AR1912

TASMANIA

# REPORT

OF THE

# SECRETARY FOR MINES

FOR

YEAR ENDING DECEMBER 31

## 1912

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

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# REPORT OF THE SECRETARY FOR MINES.

Mines Department,
Hobart, 1st March, 1913.

SIR,

I HAVE the honour to submit my report upon the Mines Department and the Mining Industry for the year ending 31st December, 1912.

## GENERAL REMARKS.

The aggregate value of the minerals raised during the year was £1,493,502, being an increase of £144,005 on the value of the output of the preceding year.

The value of the gold won was £29,192 more than the previous year, while the output of silver-lead ores was increased by 28,622·673 tons, and the value by £56,547.

The average price of tin was £209 17s., as compared with £193 1s. 2d. for the previous year. It started at £203 10s., and reached its highest (£231 5s.) in October.

The average price of fine silver for the year was 2s. 6·262d. per oz., as against 2s. 2·549d. last year. The highest monthly average was in December, when it reached 2s. 7·645d.

The average price of copper was £73 2s. 10·525d. per ton, as against £56 18s. 9·267d. last year.

## Assistance to Prospectors.

A sum of £1000 was placed upon the estimates for the year ending 30th June, 1912, for the purpose of establishing food depots and assisting prospectors to further develop their discoveries.

Numerous applications for assistance were lodged, and after investigation it was decided to assist the most deserving upon the £ for £ principle. The following amounts were paid away, the applicants having expended similar sums since lodging their applications:—

| | £ | s. | d. |
|---|---|---|---|
| Comet Tribute Prospecting Syndicate, No Liability | 360 | 0 | 0 |
| L. D. Edwards | 32 | 2 | 0 |
| A. D. Sligo | 34 | 7 | 10 |
| D. B. Sweeney | 75 | 0 | 0 |
| W. Radford | 34 | 2 | 0 |
| W. G. Barker | 33 | 7 | 6 |
| J. E. Littlechild | 11 | 0 | 6 |
| W. H. T. Brown | 50 | 0 | 0 |
| M. Cunningham | 11 | 17 | 6 |
| D. F. O'Halloran and others | 39 | 2 | 4 |
| Martin Healy | 50 | 0 | 0 |
| Edgar McGuiness | 44 | 6 | 9 |
| | £775 | 6 | 5 |

The Renison Bell Prospecting and Mining Company applied for assistance upon the £ for £ principle for the purpose of prospecting its property by means of diamond-drill bores. A sum of £500 was allotted, but only £168 10s. 8d. was claimed before the vote for the year lapsed. The company was using its own diamond-drill, but has now decided to let the work on contract.

Although no discoveries of any importance have as yet been reported as a result of the expenditure of the money thus provided by the Government, it is probable that

some persons who did not possess sufficient capital themselves to open up their discoveries before bringing them under the notice of the public, have been enabled to do so, with some hope of getting further outside capital to develop them.

A further sum of £1000 was provided under "The Appropriation Act" for the year ending 30th June, 1913, and the following amounts were expended on the £ for £ principle up to the 30th December:—

| | £ | s. | d. |
|---|---|---|---|
| The Comet Prospecting Syndicate ... | 285 | 12 | 4 |
| W. Radford ..... | 31 | 12 | 3 |
| W. G. Barker ..... | 10 | 10 | 0 |
| | £331 | 14 | 7 |

The Comet Prospecting Syndicate has since ceased operations owing to the funds of the syndicate having become exhausted.

## Mining Conferences.

On the 26th July last the following circular was issued by you to a number of prominent mining men inviting them to a conference to be held in Launceston on the 30th July, and a similar circular was addressed to the leading men interested in the mining industry on the West Coast to attend a conference at Zeehan on the 5th August:—

"The advancement of mining in Tasmania has been adopted as one of the chief features of the policy of the present Government, and the duty of evolving a scheme of legitimate State encouragement and practical assistance is a responsibility falling upon me, as Minister for Mines.

"To obtain the best advice from those experienced in mining, and more particularly from those engaged every day in the development and practical working of mines,

seems to be one of my first duties. I am accordingly requesting a few of the prominent mining men of the various districts to kindly give their very valuable assistance, which I am sure the Government, and the country at large, will appreciate.

"In pursuance of this I have the honour to invite you to a conference to be held on the afternoon of Tuesday, the 30th instant, at 3 o'clock, at the Mines Office, Launceston, and hope that you will be able to be present without inconvenience. If not able, may I ask you to contribute a paper or send some written suggestions or recommendations of a practical nature.

"Some special points which may be considered by the conference are mentioned below; they are:—

(1) Encouragement to Prospecting—
- (*a*) By sending out State exploration parties;
- (*b*) By co-operation with private enterprise in sending out prospecting parties;
- (*c*) By suggestions of desirable districts which are at present untried, or only partially tried; and
- (*d*) The question of special training and granting certificates of qualification to prospectors.

(2) Assistance to Mines—
- (*a*) Assistance to individual mines in new districts in cases which may have encountered special difficulties;
- (*b*) Assistance in cases of depression extending over whole districts;
- (*c*) The establishment of public batteries or concentrating plants;
- (*d*) Boring for alluvial, or diamond-drilling in connection with lodes.

"There will be many sub-items under both of the above-mentioned classifications which will suggest themselves to you.

"Hoping to receive your kind assistance and thanking you in anticipation."

Large and representative gatherings met in Launceston and Zeehan in response to the invitation, and many matters which were considered of vital importance to the industry were discussed. The most important matter brought under notice at the Zeehan Conference was the urgent necessity for providing a sum of money for systematically prospecting the country in and around Zeehan. It was pointed out that there was only one large mine working at Zeehan, and unless new lodes were discovered and worked the miners would have to leave the field in search of employment elsewhere. Most of the lodes are held by companies, and it was recognised that there might be difficulty in arranging with the owners to prospect their sections and obtain a refund of any expenditure incurred in prospecting and opening up any new discoveries made.

"The Aid to Mining Act, 1912."

The Act empowers the Minister to enter upon any Crown land or leased land and search, prospect, or mine thereon. Any gold or minerals discovered on leased land shall be deemed to belong to the Crown, but the Minister shall offer such discovery to the lessee upon such terms and conditions as he deems reasonable, or the lessee may submit an offer in writing to the Minister for the same. Should the lessee fail to come to an agreement, the Minister may let such discovery upon tribute at such royalty and upon such terms and conditions generally as he may think fit, or he may deal with the discovery or development for the mutual benefit of the Crown and the lessee.

The Act empowers the Minister to advance and expend moneys, and to employ such and so many persons as he deems proper at such remuneration as he thinks fit, to call for tenders, enter into any contracts as may be neces-

sary, and to expend a sum of £20,000 in carrying out the following works:—

(A)—*Mining Prospecting and Development Work, &c., undertaken by or under the Direction of the Department of Mines.*

| Purpose. | Amount. |
|---|---|
| To be applied by the Minister— | £ |
| 1. To provide for salaries of supervising engineers, and office charges, travelling expenses, printing and advertising, and any miscellaneous charges connected with the purposes of this Act | 2000 |
| 2. In prospecting or mining for gold or any other metal or mineral or developing mines at or near Zeehan | 4000 |
| 3. In the equipment, salaries, wages, &c., of four Government prospecting parties | 1500 |
| 4. In prospecting for gold by means of diamond-drill or otherwise, at Beaconsfield | 1000 |
| 5. In prospecting for gold or any other metal or mineral at Lefroy, Mathinna, and in the North-Eastern mining division | 2000 |
| 6. In the purchase and erection or hiring of a State battery or other plant for the examination or treatment of ores in a locality on the West Coast deemed suitable by the Minister, and the cutting, construction, and formation of races, dams, and other works deemed necessary by the Minister in connection with the same, pursuant to Part IV. of "The mining Development Act, 1912" | 6000 |
| 7. In opening up old tracks | 500 |
| 8. In cutting and constructing tracks in the Heemskirk District, and from Macquarie Harbour to Port Davey | 1400 |
| 9. In obtaining reports upon sites for conservation of water | 350 |

(B)—*Advances in Aid of Mining and Prospecting.*

| Purpose. | Amount. |
|---|---|
| 10. Advances to miners for prospecting, pursuant to "The Mining Development Act, 1912"... | £ 750 |
| 11. Assistance towards boring not exceeding one-half the total cost, pursuant to Part V. of "The Mining Development Act, 1912"..... | 500 |
| | £20,000 |

Mr. Hartwell Conder, of Strahan, was appointed State Mining Engineer, to take charge of the whole of the works on the West Coast, and Mr. Joseph H. Levings, mining engineer, was appointed his assistant.

The following is a report on the work done during the month of December, 1912:—

*General.*—A room for offices was placed at the disposal of the engineers by the Commissioner at the Courthouse, Zeehan, and this has been equipped with office furniture, and will be used as headquarters for all the work to be carried out.

*Zeehan Prospecting.*—Only one party was started here during the month. Their work has consisted in trenching across the main course of the lode in the southern portion of the Florence property. The lodes in this property were cut off or displaced by a fault to the south, the line of which bears about N. 68° W., and the object of the work is to pick up the lode south of this fault. In all, 861 feet of trenching to bedrock were completed, but so far this work has been without favourable result.

Arrangements have been made to put several parties on to the work around Zeehan with the new year.

*Prospecting Parties.*—The time was too short before the holidays to start any parties, but arrangements have been made to have parties at work early in the new year—(1) north of the Pieman at Renison Bell, (2) south of Mt. Zeehan, (3) west of Mt. Darwin, (4) towards Point Hibbs.

The country that is being opened up by a track cut from Crotty towards the Frenchman's Cap was examined, but it was decided not to send a party out here until the Franklin River was bridged. This bridge should be completed about February next.

*State Battery.*—An examination has been made of the country between Renison Bell and X River, and it has been found possible to connect up the various mining properties at these two places to a central point, where a battery can be erected. A report has been furnished on this matter dealing with the whole question of the erection of a State battery.

*Old Tracks.*—Arrangements have been made to open up an old track from Darwin to the Andrew River, and this will be done by two men, who will also prospect the route.

*Point Hibbs Track.*—A good start has been made on this track, which will open up the Point Hibbs copper country, and also serve as the commencement of the track from Macquarie Heads to Port Davey. Double Cove, distant 12 miles from Strahan, and about half-way down the southern shore of Macquarie Harbour, was taken as the base of operations, and since this work will be of a permanent nature, a small jetty has been thrown out, and a hut and store erected on the shore close to it.

Double Cove is a small inlet offering complete shelter in any weather to boats up to 8 feet draught, and capable, at a moderate cost, of being made a perfect little harbour for larger craft.

From this base an exploratory track has been carried back some 3 miles, which, with a few diversions, can be made into an efficient pack-track. This track should reach the sea in a total distance of about 5 miles, and will then be extended south along the coast. Ultimately it will be continued to Port Davey, and equipped with telephone line by the Federal authorities.

## "The Mining Development Act, 1912."

This Act was passed during the last session of Parliament, and received the Royal Assent on the 17th December, 1912. It empowers the Minister for Mines to grant to any person or company a sum of money not exceeding £1000 as an advance by way of a loan for the purpose of developing a mine, procuring, erecting, and connecting machinery, plant, or appliances for such purpose, and for providing other works and things which, in the opinion of the Minister, may be necessary for such purpose.

For every pound advanced, the borrower must expend out of his own capital a like sum of £1. Interest at the rate of 5 per cent. is charged on the amount advanced by the Government. The borrower is required to execute a first mortgage of the whole of the mine to secure the repayment of the advance and interest and the due performance of the agreement and the provisions of the Act.

All moneys advanced must be repaid before any money or property of the borrower can be paid or divided by way of dividend or otherwise amongst, or be received or retained by, any member or members of the company.

Provision is also made for advances up to £200 being made to miners for prosecuting purposes upon the £ for £ principle.

The Minister is also empowered to enter into an agreement with any miner's association or other body of persons, or with any person, to pay a proportionate cost, not exceeding one-half, of any boring operations for gold or minerals.

Further provision is made for constructing dams, waterraces, &c., for the more economical development of any mining district, also for purchasing any boring plant and accessories.

No applications for assistance under the provisions of the Act had been made prior to the close of the period under review, but a number of applications have since been received, and are being dealt with.

## The North Lyell Disaster.

The terrible mining disaster which occurred at the Mt. Lyell Mining and Railway Company's mine at North Lyell on the morning of Saturday, the 12th October last, is unprecedented in the history of Australia.

A fire broke out in the pump-chamber at the 700-feet level, and nearly 100 men were imprisoned and cut off from assistance from their fellow workers. The pump-house was built of pine, and was completely destroyed, The dense volumes of smoke coming up the main shaft not only made escape impossible, but also prevented rescue parties from going below, and for many hours the anxious relatives and friends of the entombed miners were kept in dreadful suspense as to their fate. Rescue parties from Melbourne, Hobart, and Launceston were upon the scene as soon as possible, and with the help of smoke-helmets were able to reach the survivors at the 1000-feet level and bring them to the surface after being entombed for four days.

After the survivors were rescued it was ascertained that 42 were still missing. These were employed in the levels above the 700-feet level, and succumbed to the deadly fumes arising from the burning timbers.

No one can imagine the anguish the poor fellows suffered when they knew there was no hope of escape, and that death was inevitable. They met their fate like true Britons, some spending their last moments in writing messages on scraps of paper to the loved ones they parted with for the last time that fateful morning.

There were many willing to risk their lives in endeavouring to reach those below, and foremost amongst such was Mr. Albert Gadd, whose acts of bravery are unequalled in the history of Tasmanian mining. He descended the shaft many times to rescue the 50 survivors, regardless of the consequences to himself. His health suffered from the effects of the deadly mon-oxide gas, and he died in St. Margaret's Private Hospital on the 19th February.

Full particulars of the disaster will be found in the report of the Chief Inspector of Mines.

In order to guard as much as possible against the occurrence of accidents of a similar character in future, I caused the following circular to be published in the principal newspapers, and also posted copies of same to all the leading mineowners:—

"Mineowners are requested to see that adequate precautions against fire are taken both underground and at surface, and that proper provision is made for the suppression of any outbreak of fire in or at their mine.

"In the event of an outbreak of fire underground, the mining manager should immediately cause all men to be effectively warned and brought to the surface without delay.

"Mineowners are especially requested to provide sufficient means of escape for men working underground, so that in the event of the usual exit being rendered useless by fire, gas, ingress of water, falls of ground, or any other unforeseen occurrence, no difficulty may be experienced in reaching the surface.

"Mining managers should see to it that necessary connections between levels and between the uppermost level and the surfaces are constructed, and that all passes or rises intended for rescue purposes or as means of egress are fitted with ladders and are maintained in a state of efficiency as auxiliary travelling ways and exits from the mine.

"All persons employed underground should be properly informed in respect of the auxiliary exits, and it is recommended to paint the word 'Escape' conspicuously in white letters at all entrances to rises and passes used or intended to be used as exits.

"The mining manager should always inscribe in his mine record-book the occurrence of any outbreak of fire, whether underground or at surface, and also notify same to the inspector of mines for the district.

"Moved by a desire to avoid loss of life, the Mines Department asks mineowners not to content themselves with confining their measures merely to the limits of statutory requirements, but to bestow on this matter their most serious and anxious attention, and not to fail to make such provisions in their mine as may be naturally considered advisable or desirable in the interests of human safety.

"Mineowners are requested to bring this circular under the notice of their mining managers, and to give the necessary instructions for giving effect to its contents."

## Appendices.

Appended will be found the following reports:—

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

Report of the Government Geologist.

Report of the Assistant Government Geologist.

Report of the Chief Inspector of Mines.

Reports of the Inspectors of Mines.

## Gold Mining.

The following return shows the quantity and value of fine gold won during the year, being an increase of 6872·379 oz., valued at £29,192, as compared with the previous year:—

| | Quartz. | Alluvial. | Cyanide. | Blister Copper | Silver-lead Bullion | Totals. |
|---|---|---|---|---|---|---|
| | ozs. | ozs. | ozs. | ozs. | ozs. | ozs. |
| Beaconsfield | 11,122·00 | ... | 9933 | ... | ... | 21,055 |
| Mathinna ... | 73·9 | ... | 262·35 | ... | ... | 336·25 |
| Mt. Victoria, Warrentinna, Mt. Cameron | 31· | 255·11 | ... | ... | ... | 286·11 |
| Lefroy ..... | 18·95 | 18· | ... | ... | ... | 36·95 |
| Lisle, Golconda, Lilydale | ... | 188·8 | ... | ... | ... | 188·8 |
| West Coast... | ... | 100·15 | ... | 7351 | 8673 | 16,124·15 |
| Totals... | 11,245·85 | 562·06 | 1019·35 | 7351 | 8673 | 38,027·26 |

Value, £161,300, equal to 37,973·252 oz. fine gold.

*Beaconsfield.*—The Tasmania Gold Mine Limited obtained 21,055 oz., valued at £90,642 4s. 6d., from 53,083 tons of quartz; the average number of men employed being 443. The following is an account of the work done during the year:—

Pit work completed for western unit at 1500-feet level.—A crosscut was driven west from Grubb's crosscut, just beyond the floodgate, to a point vertically beneath Hart's shaft, the object being to rise to the bottom of the latter shaft, which is now down to 1400 feet, or 30 feet below its deeping working plat. This shaft will pass through the lode between the 1400 and 1500 feet levels, and the plat at at the lastnamed will be on the south side of the shaft. Already the crosscut has passed through the lode, and is now nearly under Hart's shaft.

Development on the lode at the 1500-feet level was for the greater part of the year on the east side of Grubb's crosscut. Driving west could not be commenced with safety until the permanent pit-work at Grubb's shaft was completed.

The drive going west on the lode now shows a fine face of payable stone. Altogether the prospects at this level are better than those obtained at the 1370-feet level.

The scheme for the future development and deepening of the mine has been carefully thought out. The superintendent's proposal is to sink an underlay shaft between the 1500-feet in footwall country going down in one of the dry strata beds, 260 feet, cutting a chamber and installing electrically-driven pumps, which would be protected by a floodgate. The lode would then be driven on to cut the main body of water which these pumps would lift. The sinking-lifts in the first instance would be worked by wire-rope transmission from the main pumps. As the country is drained the sinking of both Grubb's and Hart's shafts will be continued simultaneously, together with the driving of 1625-feet level, in practically dry ground. Eventually the main pumping plant will be extended to

that level, and the sinking of the underlie will be resumed in the dry footwall country, and so on from level to level until 2250 feet is reached. The permanent pumping-plant now in use is designed to cope with the water down to 2000 feet.

Under this scheme the driving of the deeper levels, and the sinking of the main shafts will be accomplished expeditiously and economically.

The total quantity of gold won by the company is 808,255 oz., from 982,587 tons of quartz. The total amount paid in dividends up to 1905 was £772,671 15s., since which date no dividend has been paid.

The company's North Tasmania Mine has been worked by a tribute party.

A prospecting shaft has been sunk (100 feet) on a section just south of Hart's shaft and driving north and south carried out, but nothing payable has been discovered.

Coronation Gold Mine.—The shaft has been sunk 260 feet, and crosscutting, both north and south, for a considerable distance, but without discovering anything payable.

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

| | oz. |
|---|---|
| Creek Cyanide ... ... ... ... ... | 12·75 |
| Gray ... ... ... ... ... ... ... | 6·20 |
| Others ... ... ... ... ... ... ... | 18·00 |
| Total ... ... ... ... ... | 36·95 |

The Lefroy Prospecting Association did a good deal of work in endeavouring to trace a continuance of the old Land o'Cakes lode to the west, but failed to discover anything payable.

The Little Jack Prospecting Association, under the supervision of Mr. George Barker, did some prospecting near the Nugget Claim, a little to the north-east of the

Post-office. A tunnel was driven 180 feet south in soft slate, and passed into an alluvial deposit of sub-angular quartz and drift. This is one of several gutters forming the inception of the Lefroy deep lead. Mr. Barker claims to have obtained prospects equal to 6 dwt. to the ton from the alluvial. No specimens were found showing gold. A shaft was sunk 35 feet in the soft slate at another place, and some driving done, but no lode was discovered. Both tunnel and shaft were too low to bottom the gutter.

King Prospecting Association.—Prospected for alluvial in the flat north of the town on the line of the star lode. A shaft sunk 60 feet followed the lode into the alluvial gutter 40 feet wide. The lode is faulted and heaved 45 feet to the north at this gutter. A winze was sunk 40 feet, and the gutter bottomed, but no payable gold was discovered in either lode or alluvial. The same association did some prospecting east of the Volunteer group, but did not discover anything payable.

The New Pinafore Company prospected the Coronation section, situate south by west from the town. A number of prospecting shafts varying in depth from 15 to 30 feet were sunk in the alluvial and in the bedrock sufficiently deep to crosscut and search for lodes.

*Back Creek.*—The Back Creek Alluvial and Quartz Syndicate, with a capital of £295, opened on alluvial, and won 13 oz. 12 dwt. of gold.

*Lisle and Golconda.*—The only mine at present working is the Golden Pyramid Gold Mining Company. A north and south lode was discovered about six months ago, which gave from 6 to 13 dwt. of gold per ton, and a few ounces of silver. The lode was followed north for a short distance, when a slip was met with which cut the lode off. The country is very much disturbed and broken, granite and sandstone alternating. Many years ago a block of quartz was discovered which is said to have yielded 12 oz. of gold to the ton, and the company is endeavouring to discover the reef from which it was shed.

Lebrina Gold Mining Company.—This mine has passed into the hands of new owners, and is now called the New Lebrina Gold Mining Company. Operations commenced in June. A shaft 10 feet by 4 feet (three compartments) was sunk by windlass to water-level, 40 feet. The plant of the old Wyengatta Mine (winding engine, stationary boiler, poppet-head, &c.) was purchased and erected. A 10-head battery (old plant from the Tasmania Mine) is being erected. The prospects for this company of success are fairly encouraging. The mine is situate about 1½ mile north from the Wyena railway-station. The distance from the Lebrina station is nearly 3 miles, in a north-easterly direction.

*Warrentinna*—New Golden Mara Gold Mining Company.—After prospecting and exploring the old East Volunteer and Baily Lease workings, and having obtained excellent results from bulk parcels of ore sent to the Mt. Lyell Company and to Cockle Creek (N.S.W.), work was suspended in February to enable the company to refloat and obtain further capital. Work was not resumed until the end of October. At the close of the year a new main shaft, 11 feet by 4 feet in the clear (three compartments) was sunk by windlass to a depth of 50 feet. This shaft is being sunk in the position indicated by the company's consulting engineer, Mr. Cundy, and will command five lodes.

The company is now engaged in the erection of poppet-heads. A steam winding and pumping plant has been purchased. The main shaft is to be sunk to a depth of 330 feet; crosscutting both east and west at the 200 feet and at the bottom levels will then be undertaken.

*Mathinna*.—The New Golden Gate Company during the first quarter treated 130 tons of sand, and obtained 144 oz. of gold. The total quantity of quartz obtained from the mine is 279,873 tons, which yielded 234,410·65 oz. of gold. The total amount paid in dividends was £355,200.

The company has now been wound up and the whole of the plant disposed of. The sections were purchased

by a small syndicate, of whom Mr. Edward Moses is the principal. The syndicate is now working in the old 200-feet and 300-feet levels and stopes, taking out patches and blocks of stone left from the early workings, and are very well pleased with the results obtained. Mr. Moses intends testing the country south of the "slide" at these shallow levels. At the lower levels the southward continuation of the lodes was cut off by this slide. Some very rich bunches and short makes of stone were found at places along the track of the slide, and for a little way into the south country-rock.

*Gladstone.*—O'Halloran, Fleming, and Shields did a lot of prospecting on the old Royal Tasman line of lodes from an old tunnel. An off-set driven 50 feet reached the main lode face at the northern extremity of the old workings. The width of the lode at this point is nearly 5 feet, values said to be 6 dwt. A crosscut (30 feet) was driven to the north-east from the end of the old tunnel, but no lode was discovered. Some surface prospecting was done, and the lode was traced some distance south of the old shaft, and good prospects of gold were obtained. Work ceased in July, since which time nothing has been done.

*Alluvial and Gold-dredging Companies.*

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

| | oz. |
|---|---|
| South Mt. Cameron Tin Mining Company... | 34·9 |
| Briseis Tin and General Mining Company ... | 36·56 |
| South Mt. Cameron Dredge ... ... ... ... ... | 1·5 |
| Total ... ... ... ... ... ... ... ... ... ... | 72·96 |

West Coast.

Fossicking for alluvial gold continues in various localities. The principal is confined to Jackson's Creek, at the Linda, where rough coarse gold is present, and a local syndicate, known as McDowall's, has done much service-

able work by way of tunnelling and surface prospecting in order to locate its base or gutter.

### Silver-lead Mining.

The quantity of silver-lead ore produced was 90,123·868 tons, valued at £309,098, being an increase in quantity of 28,622·673 tons, and an increase in value of £55,737.

The principal producers were:—

| | Tons. | Value. |
|---|---|---|
| | | £ |
| *Zeehan Mines.* | | |
| Zeehan-Montana | 1433·50 | 29,505 |
| Zeehan-Western | 383·48 | 7349 |
| Zeehan-Queen | 2028 | 2194 |
| Mt. Zeehan (Tas.) | 2449 | 6330 |
| Oonah | 3892 | 2292 |
| South Comstock, Block 10 | 457·75 | 1672 |
| Balstrup's | 11·087 | 198 |
| Silver Queen Extended | 238·422 | 1364 |
| Lease 903M | 23 | 502 |
| Barnett's | 5·76 | 82 |
| Austral Valley | 474·471 | 501 |
| Quigley's, 3835 | 8·321 | 183 |
| Section 901 | 24·76 | 348 |
| *Dundas Mines.* | | |
| Adelaide | 1099·5 | 7485 |
| Hercules | 30,887·0375 | 95,526 |
| Zeehan-Dundas | 227 | 5647 |
| Ring Valley | 367·86 | 5317 |
| Comet | 19,710·4 | 15,597 |
| Bon Accord | 123·58 | 1535 |
| *Rosebery Mines.* | | |
| Tasmanian Copper | 100 | 525 |
| Primrose | 7965·22 | 40,141 |
| *Mt. Farrell Mines.* | | |
| North Mt. Farrell | 2167·3 | 24,662 |
| Murchison | 5·26 | 63 |
| Sterling Valley | 20·5 | 194 |
| *North Pieman Mines.* | | |
| Chester Mine | 10,875·36 | 4269 |
| *Mt. Lyell Mines.* | | |
| Tasman and Crown Lyell Extended | 118 | 700 |

*Zeehan District.*—Zeehan-Montana Mine Limited.—No. 1 Shaft.—For the purpose of economising, the whole of

the surface equipment has undergone a system of centralisation, consequently the whole of the exploratory work and developmental work during the year has been carried out from the company's No. 1 shaft, and notwithstanding the fact that the ends of the principal workings are at long distances from this shaft, the centralisation of the surface works has been the means of considerable reduction in the standing charges incidental to the mine costs.

Mining Operations.—Mining operations have been conducted on Nos. 2, 2A, and 4 lodes, at Nos. 2, 3, 4, 5, and 6 levels. At the commencement of the year practically the whole of the stoping reserves were situated north of the shaft, the major portions being well toward the middle portion of the late Tasmanian Silver Crown Mine, part of the company's property. The main drives had, previous to the commencement of the year, for a very long period been driven along the line of unproductive lodes, the major portions showing a trace only of galena, and the first half of the year was taken up in continuing these drives and further testing the lodes by rises and stoping over the main levels, and in this way, to some extent, recouped the company for a time for the heavy cost of extending the long and unremunerative drives; for after stoping the lodes for considerable distances both along and above the main level several bunches of galena ore have been met with, and in at least one instance a very considerable shoot of pure galena has been developed between Nos. 4 and 3 levels. This and other bunches discovered in a similar manner—*i.e.*, by stoping—have been the source from which the major portion of the output during the year has been drawn. During the latter half of the year the exploratory work was concentrated south of the shaft, and more especially along the strike of the south-east, or "middle," slide. This work was first conducted on No. 5 level, starting from a point where the slide had dislocated No. 8 lode. The ground south of the slide was explored by driving in a south-easterly direction (the direction of the strike of the slide) for a distance of about 260 feet.

At this point the drive intersected what is evidently the southern continuation of Nos. 2 and 4 lodes, the latter showing ore. The company has since driven along the course of No. 4 lode for a distance of 100 feet, and for this distance the lode may be considered payable.

Following the above discovery drives were put out at Nos. 4 and 6 levels, cutting the lode at each level. At No. 6 level the lode is showing a little ore, but is not, so far as driven on, quite payable. At the No. 4 level the lode has been driven on for a distance of 100 feet, the whole distance proving highly payable.

The discovery of this new shoot of ore in what may be considered practically virgin ground is of considerable importance, and has given encouragement to push on with further exploratory work along this slide to test the existence or otherwise of No. 1 lode, the position of which is 180 feet further east. A drive is now being put out along the slide at No. 5 level towards the No. 1 lode.

Tributers.—Notwithstanding the fact that the company has offered every inducement possible to persons desirous of undertaking this work, there have been no enquiries, and consequently practically nothing has been done in this direction.

Work carried out during year :—

| | | |
|---|---|---|
| Main drives..... | 1785 feet | |
| Main crosscuts... | 520 „ | |
| Main rises..... | 853 „ | |
| Stoped ..... | ... | 254,010 cubic feet |
| Total | 3158 feet | 254.010 cubic feet |

| Output :— | Tons. | Value. £ s. d. |
|---|---|---|
| Hand-picked 1st class ore ..... | 624·47 | — |
| Lode stuff raised (or 2nd class ore), 8936 tons, producing concentrates..... | 808·97 | — |
| Total galena-ore ..... | 1433·44 | £23,728 8 2 |
| Silver-bearing gossan and flux ... | 398·88 | 304 10 6 |
| Total for Year ..... | 1832·32 | £24,032 18 8 |

The mine has been in constant operation for 20 years. The following represents a record of the work carried out, and the expenditure in connection with Nos. 1 and 2 shafts; the latter being in operation for eight years, but is now closed down:—

| No. 1 Shaft - | Feet. | |
|---|---|---|
| Sunk to ..... | 835·5 | |
| Winzes ..... | 2386·0 | |
| Rises ..... | 9095·0 | |
| Crosscuts ..... | 18,270·0 | |
| Drives. ..... | 38,597·0 | |
| Stopes..... | 229,192·0 | or 6,875,760 cubic feet |
| Total (No. 1)... | 298,375·5 | |

| No. 2 Shaft— | Feet. | |
|---|---|---|
| Sunk ..... ..... | 520 | |
| Winzes ..... | — | |
| Rises ... ..... | 1679 | |
| Crosscuts ..... | 3392 | |
| Drives ..... . ... | 4604 | |
| Stopes ..... | 43,360 | = 1,300,800 cubic feet |
| Total (No. 2)... | 53,555 | — |
| Stoped ..... | ... | 6,875,760 cubic feet |
| Totals..... | 351,930·5 | 8,176,560 cubic feet |

Ore raised:—

| | Tons. | Tons. | | Lead. °/o | Silver. Ozs. |
|---|---|---|---|---|---|
| No. 1 shaft— | | | | | |
| Lode stuff raised | ... | 228,381 | assaying | 8·6 | 10·9 |
| Prill Ore..... | 37,844·2 | ... | „ | 61·9 | 84·4 |
| Concentrates.... | 35,779·3 | ... | „ | 66·8 | 78·2 |
| No. 2 shaft— | | | | | |
| Lode stuff raised | ... | 28,476 | „ | 10·0 | 8·4 |
| Prill ore..... | 2046·7 | ... | „ | 60·4 | 48·0 |
| Concentrates..... | 1845·6 | ... | „ | 66·1 | 54·0 |
| | 77,515·8 | 256,857 | | | |

Total cost :—

No. 1. Shaft—

| | £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| Wages and Contracts | ... | | | 370,568 | 2 | 11 |
| Stores ..... | | | | 159,557 | 1 | 4 |
| Total cost No. 1 shaft..... | | | | £530,125 | 4 | 3 |

No. 2 shaft—

| | | | | | | |
|---|---|---|---|---|---|---|
| Wages and Contracts | 35,163 | 7 | 1 | | | |
| Stores ..... . | 16,700 | 17 | 4 | | | |
| | | | | 51,864 | 4 | 5 |
| Total cost ..... ..... | | | | £581,989 | 8 | 8 |

Zeehan-Western Limited.—No. 1 Shaft.—The company's operations at this shaft have been confined to the developing and stoping of No. 3 branch off No. 1 lode. These workings are now exhausted.

No 3 Tunnel.—This tunnel is being driven westerly under the hill which stands west of No. 1 shaft. There are two known lodes traversing this hill, as proved by the deeper levels of No. 1 shaft. This tunnel is for the purpose of testing their value at a shallower level, and has been driven a total distance of 288 feet. The line of what is known as No. 5 lode is expected to be reached in 130 feet further driving.

South Boundary Shaft.—This is situated near the south boundary of the company's property, and has been sunk to a depth of 200 feet. There are three lodes in the vicinity of this shaft. No. 1 lode is the principal one. The main working shaft has been sunk on this lode. Nos. 2 and 3 lodes stand to the east of No. 1 lode, and are 120 and 170 feet distant from No. 1 lode respectively.

No. 1 Lode.—As mentioned above, this has proved the principal lode in this part of the property, the ore-shoot being about 150 feet long, and in depth, starting from a few feet below the surface to an average of 20 feet below the No. 1 or 100-feet level. At a point about 130 feet

below the surface a slide was met with. This faulted the lode to the east a distance of about 25 feet. This lode has been driven on at No. 2 level for a length of 250 feet, and the full length has been stoped out to the slide, but the lode proved unpayable below the slide, and, so far as exploratory work at the 200-feet level has proven, neither of the three lodes are payable below No. 1 level.

Nos. 2 and 3 Lodes.—These lodes are exceedingly small. The average width does not exceed 3 inches. including many entirely blank places found in stoping, so that, of themselves, they cannot be considered payable. The excellent returns of ore raised from No. 1 lode have been sufficient to pay the cost of its own mining, and also the cost of pumping, winding, and other standing charges connected with the mine. Thus the company has been able to explore and stope these small veins, leaving no lode material (good and poor being mixed) behind, which, in addition to working the mine fairly profitably, has provided employment for a considerable number of men.

Tributers.—During the year every encouragement has been given to tributers, but with the exception of the men who have been tributing previous to the commencement of the present year there have been no enquiries. An average of four parties has been employed during the year, all of whom have made very fair wages.

Summary of Underground Work.—The following represents the underground work carried out during the year:—

| | Feet. | |
|---|---|---|
| Winzes..... | 107 | |
| Rises..... | 365 | |
| Drives ..... .. | 869 | |
| Crosscuts ..... | 390 | |
| Stopes..... | ... | 109,380 cubic feet |
| | 1731 | 109,380 cubic feet |

Summary of Output for Year.—The following represents the ore raised during the year, and its value (including ore raised by tributers):—

| | Tons. | Value. £ s. d. |
|---|---|---|
| Galena ore ... ..... | 503·91 | 8702 6 1 |
| Gossan ore ..... | 678·06 | 248 14 10 |
| Carbonates..... ... | 20·01 | 10 13 5 |
| | | £8961 14 4 |

Average number of men employed, 32.

Zeehan Queen Limited.—The work done on this mine during the year was confined solely to the operations of tributers. Very little legitimate prospecting was done, and payable results were obtained by one or two parties only. A quantity of iron pyrites was sold for its sulphur values, the average assay of which was about 40 per cent.

The men employed averaged about 10; the output was:—

| | Net Weight. Tons. | cwt. | qr. | lb. | Value. £ | s. | d. |
|---|---|---|---|---|---|---|---|
| Ore ..... | 104 | 5 | 3 | 15 | 623 | 2 | 5 |
| Flux ..... | 805 | 8 | 2 | 18 | 142 | 15 | 1 |
| Pyrites ... | 1216 | 9 | 2 | 12 | 430 | 2 | 3 |
| Total... | 2126 | 4 | 0 | 17 | £1195 | 19 | 9 |

The Mount Zeehan (Tasmania) Silver-lead Mines Limited.—The work done on this company's property has been mainly confined to the operations of tributers. Their work has been done on small, known surface shoots of ore. Little prospecting has been done. Results have been only payable.

Trenching by the company on Section No. 1065-M disclosed a small vein of galena. To further test the find an adit was commenced which, at the close of the year had been driven a distance of 112 feet. It has since been extended to 118 feet 6 inches, at which point the footwall of the lode was reached, showing it to be 4 feet in width of hard quartzite, carrying a little galena in patches. Insufficient work has been done to warrant an opinion as to its value, but it looks promising.

The mill has run on second-class ore from Zeehan-Dundas Mines Limited, and from other sources when available.

The average number of men employed during the period was 16.

The output of ore was:—

| | Net Weight. | | | | Value | | |
|---|---|---|---|---|---|---|---|
| | tons. | cwt. | qr. | lb. | £ | s. | d. |
| Ore ..... | 274 | 11 | 3 | 17 | 2973 | 2 | 10 |
| Flux ..... | 511 | 11 | 2 | 9 | 141 | 3 | 9 |
| Tailings... | 2716 | 14 | 0 | 7 | 814 | 19 | 11 |
| Total ... | 3502 | 17 | 2 | 5 | £3929 | 6 | 6 |

*Lyell District.*—At the Tasman Crown Extended Mine work of an exploratory and experimental character, both in the mine and mill, has been carried out. At present the company is being reconstructed for the purpose of providing capital for further alterations and additions, when it is stated payable returns will be obtained from the sulphide ore, which contains appreciable quantities of zinc, lead, and silver.

*Dundas District.*—The Mount Zeehan (Tasmania) Silver-lead Mines, Limited (Copper Nickel Mine).—The property, charted in the names of W. Wallace, T. H. Vincent, J. and G. Wallace, has been worked under option of purchase by this company.

On Section No. 4495M a prospecting shaft was sunk 70 feet and the lode struck, but owing to a burst of water which was too heavy for the temporary plant installed to deal with, the width could not be ascertained, but apparently the ore is equal to what was seen at the surface.

Meanwhile a trial lot of 150 tons of ore was broken from the surface, and from where the lode was passed through in the prospecting shaft, and shipped to Europe.

It was decided to suspend mining operations pending results of this trial shipment. Surface prospecting was carried on in the interim, and a large ore-body of equal grade was found on Section No. 4496-M.

The results of the trial shipment were so satisfactory that the company has decided to exercise its option of purchase, and continue the development of the property.

The obstacle to the development of mining in this district, as experienced with this mine and also Zeehan-Dundas Mines Limited, is the large volume of water which has to be contended with at a moderate depth, a great deal of which is surface water.

The Comet Tribute Prospecting Syndicate.—Nineteen thousand seven hundred and nineteen tons of metal-bearing flux were mined and delivered to the Tasmanian Smelting Company, valued at £8328 11s. 7d.

The flux was mined all above water-level, about 50 per cent. being broken in the open-cut, and the balance was won underground and taken out on the square set system of timbering. The average width of the lode worked during the year was about 40 feet, and it is proved for 900 feet in length. No enrichments were met during the year. The flux was of a very even grade, averaging a little over 4 per cent. of lead and 1 oz. of silver to the ton.

Adelaide Mine.—This mine is also being worked by the Comet Tribute Prospecting Syndicate. During the year 3720 tons of ore were won producing:—

| | £ | s. | d. |
|---|---|---|---|
| 459 tons 9 cwt. clean ore, realising... | 4692 | 7 | 10 |
| 204 tons 6 cwt. gossan flux, realising . | 93 | 12 | 0 |
| | £4785 | 19 | 10 |

Outside the work in raising ore a fair amount of prospecting work was also done. Two crosscuts were put out from the 270-feet level—one east, to tap the Anderson lode; and one west, to tap the large gossan formation showing on the surface. The ground passed through in these crosscuts was very hard. Owing to the hard nature of the ground progress was very slow, and the ore cutting out in the lode that was being worked the finances became so strained that the syndicate had unfortunately to cease operations before either crosscut had reached the point aimed at. A third crosscut was driven east from the surface level to cut the lode in the Adelaide ground, and better success was met here, as the lode on being cut proved to be 10 feet wide of metal-bearing flux, carrying 6 per cent. lead and 1½ oz. of silver to the ton. There is 100 feet of ground over the present crosscut, and by driving south on the lode 250 feet in height will be obtained.

Zeehan-Dundas Mines Limited.—At the commencement of the year additional pumping machinery was being installed in order that development at deeper levels might be proceeded with.

The main shaft was sunk to 103 feet below No. 1 level, or 185 feet from the surface, but owing to the quantity

of water that had to be dealt with the company was compelled to withdraw from the level 100 feet below No. 1 level and open out at 85 feet, or 170 feet below the surface.

A crosscut west has been driven 200 feet with the object of intersecting No. 5 lode, which is expected at 280 feet.

No. 2 lode was cut in the crosscut and driven on 220 feet without meeting with anything of value.

In No. 1 level south, on No. 5 lode, 137 feet 6 inches were driven, and a payable ore-body developed, which is now being stoped.

An average of 40 men were employed during the year.

The average volume of water pumped during the year was 1,000,000 gallons daily.

The output was 84 tons 5 cwt. first-class ore and 944 tons seconds. The latter was treated at the Mt. Zeehan Company's mill, and produced, together with the first-class ore, a total of 256 tons 7 cwt. 3 qr. 6 lb. net of marketable ore, worth £5031 9s. 9d.

The Ring Valley Mine.—The ore raised comprised antimonial and lead sulphides and fahl-ore. The average number of men employed was 16.

Developments to date have not disclosed anything of importance above the 130-feet level, but the underhand stopes below this level have disclosed three distinct zones of different ores. The first comprises antimonial lead ore, the second fahl-ore, and the third yellow copper pyrites.

These separate lenses of ore are nearly equal in length, roughly, 50 feet each.

*Mt. Read District.*—The following is a report of the work done by the Hercules Gold and Silver Mining Company:—

*Ore Broken and Sold.*

| Ore. | Tonnage | Gross Value. | Net Value. | Gross Value. per ton. | Net Value. per ton. | Metal Contents. | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Gold. | Silver. | Lead. | Zinc. |
| | | £ | £ | s. d. | s. d. | oz. | oz. | tons. | tons. |
| Silver-lead Sulphide ..... | 28,821 | 92,474 | 22,754 | 64 2 | 15 9½ | 4637 | 31,665 | 2186 | 8011 |
| Zinc Blende..... ..... | 2043 | 15,430 | 4073 | 151 0½ | 39 8·9 | 226 | 16,957 | 129 | 778 |
| Total ..... | 30,864 | 107,904 | 26,827 | * 69 11 | *17 4·6 | 4863 | 48,622 | 2315 | 8789 |

* These figures represent the gross and net values actually received, excluding the zinc.

Average number of men employed, 116.

*Underground.*—The main works carried on were in Nos. 3A, 3, and 4 levels, and consisted of:—

| | Feet. | Inches. |
|---|---|---|
| Drives..... ..... | 497 | 6 |
| Crosscuts..... | 291 | 6 |
| Rises and Winzes ..... | 213 | 0 |
| Total..... | 1039 | 0 |

Ore-production.—The output has been obtained from the block of ground between Nos. 3A and 4 levels, from A, B, E, and F ore-bodies, of which the E body was the chief producer. The stopes which have been opened up now show the following measurements:—

| Level. | Ore Body. | Stope. | Length. | Average Breadth. | Height. | Cubic Measurement. |
|---|---|---|---|---|---|---|
| | | | feet. | feet. | ft. in. | feet. |
| 3A | E | Main | 40 | 12 | 7 6 | 3600 |
| 3A | E | 1st | 25 | 8 | 7 6 | 1500 |
| 3 | B | Main | 62 | 21·5 | 7 6 | 9998 |
| 3 | B | 1st | 47 | 23 | 7 6 | 8108 |
| 3 | B | 2nd | 14 | 14 | 7 6 | 147 |
| 3 | E | Main | 129 | 47 | 7 6 | 45,468 |
| 3 | E | 1st | 52 | 57·5 | 7 6 | 41,926 |
| 3 | E | 2nd | 44 | 35 | 7 6 | 11,550 |
| 4 | A | 1st | 12 | 12 | 7 6 | 1080 |
| 4 | A | 2nd | 21 | 14 | 7 6 | 2205 |
| 4 | A | 3rd | 30 | 16 | 7 6 | 3598 |
| 4 | B | 1st | 140 | 28 | 7 6 | 29,398 |
| 4 | B | 2nd | 135 | 23·5 | 7 6 | 23,789 |
| 4 | B | 3rd | 119 | 34 | 7 6 | 30,344 |
| 4 | B | 4th | 109 | 24 | 7 6 | 19,620 |
| 4 | B | 5th | 70 | 24·5 | 7 6 | 12,862 |
| 4 | E | Main | 275 | 54 | 7 6 | 111,366 |
| 4 | E | 1st | 225 | 63 | 7 6 | 106,312 |
| 4 | E | 2nd | 222 | 51 | 7 6 | 84,914 |
| 4 | E | 3rd | 214 | 44 | 7 6 | 71,280 |
| 4 | E | 4th | 202 | 34 | 7 6 | 51,510 |
| 4 | E | 5th | 171 | 31 | 7 6 | 39,825 |
| 4 | E | 6th | 160 | 26 | 7 6 | 31,200 |
| 4 | F | 3rd | 59 | 22 | 7 6 | 9735 |
| 4 | F | 4th | 59 | 15 | 7 6 | 6308 |

Development Work.—This work has not been gone on with as much as was desirable, chiefly owing to the difficulty in obtaining competent miners. In the 3A level, the B lode was cut in the western continuation of the crosscut; also in No. 3 level a considerable body of low-grade ore was met with at the north end of the north mullock drive, No. 3 level thus proving the northerly continuation of the E ore-body.

An additional rise has been put through to the surface, thus making it possible to obtain larger amounts of filling for the stopes. The 3A west crosscut has also been extended to the surface, and filling from the open-cut can now be trucked and tipped direct into the southern end of the E stopes.

Surface.—All mine buildings, offices, quarters, and manager's house have been kept in good repair, and a new change-house fitted up for the employees. The haulage tramway has been in constant operation, and the whole plant has worked smoothly. During the year new brake-blocks were fitted to the haulage-controlling gear. The crushing, sorting, and classifying mill at Williamsford was only worked till June last, and has since been discontinued owing to the small tonnage of high-grade zinc ore available.

General.—For the 12 months, all the various works have been carried out successfully.

Early in the year (at the end of February) a fairly large fall occurred in the hangingwall portion of the E ore-body, a mass of schist and sulphide ore of several thousand tons weight coming away from a natural cleavage in the ore-body indicated by a pug seam. This caused the temporary loss of all the northern hangingwall workings in the E lode. The fallen and crushed ground has since been recovered, and this part of the workings is again in the productive list.

An average monthly output of 2500 tons of sulphide ore to the Tasmanian Smelting Company has been main-

tained, and should be easily held to until the close of the present contract.

A good deal more labour is now offering, and a more progressive policy of development and other works is being now attempted.

*Mt. Farrell District.*—The North Mt. Farrell Company.—Thirteen thousand two hundred and nineteen tons of crude ore have been mined and treated. The output of marketable silver-lead ore was 2168 tons, of a value of £24,639. There has been a serious decline in the quantity of first-class ore won, and through scarcity of labour it was not possible to augment the output of concentrates to an extent sufficient to compensate for the loss of revenue due to the reduction in the amount of "firsts" produced. However, favoured by the good market prices for silver and lead during the term, a fair profit has been made after meeting all charges, inclusive of those for developmental work.

The bulk of the mill supplies have been drawn from the No. 5 level, whilst the upper adit levels contributed a fair quantity of good-grade ore. There are still substantial tonnages of milling ore available for extraction at these levels, and with another deeper level shortly entering into the productive stage, the present state of ore reserve may be considered satisfactory.

Dearth of skilled labour has interfered considerably with the progress of developmental operations; but under adverse circumstances a fair amount of developmental work has been done. In addition to the carrying out of further exploration of known ore-bodies at the various levels, the shaft has been deepened and another level—No. 6—opened up. This level is 70 feet below No. 5 level and 130 feet below the lowest adit level. Driving north and south on the No. 3 lode (which was intersected by the crosscut, carries 3½ feet of fair-grade milling ore) has recently been commenced at this new level.

The sections north and adjoining this company's property have lately been acquired from the Mackintosh Mining Company. By this purchase a considerable extent of ground along the course of the lodes northwards has been secured, the exploration of which will be undertaken at an early date.

*North-Western Division.*—The Magnet (Victorian) Silver Mining Company expended £1194 14s. 5d. in various works at the mine, principally in putting the shaft in thorough working order, erecting an up-to-date whim, and completing new poppet heads over the north shaft. The shaft is now in good order down to a depth of 220 feet, and a great drainage tunnel over 4000 feet in length is now connected with it. Two drives from the shaft, one running north and the other north-west, each between 40 and 50 feet in length, have been driven.

The year was an exceptionally wet one, and the rush of flood-water in the last quarter damaged the main shaft and the drainage tunnel.

Six men were regularly employed.

*Northern and Southern Division.*—The Round Hill Mine produced 394·2 tons of ore, valued at £3356; an average of 10 men being employed.

The Devon Mine produced 15·1 tons of ore, valued at £332.

This mine is being worked on tribute by Messrs. Gabbedy and King. Work is confined to the creek tunnel level and stopes overhead. The lode is from 10 to 12 feet thick. About 35 tons of ore per month are sent to market. The crushing and concentrating plant is run by water-power, and the mill has been kept going full time during the rainy season of the year.

## Copper Mining.

The quantity of blister copper and copper ore produced was 6527·6 tons, valued at £440,444; being a decrease of 1780·4 tons on the previous year.

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

| | Dry Weight. Tons. | cwt. | qr. | lbs. |
|---|---|---|---|---|
| Mt. Lyell Mine ore... ... ... ... ... | 160,714 | 19 | 3 | 13 |
| North Lyell Mine ore ... ... ... ... | 85,741 | 9 | 1 | 1 |
| Purchased ore ... ... ... ... ... ... | 73 | 10 | 3 | 0 |
| Metal-bearing flux from North Lyell Mine ... ... ... ... ... ... | 147 | 10 | 1 | 5 |
| Metal-bearing flux from Lyell-Tharsis Mine ... ... ... ... ... | 12,335 | 4 | 2 | 1 |
| Total ... ... ... ... ... ... ... ... | 259,012 | 14 | 2 | 20 |

Quantity and value of metal produced:—
Blister copper, 5136 tons, containing—

| | £ | s. | d. |
|---|---|---|---|
| Copper, 5073 tons, valued at ... ... | 385,739 | 9 | 0 |
| Silver, fine, 364,022 oz., valued at... | 45,224 | 19 | 2 |
| Gold, fine, 7351 oz., valued at ... ... | 31,241 | 16 | 2 |
| Total ... ... ... ... ... ... ... ... | £462,206 | 4 | 4 |

Since the inception of the company 121,319 tons of fine copper, 10,160,756 oz. of fine silver, and 311,467 oz. fine gold have been won, and £2,766,574 has been distributed in dividends.

The company has recently acquired the Lyell Comstock Company's sections, and these have been connected by rail with the reduction works.

The Lyell Blocks Copper Company has sunk its main shaft 550 feet below the surface of the Consols adit, or 1050 feet from the surface, with the hope of intersecting ore-bodies similar to those worked in the North Lyell Mine adjoining.

The Mt. Darwin Syndicate has done a little prospecting during the year, but the field has been for some time practically deserted. It is intended to send one of the assistant geologists at an early date to inspect and report upon the field.

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

Murray's Reward, 1214 tons, value £8008.

Central Balfour Company, 6 tons, value £5.

*Heazlewood.*—The Jasper Copper Company.—Fourteen tons of ore, valued at £325, have been won during the year.

*East Coast.*

*Northern and Southern Division.*—The Mt. Mueller Prospecting Syndicate has employed six men and expended £550 in prospecting its property at Tyenna; 210 feet of driving has been done to cut the lodes at a depth.

## Tin Mining.

The quantity of tin ore raised was 3713·825 tons, valued at £543,103; an average value of £146 4s. 9·162d. per ton.

This shows a decrease of 240·225 tons on the previous year.

The statistics for the year are:—

| | Ore won. | Miners employed. | |
|---|---|---|---|
| | Tons. | Europeans. | Chinese. |
| Northern and Southern Division | 49·28 | 36 | — |
| North-Eastern Division ... ... ... | 1746·65 | 592 | 65 |
| Eastern Division ... ... ... ... ... | 335·10 | 309 | 31 |
| North-Western Division ... ... ... | 1357·26 | 547 | — |
| Western Division ... ... ... ... ... | 225·535 | 182 | — |
| Total ... ... ... ... ... ... | 3713·825 | 1666 | 96 |

*North-Eastern Division.*—The output of tin ore was 1746·65 tons, obtained as follows:—

| | | |
|---|---|---|
| ***Pioneer and Gladstone Districts.*** | | |
| Pioneer Tin Mine ... ... ... ... ... ... | 468·15 | |
| Aberroe ... ... ... ... ... ... ... ... ... ... | 16·85 | |
| South Mt. Cameron ... ... ... ... ... ... | 105·7 | |
| Garibaldi ... ... ... ... ... ... ... ... ... | 19·9 | |
| South Mt. Cameron Dredge ... ... ... | 2·75 | |
| Clifton Creek ... ... ... ... ... ... ... ... | 115·55 | |
| Yee Gee ... ... ... ... ... ... ... ... ... ... | 47·15 | |
| Other claims ... ... ... ... ... ... ... ... | 125·30 | |
| | | 901·35 |

| | Tons. | |
|---|---|---|
| ***Ringarooma District.*** | | |
| Federal | 4·10 | |
| Bell's Hill | 7·20 | |
| T. and W. Chorley | 2·45 | |
| Other claims | 18·85 | |
| | | 32·60 |
| ***Derby District.*** | | |
| Briseis Tin Mines | 538·85 | |
| Clyde | 8·40 | |
| Waverley | 10·30 | |
| Other claims | 34·80 | |
| | | 592·35 |
| ***Branxholm District.*** | | |
| Arba Tin Mine | 101·70 | |
| New Ruby Flat | 31·05 | |
| Mt. Stronach | 2 | |
| Other claims | 19·45 | |
| | | 154·20 |
| ***Moorina District.*** | | |
| Wilberforce Pump Company | 14·90 | |
| Weld Tin Mine | 27·55 | |
| Native Youth | 6·65 | |
| New Banca | 5·65 | |
| Other claims | 9·25 | |
| | | 64·00 |
| ***Straits Islands*** | ... | 2·15 |
| **Total** | ... | 1746·65 |

*Eastern Division.*—The output of tin ore was 335·10 tons, obtained as follows:—

| | | |
|---|---|---|
| ***Weldborough Mines.*** | | |
| Fancy Creek Mine | 11·75 | |
| Other claims | 86 | |
| | | 97·75 |
| ***Lottah and Blue Tier Mines.*** | | |
| Anchor Mine | 143·35 | |
| Other claims | 4 | |
| | | 147·35 |

*St. Helens Mines.*

| | Tons. | |
|---|---|---|
| J. McAuliff | 10·35 | |
| A. Williams | 1·45 | |
| J. C. Macmichael | 1·75 | |
| J. Budgeon | 2·25 | |
| J. Smith | ·05 | |
| C. Miller | 6·40 | |
| Pioneer Mine | 2·60 | |
| M. Hartnett | 1·55 | |
| Other claims | 14·10 | |
| | | 42·50 |

*Avoca Mines.*

| | | |
|---|---|---|
| Rex Hill | 3·35 | |
| Gipp's Creek | 5·05 | |
| South Esk | 13·90 | |
| New Roy's Hill | 6 | |
| Storey's Creek | 10·95 | |
| Foster's | 6·85 | |
| Desire | 1·15 | |
| | | 47·25 |
| *Schoutens* | | ·25 |
| Total | | 336·10 |

*North-western Division.*—The output of tin ore was 1357·26 tons, obtained as follows:—

| | Tons. |
|---|---|
| Mt. Bischoff | 1110 |
| Mt. Bischoff Extended | 171·35 |
| Weir's Bischoff Surprise | 13·36 |
| Wombat | 3·05 |
| Mt. Cleveland | 40·5 |
| Ringtail | 9·5 |
| Waratah Alluvial | 9·5 |
| **Total** | 1357·26 |

*Western Division.*—The output of tin ore was 225·35 tons, obtained as follows:—

| | Tons. |
|---|---|
| Boulder Mine ... ... ... ... ... ... ... ... ... | 35·75 |
| Renison Bell Mine ... ... ... ... ... ... ... ... | 95·85 |
| Montana Tin Syndicate ... ... ... ... ... ... | 29·460 |
| Other claims ... ... ... ... ... ... ... ... ... ... | 64·475 |
| Total ... ... ... ... ... ... ... ... ... | 225·535 |

*Northern and Southern Division.*—The Shepherd and Murphy Mine produced 48·58 tons of tin ore. Progress at the mine shows good results. There has been an improvement in the output of tin and wolfram, but a falling-off in bismuth as compared with 1911. Work is chiefly confined to No. 4 lode, but Nos. 2, 5, and 6 are also being worked in places. An intermediate level has been driven on No. 4 lode and the main bottom adit level.

*North-eastern Division.*—Pioneer Tin Mining Company Limited.—No. 1 electric and No. 2 steam plants working as one unit, and No. 2 electric plant also working as one unit, sluiced 728,000 cubic yards of drift, for a yield of 468·15 tons of stream tin, valued at £75,000.

The water-supply amounted to 43 inches, and with the 6-feet additional height added to the Frome Dam, has maintained an ample supply for all requirements.

During the year the first unit of an electrically-driven plant to stack tailings from the ends of the tail-races, has been installed, and will shortly be at work.

On the company's Argonaut leases, at St. Helens, an extension of the head-race has been constructed for a distance of 1¾ mile; 14 miles of race have been cleaned out and repaired; and the sluicing-plant, which is now in course of erection, should be completed and at work early in February. The average number of men employed was 70.

The Briseis Tin and General Mining Company completed the main-road deviation to admit of a channel being

opened through the point where the old road ascended the hill past the Ringarooma overburden face. This channel is now nearly completed, and will be used to divert the river from a point just above the old bridge. By this means a good length of the bed will be left dry, and the deep-lead workings on Krushka's Flat can then be carried north across the old river channel. The deviation of road and river was a big undertaking. It is estimated, however, that £100,000 worth of tin at least will be won from the flat and river bed.

Most of the output has been obtained from drifts on the southern side, but during the year the top poorer drifts on the northern side have also been worked and produced black tin up to expectations.

Drift is now being worked 80 feet below the river level. It is raised to a sluice on a bank and treated, the tailings being dumped by a belt fed by a bucket elevator.

The total ground worked was 730,100 cubic yards.
Black tin won, 535 tons.
Equivalent metallic tin, 387·98 tons.
Gold, 18·11 oz.
Approximate value, £81,668.
Black tin from Mutual Hill leases, 3·85 tons.
Equivalent metallic tin, 2·77 tons.
Approximate value, £629.
Average number of men employed, 144.

The Arba Tin Mining Company, No Liability, has been working with satisfactory results. By surrendering its right to the "tailings easement" the company obtained a mineral lease from the Crown which will enable it to work the western portion of the area, which is known to contain rich deposits of tin ore. The company has proved, by boring, the existence of about 700,000 cubic yards of tin drift, which, it is stated, will average 2 lb. of black tin to the yard. The ground is comparatively shallow, not exceeding an average of 30 feet in depth.

The Guiding Star Tin Mining Company.—This company commenced operations during the last quarter of the year.

The mine is situated to the south of Branxholm, and was formerly owned by Mr. Peter Smith. The lode, which has been traced for a considerable distance on the surface, is 5 feet in width, and has been proved by a shaft 40 feet in depth; also by Mr. Smith's open-cut, in which considerable work has been done, to contain rich tin oxide. The new company commenced by putting in a tunnel, which cut the lode at 128 feet from the entrance, and at a depth of only 48 feet from the surface, or 8 feet below the bottom of the shaft already referred to; thus, for 128 feet of tunnel-driving 8 feet greater depth of lode has been proved.

Mutual Hill Tin Mining Company.—This mine is now being worked by the Briseis Tin and General Mining Company by arrangement with the owners, to equip, and work the ground on lines similar to those on which the Briseis Company worked the New No. 1 Brothers' Home Mine. The operating company gets so much per cubic yard for removing the overburden, and a percentage of the tin won, to compensate for working, elevating, and sluicing the tin-drift. The flats at the junction of the Main Creek and the Ringarooma Rivers are now being worked.

Upper Cascade and Main Creeks.—A good number of mines and small claims are working. The Imperial Tin Mining Syndicate tested a lode on its property, but no good results were obtained. R. Davey and party appear to be doing well on the Old Clyde ground.

At Bell's Hill some alluvial is being worked.

In addition to the foregoing about 20 men are working on small claims in the neighbourhood.

Weld Tin Mining Company is obtaining good returns from the old mine. Some work has been done in the deep ground of the Old Moorina Company's Mine, north of the township of Moorina, acquired by Mr. Thompson a year ago, but the developments have not gone far enough for any appreciable results yet.

Messrs. Pitchford and Pointer have a small plant, and are doing very well on the Old Pioneer Extended ground.

Messrs. Sheehan Bros. are working with an engine and gravel-pumps on the Lower Wyniford River. They only commenced late in the year, and are said to be doing remarkably well.

A little higher up the river is Yee Gee's South Argus Tin Mine, which is equipped with a stationary boiler and engine, and 10-inch gravel pumps. About 16 men (6 Europeans, including 3 enginedrivers) and 10 Chinese are employed. There is a good deal of river flat, as well as the river-bed, to work. Very good returns are being obtained.

The South Garibaldi Tin Mining Company is working the river-flat, a heavy boulder wash of low gravel.

*Eastern Mining Division.*—The Anchor Tine Mine Limited, employing an average number of 135 men, had an output of 143 tons 9 cwt. of tin ore, valued at £20,000. The mine suffered severely from the drought in the early part of the year, and when water was plentiful a break-down of machinery occurred. At the Anchor Mine most of the work was done on the eastern side, where the over-burden, containing a good deal of hard rock up to 70 feet in depth, had to be removed. At the Australian Mine the first face opened was practically worked out. A haul-age-road was constructed to the " Old Puzzle " face, which did not come up to samples, and proved disappointing. A long haulage road was constructed also to the faces on the hill-top, which are more promising.

Other small claims on the Blue Tier have not been doing much.

The Pioneer Tin Mining Company has equipped its Argonaut Mine, near St. Helens, with a gravel-pump and 12 horse-power portable engine, mounted on a barge. Some overburden and old tailings have been removed, but tin-getting had not commenced at the end of the year.

A few small claims working in the district have been doing fairly well. On the whole, the output of tin has been better than for the previous year.

New Roy's Hill Mine, Avoca.—Not much has been done apart from prospecting during the year.

Royal George Tin Mine.—The company commenced opening its mine about the beginning of April. The lode-formation running south-east and north-west follows the top of a fairly high ridge, and has been proved for a distance of 700 feet on the surface. A crosscut from the bottom of a 40-feet shaft sunk on the east side shows the formation to be at least 20 feet wide. There are no well-defined walls; the tin-rock merges into the surrounding country granite. A main working adit has been driven to cut the lode at its north-western end, where it passes into the New Roy's Hill Freehold property. The formation has been driven on 200 feet or so, and near to the bottom of the 40-feet shaft. The mine manager estimates bulk values for the full width at 1¼ per cent. of tin.

The company purchased the whole of the Mt. Rex Tin Mining Company's plant, also machinery from the New Golden Gate and Tasmanian Consols mines, at Mathinna. A 20-head battery fully equipped with tin-dressing machinery has been erected; an electric pumping plant has been installed to pump water from the river half a mile distant; and everything was in readiness to commence crushing at the commencement of the year.

Foster's Freehold.—A 5-head battery and tin-dressing machinery has been erected and put to use during the later part of the year. The main lode is being opened up to a shallow depth at the south end. It is 4 feet 6 inches wide and gives excellent prospects of tin. A 40-feet shaft shows the downward continuance of this lode to be good. The working of a good-sized area of the surface detritus, which in itself carries good payable tin, has exposed a soft rock intersected with innumerable small veins and bunches of tin oxide. One or two good-sized lode-veins intersect this formation. Mr. Foster has obtained good returns from work done in a crude way in the past, and now that he has got machinery, the result should be highly satisfactory.

The Wilberforce Pump Company is still working with an engine and gravel pump, and is getting fairly good returns.

Some tin is being won from the Old Native Youth Mine by Mr. Nobes with a small gravel-pump plant.

The Fancy Creek Tin Mine at Weldborough was working and doing fairly well in the latter part of the year.

A number of small mines have been working round about Weldborough, and have been doing fairly well.

Between 30 and 40 claims are working round about Gladstone, Mussel Roe, and Aberfoyle. About 60 men are employed.

For the first quarter of the year the weather was dry and water scarce. Good rainfalls occurred during the autumn, winter, and spring, and this, coupled with the extraordinary high price of tin ore, has made the prospects very bright for the tin-miners.

A couple of new plants (portable engines and centrifugal pumps) have been put in use by different claim-owners to pump water from the Government race on the low-ridge divide between the Ringarooma and Mussel Roe Rivers to the north of Edina. Some fairly good tin patches occur along this ridge, which is from 50 to 100 feet above the Government race.

The Aberroe Tin Mining Company, No Liability.—Eighty-eight thousand cubic yards of material were treated for a yield of 21 tons of tin ore, which realised £2900. The average number of men employed was 14.

The summer and autumn were very dry, but the winter and spring were above the average for rain. The total fall for the year was 30¼ inches, which is about the average.

The South Mt. Cameron Tin Mining Company, No Liability, treated 183,690 cubic yards of tin-bearing wash for a return of 89 tons 11 cwt. of tin oxide. In addition to the above, 3850 cubic yards of decomposed

granite " bottom " were removed for the purpose of bringing up tail-races. The amount of alluvial gold obtained from the tin oxide was 34·9 oz.

For the first half of the year the ground treated was of a hard nature, and a little under the average value, 89,450 cubic yards of wash being treated for 40 tons 17 cwt. of tin ore, or a little over 1·02 lb. per cubic yard; but during the last six months of the year the ground improved, being easier to break up with the nozzles, and a little richer in tin oxide, 94,240 cubic yards being treated for a return of 48 tons 14 cwt., or an average of about 1·15 lb. of tin oxide per cubic yard.

The faces at the mine still show a large body of wash similar to that treated for the year.

No alterations of any importance have taken place at the pumping-station, but the Ringarooma River during the summer months is very low and troublesome both at the pumps where the water is taken out for the nozzles, and at the end of the tail-race, where the tailings are dumped into the channel. The average number of men employed was 38.

The Clifton Creek Tin Mining Company.—About 8 acres of land have been worked out, the yield of tin ore being 112 tons 7 cwt. 1 qr. 18 lb., valued at £16,073 4s. 7d. The average number of men employed was 37.

Mode of Operations.—Centrifugal pumping of the gravel, with hydraulic columns into the face, the power being supplied from a nozzle pump situated on a barge. The method is a return water scheme, the water being used over and over again; the quantity required being 2250 gallons per minute. There is very little water on the mine, the average supply being about 150 gallons per minute per annum.

The Clarence Tin Prospecting Association, No Liability.—Mr. W. H. Twelvetrees, Government Geologist, who was in the Gladstone district recently attending the

annual meeting of the Mt. Cameron Water-race Board, took advantage of the opportunity to make a flying trip to the mineral sections held by the Clarence Tin Prospecting Association, and furnished the following short report:—

"I beg to submit the following report of the Clarence sections.

"These comprise a group of alluvial tin sections drained by the head waters of the eastern branch of the Boobyalla River, situate for the most part on the west side of Hurst's-road to Boobyalla, 4 and 5 miles north of the farm lands on the northern edge of the Derby basaltic plateau.

"They are due north of the Tasmanian Mineral Exploration Company's agricultural block, through which many years ago I traced the probable extension of the ancient Ringarooma deep lead, and pending more detailed examination I think it very likely that this alluvial channel is the continuation of the same lead.

"A comparatively narrow channel of deep ground seems to exist for a mile south of the Clarence workings, bounded on both sides by high granite country. Further boring in a southerly direction will throw light on the relation of this channel to the Ringarooma lead, for which an outlet at the west end of Mt. Cameron has long been assumed.

"On two occasions I took the opportunity of looking at the Clifton alluvial workings near South Mt. Cameron, and examining them, especially in connection with a suggestion that they might possibly represent a diversion of the Ringarooma lead to the east end of Mt. Cameron. The nature of the wash and the apparent course of the drift are unfavourable to this hypothesis.

"On the Clarence ground test bores have been put down along ten lines, aggregating 4½ miles and 4 chains in length. Of these lines six have been laid out transversely to the trend of the alluvial channel, and four lines in the direction of the channel itself.

"The most northerly line is a line of bore-holes and pits south of, and parallel with, the river, ranging from 10 to 14 feet in depth, through white sand and bands of gravel and wash, yielding from a trace of tin ore up to quarter and half a pound per cubic yard of material passed through. In all reports of yields the proportional rates of mineral are calculated with reference to the total footage bored, and the manager has used for his calculations a box containing a measured cubic foot of material.

"No. 2 Line.—An east and west line in the northern part of the property has been bored for 26 chains to depth up to 33 feet, disclosing about a foot of quartz and sandstone wash, with from a trace to 1½ lb. of tin ore per cubic yard of material bored.

"The lead here abuts on sandstone country to the north, and the ground, contrary to what one would expect, deepens in a southerly direction. The granite country junctions with the sandstone on the north side of Bonser Creek, where the road crosses the streams. The strike of the sandstone strata is N. 30° W., and the dip steep to south-west.

"No. 5 Line.—At right angles to the preceding line is a north and south line of bores a chain apart for 7 chains between the Boobyalla River and the road. The holes have been bored to depths of 12 and 14 feet, showing coarse wash for 5 and 6 feet. The bottom is soft granite. The tin yield from each hole was ½ lb. per cubic yard of material, falling-off at the northern end of the line. This line appears to be on the course of the channel and its gravel, as well as that bored through on the preceding line (No. 2), corresponds in character with the modern Boobyalla shingle.

"No. 4 Line.—Roughly parallel with No. 5 line, but on the western side of the river just inside the eastern boundary of Section 5623-M, is No. 4 line, which has been bored for 11 chains. The holes are a chain apart, and vary in depth from 11 to 20 feet. The wash at each end

of the line thins to a foot, but in the centre of the line and for about half its total length has a depth of from 4 to 5 feet. The yield in tin ore was from ¼ to ½ lb. per cubic yard of material.

"No. 3 Line.—This is a long boring-line east and west across the two sections, 5626-M and 5623-M, comprising 10 bore-holes and pits from 7 to 14 feet in depth. The ground passed through consisted of sand with bands of water-worn gravel and puggy drift. The tin contents varied from a trace to a ¼ and ½ lb. per cubic yard. The most westerly bore showed the ground shallowing to 10 feet.

"No. 1 Line.—There is a long south-easterly line over a mile long crossing Section 8623-M, crossing the river, the road, and Bonser Creek, far away to the south-east.

"The depth of the ground at the north end was about 31 feet; crossing the river-flat it was from 15 to 16 feet, increasing again on the terrace to the east, but shallowing towards the foothills of Mt. Cameron to 7 feet. For 9 or 10 chains the tin content was ¼ to ½ lb. per cubic yard.

"No. 6 Line.—This line is further south, being carried in a south-westerly direction across Section 661-M. Nine bores have been put down through ground averaging 16 feet in depth with a foot of wash. Three holes yielded ¼ to ½ lb. of tin; the others a trace.

"No. 2 South.—This is a long line in a south-easterly direction across Section 662-M. Twenty-one bores have been put down a chain apart through ground averaging 12 feet to 14 feet deep, in one hole 22 feet. The wash ranged mostly from 3 to 5 feet. The tin contents was ¼-lb., ½-lb., ¾-lb. 1 lb. to 1¼ lb. per cubic yard.

"No. 3 South.—This line trends north-east-south-west across the east branch flat on Section 663-M. Nineteen holes have been bored a chain apart. The ground along this line is from 14 to 24 feet deep, averaging 2 to 4 feet, and in two, 6 to 8 feet. The tin content was ¼ lb., ½ lb., ¾ lb., and 1 lb. per cubic yard.

"No. 4 South.—This line crosses the southern boundary of Section 663-M in a south-easterly direction, and boring along it is still in progress.

"Seven bores have been put down through drifts from 16 to 23 feet in depth, with 2 to 3 feet of coarse wash. Most of these yielded only a trace of tin, but the sixth bore gave 1¼ lb., and the last over 2 lb. (estimated) per cubic yard, the wash increasing to 6 feet.

"The drift in the central and southern part of the Clarence group of properties loses the local character which it seems to posses in the northern part, and assumes the aspect of ancient lead materiaal. No one can look at the large open faces excavated in the drift by previous owners and doubt the antiquity of the deposit.

"Carbonised wood and the remains of a leaf which I took from one of these faces have been microscopically examined, but they appear to belong to the peppermint, and are probably modern. The modern creek deposits in the valley have probably been laid down in ancient drift ground.

"Mr. H. H. Scott, the Curator of the Victoria Museum, who carried out the microscopical examination, reports as follows:—

"'The minute structure of the wood agrees very well with that of the white peppermint of our modern forests, and in a general way the leaf agrees with the foliage of that tree. If we apply the American key system to the two varieties of Tasmanian peppermint (white and black) we get the following sets of characters:—

"'(1) White peppermint (*Eucalyptus amygdalina*): wood diffusely porous, pores well marked; medullary rays numerous; grain even.

"'(2) Black peppermint: medullary rays as a rule larger and less numerous; pores also less numerous; grain less even.

" ' The fossil wood agrees best with No. 1. If anything, it is finer in grain, and with rather more medullary rays than obtain in the modern tree.

" ' Botanists are not agreed as to the amount of departure from a common standard manifested by the two kinds of peppermint found in this island, some regarding them as a single species, others as two well-marked varieties.

" ' Apparently the histology of the fossil wood from the Clarence would suggest as much departure from the modern white peppermint as that wood departs from the black peppermint of to-day.'

" The ferruginous grit on the high bank in the eastern part of Section 5626-M is a decided indication of the antiquity of the drift, and the elevation at which this remented bed occurs is suggestive of enormous denudations.

" The northern outlet of the lead cannot be seen on this property. The alluvial ground at the north boundary terminates against high-rock running east and west, and, moreover, is a part of the alluvians which fills the basis of the modern eastern branch of the Boobyalla River. Whether the ancient lead leaves this channel and trends north-west or not is not known. The difficulty in tracing its course is increased by our ignorance of where the shoreline was in those days. It is not likely, however, that the part of the lead near its outlet to the sea would be very rich in ore. Its tin contents would be dependent for the most part on mineral derived from the ground through which it flowed, while the great accumulations washed out of the tin-bearing granite range at its source near Derby would be deposited not far from the range.

" Future work in a southerly direction will be of considerable importance in defining the ancient lead-channel. The present preliminary boring operations have been of value in clearing up doubts and preparing for the interesting and important work of carrying the tests to a final

conclusion. If this run of ground proves to be a section of the Ringarooma lead, the tin content may be expected (other things being equal) to improve as the work is carried southward."

The New Banca Tin Mine.—The Government Geologist reports:—

"A recent visit to the New Banca group of sections held by the New Banca Tin Mining Company, No Liability, showed a general suspension of work owing to dry weather, though a couple of men were putting in time ground-sluicing. Three centres of work existed on the property—(1) the northern and western ground; (2) the Banca Creek workings; (3) Morrisby's lead.

"The northern and western run of drift consists of a body of alluvial 12 to 14 feet deep with angular quartz wash yielding, it is said, in the best holes ¼ to ½ oz. stream tin per dish. The tin is fairly fine, and comprises the black and ruby varieties.

"The bed-rock is granite, and granite forms the rim-rock. To the north of the dam, on the western section, the country falls to the coast, so that the northern rim-rock of the lead is here the watershed. The drift appears to have had a local origin, and would be of comparatively modern age. Obsidianites have been found in the wash. West of Banca Creek a large reef of white quartz traverses the granite in a north-west-south-east direction, but no mineral has been noticed in it.

"The Banca Creek workings are in drift, which heads from the granite rather suddenly. The old workings lower down the creek yielded good tin and a little gold. The drift is easy for working by elevator. Four or five tons of tin were recently won from ground worth over 3 lb. per cubic yard. The tin in these workings is fairly coarse, and different from that obtained from the northern ground.

"The ground at the Banca abounds in old workings, some of which date back for over 30 years. During the last

four years tin valued at £3809 has been produced; 3500 feet of piping and a long race from Boobyalla brings water on to the ground.

"Morrisby's lead is south of the Wilberforce lead in the eastern part of the property. It has a north-easterly direction, and its continuation in either direction has not been traced out. In its western part shafts have been sunk through about 14 feet to bottom, showing fair tin, and in the lower part of the lead really good tin is showing in the face of large workings, where 1 to 4 feet of tin-bearing wash rest on the granite bottom. This lead is obviously an ancient one, and in some way not at present understood must have been connected with an ancient Boobyalla. A high terrace on the top of the hill to the south of it apparently formed part of the same river basin, though now disconnected and bearing witness to the great changes in elevation brought about by denuding processes.

"Some, however, who have examined the country to the north-west beyond the north-eastern dam believed that the ancient river flowed out in that direction. The western end of the lead certainly seems to trend across the Banca Creek.

"The property appears to offer considerable scope for work, but the extension of the leads requires to be proved so as to see exactly how much ground is available."

The Desire Tin Company has completed a substantial head-race from Storey's Creek, and sluicing was commenced during the last quarter of the year.

The South Esk Tine Mine is still being worked with satisfactory results.

Storey and Gipp's Creeks.—About 30 men—18 at the former and 12 at the latter—are working the tin and wolfram at these creeks. They work in small parties, and are doing very well.

*Western Mining Division.*—Renison Bell Prospecting and Mining Company.—Twenty thousand two hundred and twenty tons of ore have been mined and treated, for a return of 95·85 tons of tin oxide, containing 61·7 tons

of metallic tin, which realised the total sum of £12,716. The average number of men employed was 61.

During the year two important works have been undertaken and completed, viz., the raising of the breastwork of the dam and the construction of an aerial ropeway to connect the mill with the northern workings of the mine.

The work of raising the breastwork of the dam an additional 4 feet involved the raising of the Government tramway from Meredith Siding to the Bon Accord Mine, for a distance of 11 chains, by an embankment 5 feet high, including the raising of the bridge over the Argent River; also a deviation of 13 chains in length required to be made on the Government track to Zeehan, so as to be well clear of the backed-up water from the dam.

The added height to the embankment doubled the capacity of the dam, which now covers an area of 20 acres in extent. Since the completion of this work there has been ample water both for power and milling purposes, even through the summer months.

The aerial ropeway was completed early in October. It consists of a double cable-way in two spans, being 470 feet between the terminals. From the lower to the upper terminal the ore is raised in transit a vertical height of 140 feet. The cables are of steel wire, and have a diameter of $1\frac{1}{8}$ inch. The skips are hauled by means of an electrically-driven friction winch, to which the skips are attached by a $\frac{1}{2}$-inch diameter haulage rope. The ropeway has a capacity of 130 tons per eight-hours shift.

Since the completion of the aerial ropeway, ore supplies have been drawn exclusively from the northern workings, which are opening up very satisfactorily. Most of the ore is mined from the open workings. No. 1 open cut is situated approximately 140 feet above the Argent River to the west of No. 3 adit. This open cut has been overworked a distance of 100 feet in length, the average width being about 40 feet. The depth of the face is vertically 70 feet. The whole of the ore mined from this excavation has been sent to the mill, and has proved to be highly payable.

In the underground workings the lode has been worked over a distance of 50 feet in No. 2 adit, the average width stoped being 25 feet for a height of 14 feet. The ore is higher grade than that occurring in the open-cut workings.

In No. 3 adit, which is 67 feet vertically above No. 2, no stoping has been done. Ore on the adit level has been mined for a width of 20 feet, over a length of 45 feet, and carried high in values. All further mining above this adit can be done by open-cutting. A total of 4134 tons of ore has been won from the northern workings, the remainder of supplies being obtained from the southern workings. The grade from the latter workings was, on the whole, rather poor for a 10-head battery to treat properly.

The Montana Tin Prospecting Syndicate, No Liability.—Seventeen men were employed full time, and the amount of tin won was 28·14 tons, which brought a net return to the syndicate of £3881. The faces on the south side of the section have opened out both deep and rich in tin, and prospecting on the north side has also revealed sluicing ground highly payable; this latter find, however, is not likely to be worked for some time, sufficient water not being available at present to work both sides of the section at the same time.

The work of new mill-construction, which cost £828 in the early part of the year was stopped pending the settlement of law-suits over tramway and water rights.

Boulder Tin Mining Company.—Attention has been mainly centered on dealing with the tailings dump, from which a satisfactory recovery was made.

Work in connection with the new water-supply was carried on continuously for nine months, and crushing the dense pyritic ore and calcining the concentrates during the latter part of the year. Four thousand eight hundred and eighty-seven tons of tailings were treated, 1353 tons of ore crushed, and 35 tons of tin oxide, valued at £4200, recovered.

*Heemskirk.*—Munro's Consolidated Lease.—A large amount of work was done on this property in the way of repairs, exploring, and prospecting. At the Long Tunnel the work in hand at the end of the previous year was completed on the 19th January, 1912.

Early in January a party of tributers resumed work in what is known as the tributers' workings, but after a few weeks they found the tin-bearing material had become too hard for sluicing, and as they could not crush the dirt they were breaking, they abandoned their tribute, after obtaining about 7 bags of high-grade free tin oxide from the fines of dirt broken.

During the early part of the year some work was done in the creek by one man on the north-west side of the old haulage line, with a view of locating the source of wolfram found in the creek. From this work five bags of tin oxide and one bag of wolfram of good grade were won, but as the ground became too deep and rocky for the water-supply (which, at this point, is limited) the work was abandoned without locating the source from which the wolfram came.

In the beginning of July the work of cleaning up the slimes from the slime-dam and battery-shed was completed. From this work 62 bags of low-grade oxide were sent to market, leaving about 4 tons stored in the battery-shed for future treatment by grinding. It was not until the 10th October last that opportunity permitted the sampling of the 750-feet level. For a very lengthy period up to the end of 1911 this level was blocked through a fall of ground, therefore nothing was known of this lode at this point, although good tin was known to exist in the same channel in the whip shaft or surface workings above the 750-feet level. This lode gives 150 feet of backs below the collar of the whip shaft, and will greatly facilitate the working of this portion of the property below any open-cut work that must eventually be carried out. Although this level has been driven on the course of the lode for some distance, only one wall can be seen for over 100 feet, the drive deviating to the east out of the lode-channel at a point vertically beyond the whip shaft.

Sampling.—The sampling was commenced at a point close to where the drive deviates from the lode, No. 1 sample being here taken and continued regularly across the lode at intervals of about 30 feet, going towards the approach of the level.

No. 1 sample taken for a width of 4 feet yielded 1·1 per cent.

No. 2 sample taken for a width of 5 feet yielded 1 per cent.

No. 3 sample taken for a width of 5 feet yielded 1·4 per cent.

No. 4 sample taken for a width of between 4 and 5 feet yielded 1·5 per cent.

No. 5 sample taken for a width of 2 feet yielded 1·1 per cent.

No. 6 sample taken for a width of 20 feet yielded 1·2 per cent. Seeing that this level is all in maiden ground the above results are very satisfactory.

Tributers' Workings.—As the result of some exploring work which was done in the end of the tributers' old workings it was deemed advisable in the middle of October to put men on to further prove this portion of the property. The results from the work done were very satisfactory. After starting it was found that good tin-bearing dirt was making further into the eastern ground, and had increased to a width of 5 feet of highly payable crushing material. After a distance of 14 feet had been driven a true wall was met with running nearly north and south, this being the first wall of a lode-channel seen in those workings. About 50 tons of stone from the intermediate drive and the winze is stacked outside the adit-level, some of which carries high tin values; and from the fines of the tin dirt broken about 1 ton of tin oxide was extracted by sluicing. All the forkings and tailings stored in the pits carry tin, but require the stampers to extract it.

Heemskirk Tin Syndicate.—The property, which is situate on the Tasman River, North Heemskirk, consists of about 300 acres of mineral land.

Operations were commenced in January, and buildings consisting of five dwelling-houses for employes, office, stable, store, engine-house, and smithy have been erected.

There are also other buildings erected by the contractor to the syndicate.

Plant.—This consists of a 10-inch Class B Thompson gravel-pump driven by a Robey compound portable engine capable of working up to 50 I.H.P.

To obtain water for the nozzle column, a head race 6¼ miles in length was constructed from the Heemskirk River to the mine, the capacity being from 15 to 17 sluice-heads.

About 30 chains of the river channel was cleared of snags and *debris* and enlarged, to afford sufficient get-away for flood-waters. A sludge channel for a length of 10 chains was constructed for the disposal of the tailings from the first paddocks.

A branch road was constructed to connect the mine with the Trial Harbour-Corinna-road. This has a length of about 2 miles, the total from Zeehan being 27 miles.

A firewood tramway has been constructed about 1 mile in length, over which, in addition to quantities consumed, about 1200 tons of firewood have been delivered for reserve fuel stock.

Sluicing.—Operations were started late in October, and early in December last a partial clean-up gave 2 tons 7 cwt. of stream tin oxide from 2500 cubic yards sluiced.

The method of working consists of hydraulic sluicing, and pumping of the overburden wash and drift to an elevated tail-race; the present height of lift being 40 feet.

At present the engine is working off the surface level of the ground being sluiced, but to provide for greater lift and to facilitate shifting of the plant from paddock to paddock a barge to carry the whole plant is now in course of construction.

The dimensions of pontoon are—length, 33 feet; width, 22 feet, depth, 3 feet 9 inches; and weight, when equipped, 46 tons.

*North-Western Mining Division.*—Mt. Bischoff Tin Mining Company. Surface Workings.—The usual system of

surface mining was continued in the numerous branches of the white face, brown face, Stanhope section, slaughter-yard face, gossan benches, north alluvial, summit of the mountain, and Don section. The output of crush-dirt from all sources totalled 230,506 tons, which were delivered at the mills for crushing and concentrating. From the material treated, 1200 tons of tin oxide were obtained, giving an average of 10·26 lbs. per ton of crush-dirt.

The value of ore won is estimated at £168,000; and the number of men employed averaged 439.

Underground Workings.—The extraction of ore from these workings has been continuous, and the grade and quantity of dirt stoped has been much the same as during the previous year.

During the year 1477 feet of levels were driven and 16 feet of rises, and the blocking-out and opening-up of underground ore-bodies has been kept well in advance of requirements.

A commencement was made during the middle of the year to drive a low-level adit from the northern stope of the mount, in a south-westerly direction, for the purpose of testing the ore-bodies at a depth, and 202 feet have been driven; the country passed through being mostly quartzite. A prospecting adit was also started on the south-east stope of the hill, and 151 feet driven. Seventy-three feet of good payable detrital matter was passed through at the commencement.

Filling the depleted stopes on the Queen lode dyke with mullock has received special attention, and a large quantity of material was sent below for this purpose.

Milling and Concentrating Plant.—Twenty head of stampers have been added to this plant during the year, making a total of 115 head. This, together with a further reorganization of the old plant effected a marked increase in the efficiency of the whole mill.

Hydro-Electric Power Plant.—All the machinery in connection with this plant has been used to its full capacity, and it was decided to erect another turbo-generator set; consequently a contract has been entered

into for the supply of a 300 K.W. set, similar to the last one installed.

Aerial Ropeway.—The plant installed has been in constant operation, and has given most satisfactory results, together with a considerable reduction in the transport costs. A further contract has been let for supplying a ropeway to bring ore from the lower northern stopes, so as to permit a complete and systematic testing of these large deposits. It is anticipated that this installation will be working early next year. The working costs averaged 4s. 7·944d. per ton of crude ore.

The company paid £75,000 in dividends. The total quantity of tin ore raised by the company is 71,808 tons, and the total amount paid in dividends is £2,362,500.

Cundy's Tin Sections, Waratah.—A high-level race has been constructed to bring in water to remove the overburden on the line of the lode. The Wombat Creek is picked up on the northern boundary of the section, and in 30 chains a vertical pressure of 80 feet is obtained. A site has been cleared and a 15-head battery is being erected.

## Coal Mining.

The total quantity of coal raised amounted to 53,560 tons, valued at £24,568; being a decrease of 3507 tons on the previous year.

The raisings at the different collieries were:—

| Colliery. | Tons raised. | Men employed. |
|---|---|---|
| Cornwall ... ... ... ... ... ... ... | 22,353 | 65 |
| Mt. Nicholas ... ... ... ... ... ... | 28,717 | 73 |
| Enterprise ... ... ... ... ... ... | 25 | 2 |
| Spreyton ... ... ... ... ... ... ... | 956 | 6 |
| York Plains ... ... ... ... ... ... | 679 | 2 |
| Illamatha ... ... ... ... ... ... ... | 110 | 2 |
| Catamaran ... ... ... ... ... ... | 600 | 4 |
| Mt. Cygnet ... ... ... ... ... ... | 120 | 1 |
| Total ... ... ... ... ... | 53,560 | 155 |

*Mt. Nicholas Colliery.*—This mine is now well opened up for long-wall working, and capable of doubling its present output of coal should occasion arise for doing so; unfortunately, however, the trade does not warrant a larger output. As a rule the colliery only works four days a week, yet the men employed appear to be earning fairly good pay. About 60 men and boys are employed above and below ground.

*Cornwall Colliery.*—All work has for the past eight months has been confined to the new pit. Faulting of the seam caused some trouble for a time, and work was necessarily slow, and to a degree, dangerous.

Now, however, the worst place is passed, and the long-wall face is coming into line again. This new pit is on the south-western continuation of the seam worked in the old pit, and has been opened mainly to secure more advantageous working, haulage, ventilation, &c.

*Spreyton Colliery (Mersey).*—Mr. Allison keeps on working with six or seven men, and maintains a regular output of from 80 to 90 tons per month.

*Illamatha Colliery.*—Mr. R. Bound works sometimes at his mine, but the output is very small.

*York Plains Colliery.*—The proprietor, Mr. J. C. Greig, employs a couple of men, and gets out a small but regular supply of coal, which he supplies to brewers and others requiring a clean coal. pretty well free from smoke.

*Mt. Cygnet Colliery.*—Very little is being done at this mine. A couple of men work occasionally, but the output is very small.

*Catamaran Colliery.*—An attempt was made by the proprietor to open this mine under his personal supervision. Some work was done in the autumn. A main dip heading was attempted, but a collapse took place in July, when it was found on inspection to be in a dangerous condition, and the owner was warned that he must not make any further attempt to win coal until the mine was put in thorough working order under the supervision of compe-

tent management. No work has been done since July. The property has now passed into the hands of the So h Broken Hill Company, New South Wales, who have arranged to commence boring to prove the extent of the seam.

### Bismuth.

The Shepherd and Murphy Mine at Middlesex obtained from its tin ore 7·49 tons of bismuth, valued at £2606.

The Lady Barron Mine obtained 0·1 ton, valued at £40.

### Wolfram.

The output of Wolfram ore was as follows:—

| | Tons. | Value. £ |
|---|---|---|
| Avoca ... ... ... ... ... ... ... ... | 34·20 | 3537 |
| Shepherd and Murphy Mine at Middlesex ... ... ... ... ... ... | 22·84 | 2202 |
| Lady Barron Mine ... ... ... ... | 4·05 | 235 |
| Iris Mine ... ... ... ... ... ... ... | 3·80 | 485 |
| Gurr's Mine ... ... ... ... ... ... | 1·60 | 142 |
| Total ... ... ... ... ... | 66·49 | £6601 |

Messrs. Gurr and party have completed the erection of a small roller crusher and concentrating plant to work a wolfram show to the north-east of the Lady Barron Mine.

### Tasmanite Shale.

The Railton and Latrobe Shale and Oil Company was about to commence operations on its property near Railton at the end of the year. Eighty thousand bricks were burnt on the spot for the retort building. Capital, however, was not forthcoming as fast as was anticipated; 10,000 shares were applied for out of 20,000. The Tasmanian Shale and Oil Company's property, including leases, tramways, machinery, retorts, and a large quan tity of crude oil, were purchased by the new company for £500. They now expect to be able to get sufficient capital to make a start on a sound basis.

## Osmiridium.

About 100 miners have been continually mining for osmiridium in the Savage River and its tributaries, and 778·77 oz. were obtaned, valued at £5742, an average value of £7 7s. 8·795d. per oz.; being an increase of 506·89 oz., as compared with the previous year.

In my last report I published the correspondence between the Department and the Agent-General in London with reference to the complaints made by the miners as to the price paid by the local purchasers for the mineral. The result of the enquiries made through the Agent-General confirms my opinion that the price obtained was fair and reasonable.

There appears to be so little demand for the mineral that probably if a large parcel were put on the market there would be a considerable drop in the price. The buyers doubtless recognise the fact, and are content to place small parcels on the market in order to obtain the highest possible price for it.

During the year I obtained an ounce of the mineral and forwarded it through the Honourable the Premier to the Agent-General in London for experimental purposes, and in his annual report he says, "The osmiridium you were good enough to forward was divided between Professor Dunstan, of the Imperial Institute, and Mr. Hirst, managing director of the General Electric Company. Investigations are still being made by the latter to ascertain what further uses this mineral may be put to, and this is being done without any cost to the Government. I am hopeful that it may be found possible to create a greater demand for this metal."

For some time the miners in the Savage River district have been endeavouring to trace the source from which the mineral was shed, and it is reported that Mr. William Caudry has successfully traced it to the Serpentine country in the vicinity of Bald Hill, and has applied for a reward claim, under the provisions of "The Mining Act, 1905."

## Pottery Clay.

Samples of kaolin and pottery clays have been forwarded from time to time to the Agent-General for testing purposes, and he has always been good enough to obtain reports and furnish the results for the benefit of those concerned.

In his report to the Hon. the Premier for the year 1912, the Agent-Gentral states:—"A short time ago about half a cwt. of kaolin from the Zeehan district was received from you for the purpose of being tested in this country. I now give a report thereon, which has been kindly furnished by Professor Wyndham R. Dunstan, of the Imperial Institute. The sample of crude white kaolin (china clay) contained a considerable amount of coarse grit.

"On washing the crude sample, a yield of about 50 per cent. of fine kaolin was obtained. The product was analysed with the following results:—

| | | Per cent. |
|---|---|---|
| Silica | $SiO_2$ | 46·20 |
| Alumina | $Al_2O_3$ | 37·40 |
| Ferric oxide | $Fe_2O_3$ | 1·39 |
| Titanium dioxide | $TiO_2$ | 0·16 |
| Lime | CaO | 0·42 |
| Magnesia | MgO | 0·06 |
| Potash | $K_2O$ | 0·37 |
| Soda | $Na_2O$ | 0·58 |
| Loss on ignition | ... | 13·89 |

"Vessels made from this kaolin, when fired to about 1100° C, gave pure white 'biscuit.'

"The fine kaolin is of good quality, and would be suitable for the manufacture of porcelain or pottery, or for use in filling paper or weighing textiles. It could not be exported to Europe at a profit, in competition with British clays, but it is suitable for use in Tasmania or neighbouring countries."

## Precious Stones.

Mining for precious stones has not been a profitable occupation in this State.

Some years ago zircons were obtained in great quantities in the vicinity of Table Cape, but they were very small, and of no commercial value, and the mine was abandoned.

The local jewellers purchase stones from the alluvial miners, who get them cut and set, and find a ready sale for them to tourists as souvenirs of Tasmania.

Sapphires of small size are very common in the tin-drifts of the Ringarooma and Portland districts, but are rarely worth saving; some very large and fine stones have, however, been obtained. With them are associated garnets, spinels, zircons, topazes, and occasionally beryls and chrysobels. Very large but impure beryl crystals have been found at Ben Lomond. Topazes are very common in the tin-drifts, some very large ones having been found. They are often cut and called locally "Flinders Island diamonds," this island being one of the best places for collecting them. Rock crystals, amethysts, and other varieties of crystallised quartz are not uncommon, some of the large smoky crystals of the Mt. Cameron district being much prized by the Chinese, who collect them and send them to their own country for sale. Some very large and flawless crystals have been valued at pretty high figures. Wood-opal is common in the tertiary drifts of the South Esk Basin, but no precious opals are yet known to have been found, though some of the recent basalts show a common variety. Mr. E. H. Becker, of 41 Post-office Chambers, 114A Pitt-st., Sydney, New South Wales, is a purchaser of precious stones.

Mr. Charles A. Flynn, agent for foreign and domestic minerals and gems, Los Angeles, Californit, is also a purchaser of gem stones, and is making a special business of placing Australian gems of merit on the market in California.

*The following Return shows the Quantity and Value of Mineral Products for the State of Tasmania during the Year ending* 31*st December*, 1912.

| Mineral. | Quantity. | Value. |
|---|---|---|
| | | £ |
| Gold*..... ozs. | 37,973·252 | 161,300 |
| Silver-lead Ore ..... tons | 90,123·868 | 309,098 |
| Blister Copper † ..... „ | 5136 | 430,965 |
| Copper and Copper Ore... „ | 1391·6 | 9479 |
| Tin Ore ..... ..... „ | 3713·825 | 543,103 |
| Coal..... ..... „ | 53,560 | 24,568 |
| Wolfram ..... „ | 66·49 | 6601 |
| Bismuth ..... „ | 7·59 | 2646 |
| Osmiridium..... ozs. | 778·77 | 5742 |
| Total..... | ... | £1,493,502 |

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

† Value of gold deducted.

## Geological Survey Branch.

The Government Geologist's (Mr. W. H. Twelvetrees) time has been fully occupied during the year. His report is appended.

Owing to the great demands for the services of the geologists it has been necessary to increase the staff, and a second assistant, Mr. Loftus Hills, was appointed from the 1st November.

Mr. L. L. Waterhouse, of New South Wales, was appointed Assistant Government Geologist from the 21st May, *vice* Mr. L. Keith Ward, who resigned to take up

the position of Government Geologist for South Australia in the beginning of the year.

The alterations to the public buildings in Launceston will afford an opportunity for increased accommodation for the geological staff and the establishment of a laboratory in connection with that branch of the Department.

The establishment of a laboratory and the appointment of an assayer in connection therewith will supply a long-felt want, and will relieve the geologists and the Government Analyst, Hobart, of the necessity of determining rocks and minerals, and making assays for the public and the Geological Survey Branch.

Prospectors should be encouraged to send specimens and samples of their discoveries along for determination and analysis, and this can only be done by announcing that they will be made free of charge, or upon payment of a very moderate fee.

### Inspectors of Mines.

The three inspectors have satisfactorily performed their duties during the year. Their reports are appended.

### Mining Managers' Examination.

Two candidates presented themselves for examination, but only succeeded in obtaining second-class certificates.

The regulations governing the examination of candidates have been amended, and several new subjects have been introduced to bring them into line with the requirements of the other States, so that the certificates obtained may be interchangeable. The granting of second-class certificates to such as fail to obtain first-class certificates, but who obtain at least 50 per cent. marks, has been abolished. The certificates will be of two kinds only, viz., metal mine managers' certificates and colliery manager's certificates.

### Diamond-drills.

The drills were not employed during the year.

## Departmental Staff.

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

P. A. Driscoll, Clerk, Launceston Branch, transferred to Stores Department, 1st February, 1912.

Athol Parry appointed Clerk, Launceston Branch, from 1st May, 1912, *vice* P. A. Driscoll, transferred.

P. J. E. Grant, Registrar of Mines, Waratah, transferred, 19th February, 1912.

J. Laman appointed Registrar, 2nd March, 1912.

H. C. Court appointed Registrar of Mines, Waratah, from 1st September, 1912, *vice* J. Laman, dismissed.

F. S. Grove, Clerk and Draftsman, Launceston Branch, transferred to Public Works Department, 1st May, 1912.

W. D. Reid appointed Clerk and Draftsman, *vice* F. S. Grove, transferred, from 1st May, 1912.

Charles Green, Clerk, retired from service on 30th September, 1912.

Lionel Lawry Waterhouse, appointed Assistant Government Geologist, from 21st May, 1912.

W. A. Smith appointed Clerk, 1st January, 1912, *vice* A. B. Haden, retired.

J. Wardrop appointed Clerk 1st January, 1913, *vice* C. Green, retired.

L. W. Johnson appointed Clerk (on probation), 18th July, 1912.

J. E. Cronly appointed Clerk, from 1st November, 1912, *vice* J. Wardrop, promoted.

Loftus Hills, M.Sc., appointed Assistant Government Geologist, from the 1st November, 1912.

## Revenue.

The revenue for the year amounted to £17,639 19s. 11d., being a decrease of £2916 15s. 11d. on the previous year.

The sum of £2509 5s. 3d., deposited as survey fees with applications for leases, is not included in the revenue.

## Conclusion.

In conclusion, I desire to thank the officers of this Department and the officers of the Mines Drafting Branch of the Survey Department for the loyal and efficient manner in which they have performed the various duties allotted them.

I cannot allow the opportunity to pass without specially thanking the Chief Inspector of Mines (Mr. W. H. Twelvetrees), the Chief Inspector of Mines, Victoria (Mr. A. H. Merrin), the Acting Chief Inspector of Mines, New South Wales (Mr. B. Sawyer), the Inspector of Mines, Queenstown (Mr. C. H. Curtain), and Mr. Samuel J. Dawson, manager Ida Bay Colliery, for their bravery and willing assistance at the time of the terrible disaster at the North Lyell Mine in October last. The firstnamed gentlemen were appointed to report upon the condition and methods of working the Mt. Lyell and North Lyell Mines, the safety of which were being questioned, and arrived at Queenstown on the evening of the 12th October, the day the fire broke out in the mine, and immediately proceeded thither to render all the assistance in their power, and were unremitting in their efforts to save the lives of those entombed, and in endeavouring to extinguish the fire. I also desire to place on record my appreciation of the valuable service rendered by Mr. W. D. Reid of the Geological Survey Branch, Launceston, who was appointed by me under Section 183 of "The Mining Act, 1905," to enquire into and report upon the cause of the fatal accidents in the Tasmania Gold Mine Limited at Beaconsfield, during the absence on leave of the inspector for the district.

I have, &c.,

W. H. WALLACE, Secretary for Mines.

The Hon. the Minister for Mines.

# DIAMOND-DRILLS.

*Statement of Work done to 31st December, 1911.*

| Year. | Locality. | Direction of Bore. | No. of Bores. | Total Distance Bored. | Average cost per foot, inclusive of Labour and Fuel |
|---|---|---|---|---|---|
| | No. 1 Drill. | | | feet. | £ s. d. |
| 1882-3 | Back Creek—For Gold | Vertical | 7 | 1330 | 0 10 9 |
| 1883 | Lefroy—For Gold | Ditto | 4 | 1011 | 0 5 3 |
| 1884 | Tarleton—For Coal | Ditto | 1 | 401 | 0 5 6 |
| 1886 | Longford—For Coal | Ditto | 2 | 1585 | 0 4 0½ |
| 1886-7 | Harefield Estate—For Coal | Ditto | 1 | 725 | 0 6 7 |
| 1887 | Cardiff Claim, Mount Malcolm—For Coal | Ditto | 1 | 562 | 0 17 11 |
| 1888 | Killymoon Estate—For Coal | Ditto | 1 | 504 | 0 4 5 |
| 1883-9 | Seymour—For Coal | Ditto | 5 | 2266 | 0 7 8 |
| 1889 } 1890 } | Beaconsfield (Phœnix G.M. Co.)—For Gold | Ditto | 1 | 781 | 2 0 2 |
| 1890 | Beaconsfield (East Tasmania G.M. Co.)—For Gold | Ditto | 1 | 978 | 0 14 9½ |
| 1891 | Spring Bay—For Coal | Ditto | 4 | 937 | 0 6 10 |
| 1891 | Ravensdale—For Coal | Ditto | 1 | 114 | 0 11 1½ |
| 1891-2 | Back River, Prosser's Plains—For Coal | Ditto | 2 | 854 | 0 6 1¾ |
| 1892-3 | Lefroy (Deep Lead Syndicate)—For Gold | Ditto | 4 | 979 | 0 15 9 |
| 1893 | Lefroy (East Pinafore Co.)—For Gold | Ditto | 1 | 317 | 0 10 3 |
| 1895-6 | Sandfly—For Coal | Ditto | 4 | 2130 | 0 11 5 |
| 1898 } 1900 } | Blue Tier (Anchor Co.)—For Tin | Ditto | 9 | 876½ | 0 9 1¾ |
| 1901-2 | Llandaff—For Coal | Ditto | 3 | 1944 | 0 7 4 |
| 1902 | Recherche (Catamaran Co.)—For Coal | Ditto | 2 | 956 | 0 9 3 |
| 1903 | Ditto (Moss Glen Co.)—For Coal | Ditto | 2 | 667 | 0 7 6 |
| 1908 | Sorell Creek, New Norfolk—For Coal | Ditto | 1 | 218 | Not obtainable |
| | Total | ... | 57 | 20,135½ | |

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

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

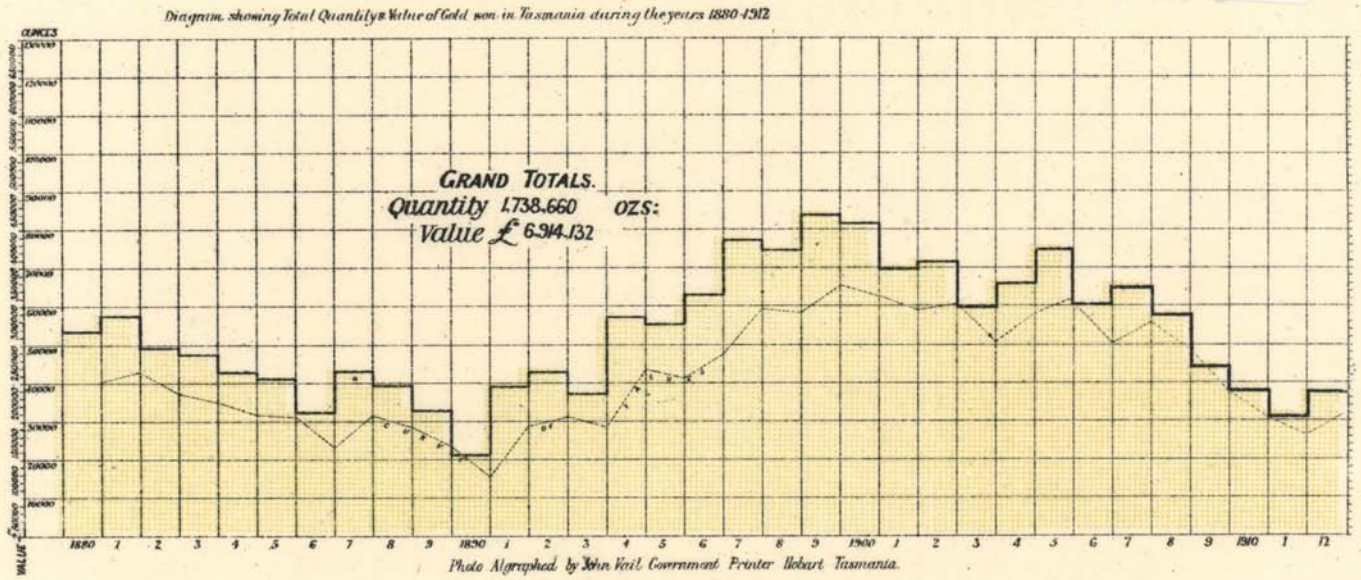
W. H. WALLACE, Secretary for Mines.

No. 1

*RETURN showing the Quantity and Value of Gold won during the Years* 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, *and* 1912.

| Year. | Quantity. | Value. |
|---|---|---|
| | ozs. | £ |
| 1880 | 52,595 | 201,297 |
| 1881 | 56,693 | 216,901 |
| 1882 | 49,122·3 | 187,337 |
| 1883 | 46,577·5 | 176,442 |
| 1884 | 42,339·95 | 160,404 |
| 1885 | 41,240·95 | 155,309 |
| 1886 | 31,014·5 | 117,250 |
| 1887 | 42,609·15 | 158,533 |
| 1888 | 39,610·95 | 147,154 |
| 1889 | 32,332·65 | 119,703 |
| 1890 | 20,510 | 75,888 |
| 1891 | 38,789 | 145,459 |
| 1892 | 42,378 | 158,917 |
| 1893 | 37,687 | 141,326 |
| 1894 | 57,873 | 217,024 |
| 1895 | 54,964 | 206,115 |
| 1896 | 62,591 | 237,574 |
| 1897 | 77,131 | 296,660 |
| 1898 | 74,233 | 291,496 |
| 1899 | 83,992 | 327,545 |
| 1900 | 81,175 | 316,220 |
| 1901 | *69,491 | 295,176 |
| 1902 | *70,996 | 301,573 |
| 1903 | *59,891 | 254,403 |
| 1904 | *65,921 | 280,015 |
| 1905 | *73,540·5 | 312,380 |
| 1906 | *60,023·4 | 254,963 |
| 1907 | *65,354·25 | 277,607 |
| 1908 | *57,085·1 | 242,482 |
| 1909 | *44,777·366 | 190,201 |
| 1910 | *37,048·053 | 157,370 |
| 1911 | *31,100·873 | 132,108 |
| 1912 | *37,973·252 | 161,300 |
| | 1,738,660·744 | 6,914,132 |

* Fine Gold.


5 cm
Diagram showing Total Quantity & Value of Gold won in Tasmania during the years 1880-1912
OUNCES
GRAND TOTALS.
Quantity 1,738,660 OZS:
Value £ 6,914,132
1880 1 2 3 4 5 6 7 8 9 1890 1 2 3 4 5 6 7 8 9 1900 1 2 3 4 5 6 7 8 9 1910 1 12
Photo Algraphed by John Vail Government Printer Hobart Tasmania.

5 cm

Diagram showing Total Quantity & Value of Coal raised in Tasmania during the years 1880-1912

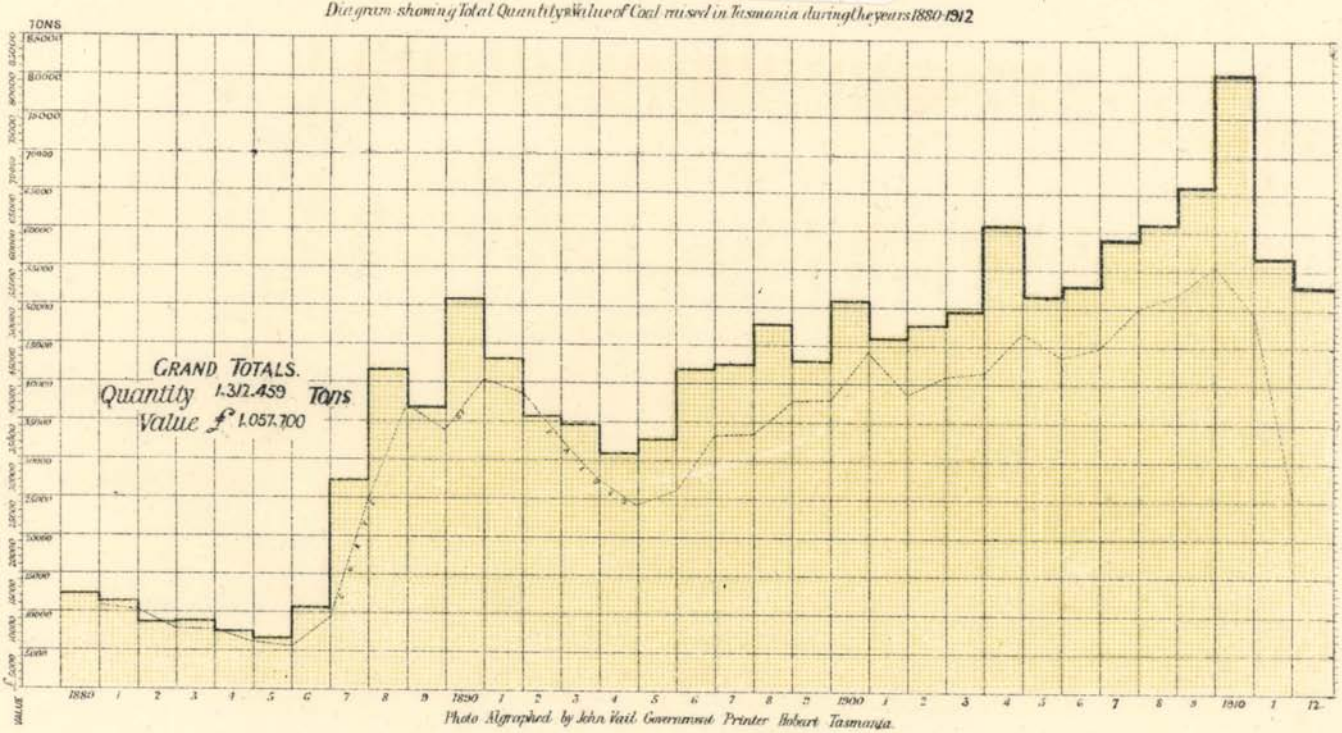



Photo Algraphed by John Vail Government Printer Hobart Tasmania.

478

No. 2.

*RETURN showing the Quantity and Value of Coal raised during the Years* 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, *and* 1912.

| Year. | Quantity. | Value. |
|---|---|---|
| | Tons. | £ |
| 1880 | 12,219 | 10,998 |
| 1881 | 11,163 | 10,047 |
| 1882 | 8803 | 7923 |
| 1883 | 8872 | 7985 |
| 1884 | 7194 | 6475 |
| 1885 | 6654 | 5989 |
| 1886 | 10,391 | 9352 |
| 1887 | 27,633 | 24,870 |
| 1888 | 41,577 | 37,420 |
| 1889 | 36,700 | 33,030 |
| 1890 | 50,519 | 45,467 |
| 1891 | 43,256 | 38,930 |
| 1892 | 36,008 | 32,407 |
| 1893 | 34,693 | 27,754 |
| 1894 | 30,499 | 24,399 |
| 1895 | 32,698 | 26,159 |
| 1896 | 41,904 | 33,523 |
| 1897 | 42,196 | 33,757 |
| 1898 | 47,678 | 38,256 |
| 1899 | 42,609 | 38,349 |
| 1900 | 50,633 | 44,227 |
| 1901 | 45,438 | 38,451 |
| 1902 | 48,863·5 | 41,533 |
| 1903 | 49,069 | 41,709 |
| 1904 | 61,109 | 51,942 |
| 1905 | 51,993 | 44,194 |
| 1906 | 52,895·75 | 44,962 |
| 1907 | 58,891 | 50,057 |
| 1908 | 61,067·75 | 51,907 |
| 1909 | 66,161·75 | 56,237 |
| 1910 | 82,445 | 48,609* |
| 1911 | 57,067 | 26,214* |
| 1912 | 53,560 | 24,568* |
| | 1,312,459·75 | 1,057,700 |

* Value at pit's mouth.

## No. 3.

*RETURN showing the Quantity and Value of Tin exported from Tasmania during the Years* 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, *and* 1904, *compiled from Customs Returns only, and Tin Ore produced during the Years* 1905, 1906, 1907, 1908, 1909, 1910, 1911, *and* 1912.

| Year. | Quantity. | Value. |
|---|---|---|
| | Tons. | £ |
| 1880 | 3954 | 341,736 |
| 1881 | 4124 | 375,775 |
| 1882 | 3670 | 361,046 |
| 1883 | 4122 | 376,446 |
| 1884 | 3707 | 301,423 |
| 1885 | 4242 | 357,587 |
| 1886 | 3776 | 363,364 |
| 1887 | 3607·5 | 409,853 |
| 1888 | 3775·25 | 426,321 |
| 1889 | 3764 | 344,941 |
| 1890 | 3209·25 | 296,368 |
| 1891 | 3235 | 291,715 |
| 1892 | 3174 | 290,083 |
| 1893 | 3128·5 | 260,219 |
| 1894 | 2934 | 198,298 |
| 1895 | 2726·75 | 167,461 |
| 1896 | 2700 | 159,036 |
| 1897 | 2423·5 | 149,994 |
| 1898 | 1972 | 142,046 |
| 1899 | 2239·25 | 278,323 |
| 1900 | 2029 | 269,833 |
| 1901 | 1789·5 | 212,542 |
| 1902 | 1958·25 | 237,828 |
| 1903 | 2376·15 | 300,098 |
| 1904 | 2171·5 | 255,228 |
| 1905* | 3891·5 | 362,670 |
| 1906* | 4472·75 | 557,266 |
| 1907* | 4342·75 | 501,681 |
| 1908* | 4520·8 | 421,580 |
| 1909* | 4511·2 | 418,165 |
| 1910* | 3701·01 | 399,393 |
| 1911* | 3953·05 | 513,500 |
| 1912* | 3713·825 | 543,103 |
| | 109,915·285 | 10,884,922 |

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

5 cm

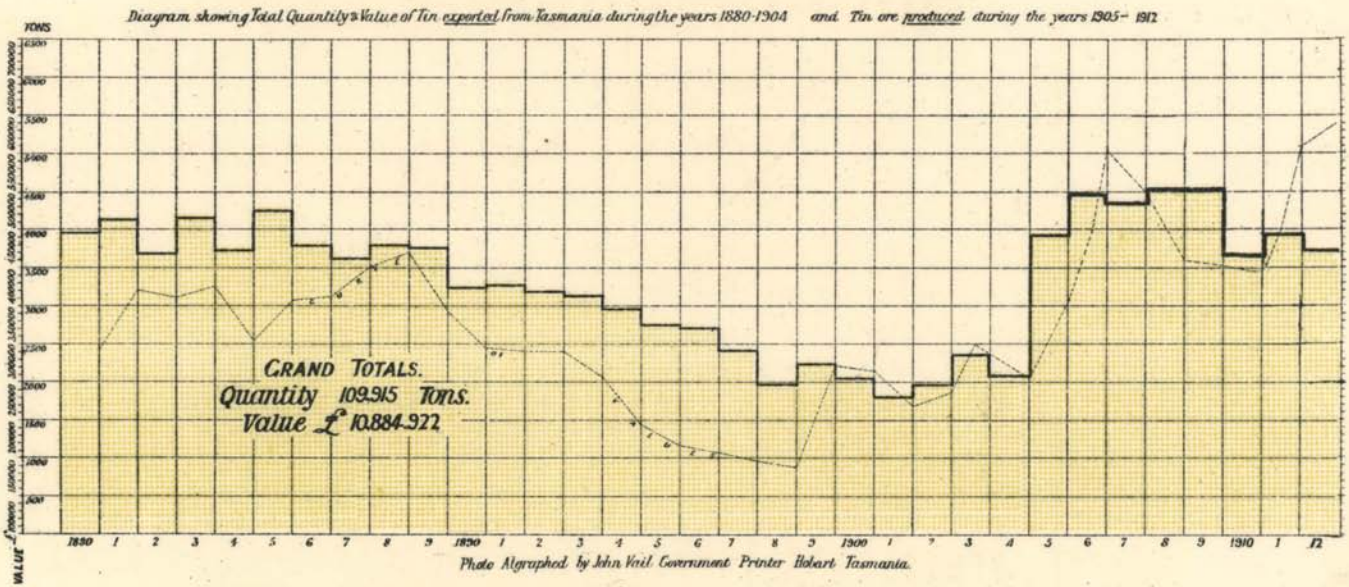



Photo Algraphed by John Vail Government Printer Hobart Tasmania.

No. 4.

*RETURN showing the Quantity and Value of Silver-Lead Ore produced during the Years* 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, *and* 1912.

| Year. | Quantity. | Value. |
|---|---|---|
| | Tons. | £ |
| 1888 | 417 | 5838 |
| 1889 | 415 | 7044 |
| 1890 | 2053 | 26,487 |
| 1891 | 4810 | 52,284 |
| 1892 | 9326 | 45,502 |
| 1893 | 14,302 | 198,610 |
| 1894 | 21,064 | 293,043 |
| 1895 | 17,980 | 175,957 |
| 1896 | 21,167 | 229,660 |
| 1897 | 18,364 | 200,167 |
| 1898 | 15,320 | 188,892 |
| 1899 | 31,519·5 | 250,331 |
| 1900 | 26,564 | 279,372 |
| 1901 | 28,774 | 207,228 |
| 1902 | 46,480 | 218,864 |
| 1903 | 42,422 | 192,492 |
| 1904 | 51,138 | 203,702 |
| 1905 | 75,270·5 | 246,888 |
| 1906 | 87,117·7 | 462,443 |
| 1907 | 89,762·5 | 572,560 |
| 1908 | 63,116·9 | 322,007 |
| 1909 | 80,378·35 | 298,880 |
| 1910 | 51,226·91 | 247,576 |
| 1911 | 61,501·195 | 253,361 |
| 1912 | 90,123·868 | 309,098 |
| | 950,613·473 | 5,488,286 |

## No. 5.

*RETURN showing the Quantity and Value of Blister Copper produced during the Years* 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, *and* 1912.

| Year. | Quantity. | Value. |
|---|---|---|
| | Tons. | £ |
| 1896 | 41·5 | 1245 |
| 1897 | 4700 | 322,500 |
| 1898 | 4955·5 | 400,668 |
| 1899 | 8598 | 735,305 |
| 1900 | 9449 | 907,288 |
| 1901 | 9981 | 879,625 |
| 1902 | 7745 | *462,151 |
| 1903 | 6684 | *478,023 |
| 1904 | 8371 | *582,540 |
| 1905 | 8610 | *704,287 |
| 1906 | 8708 | *862,444 |
| 1907 | 8247 | *832,691 |
| 1908 | 8833 | *603,063 |
| 1909 | 8638 | *586,419 |
| 1910 | 8193 | *553,822 |
| 1911 | 6022 | *385,797 |
| 1912 | 5136 | *430,965 |
| | 122,912 | 9,728,833 |

* Value of Gold contained deducted.

## No. 6.

*RETURN showing Quantity and Value of Copper Matte exported during the Years* 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, *and* 1912.

| Year. | Quantity. | Value. |
|---|---|---|
| | Tons. | £ |
| 1902 | 2500 | 50,112 |
| 1903 | 3727 | 83,624 |
| 1904 | — | — |
| 1905 | — | — |
| 1906 | — | — |
| 1907 | — | — |
| 1908 | — | — |
| 1909 | — | — |
| 1910 | — | — |
| 1911 | — | — |
| 1912 | — | — |
| | 6227 | 133,736 |

## No. 7.

*RETURN showing the Quantity and Value of Copper Ore produced during the Years* 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, *and* 1912.

| Year. | Quantity. | Value. |
|---|---|---|
| | Tons. | £ |
| 1896 | 34 | 1020 |
| 1897 | 75 | 2250 |
| 1898 | 394 | 8128 |
| 1899 | 1695 | 26,833 |
| 1900 | 4221·5 | 63,589 |
| 1901 | 11,221 | 130,412 |
| 1902 | 5994 | 65,270 |
| 1903 | 102 | 790 |
| 1904 | 104 | 1640 |
| 1905 | 1150·75 | 52,939 |
| 1906 | 2234·5 | 72,480 |
| 1907 | 788·25 | 36,975 |
| 1908 | 1185 | 6588 |
| 1909 | 1587·8 | 21,619 |
| 1910 | 671·27 | 13,150 |
| 1911 | 2286 | 22,852 |
| 1912 | 1391·6 | 9479 |
| | 35,135·67 | 536,014 |

## No. 8.

*RETURN showing the Quantity and Value of Iron Ore produced during the Years* 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, *and* 1912.

| Year. | Quantity. | Value. |
|---|---|---|
| | Tons. | £ |
| 1897 | 894 | 812 |
| 1898 | 1598 | 1598 |
| 1899 | 3577 | 3474 |
| 1900 | 5375 | 5995 |
| 1901 | 612 | 417 |
| 1902 | 2386 | 1075 |
| 1903 | 5980 | 2905 |
| 1904 | 6840 | 2975 |
| 1905 | 6300 | 2600 |
| 1906 | 2600 | 1100 |
| 1907 | 3000 | 1150 |
| 1908 | 3600 | 1600 |
| 1909 | — | — |
| 1910 | — | — |
| 1911 | — | — |
| 1912 | — | — |
| | 42,762 | 25,701 |

## No. 9.

*RETURN showing the Quantity and Value of Asbestos produced during the Years* 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, *and* 1912.

| Year | Quantity. | Value. |
|---|---|---|
| | Tons. | £ |
| 1899 | 200 | 363 |
| 1900 | 128 | 113 |
| 1901 | 46·5 | 45 |
| 1902 | — | — |
| 1903 | — | — |
| 1904 | — | — |
| 1905 | — | — |
| 1906 | — | — |
| 1907 | — | — |
| 1908 | — | — |
| 1909 | — | — |
| 1910 | — | — |
| 1911 | — | — |
| 1912 | — | — |
| | 374·5 | 521 |

## No. 10.

*RETURN showing the Quantity and Value of Wolfram produced during the Years* 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, *and* 1912.

| Year. | Quantity. | Value. |
|---|---|---|
| | Tons. | £ |
| 1899 | 3·5 | 99 |
| 1900 | 53·75 | 2058 |
| 1901 | — | — |
| 1902 | — | — |
| 1903 | — | — |
| 1904 | 15·5 | 1147 |
| 1905 | 32·25 | 2371 |
| 1906 | 19·75 | 1465 |
| 1907 | 40·75 | 4411 |
| 1908 | 4·5 | 338 |
| 1909 | 28·35 | 2494 |
| 1910 | 67·35 | 7280 |
| 1911 | 69·96 | 7769 |
| 1912 | 66·49 | 6601 |
| | 412·15 | 36,033 |

## No. 11.

*RETURN showing the Quantity and Value of Bismuth produced during the Years* 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, *and* 1912.

| 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 |
| | 43·61 | 14,961 |

## No. 12.

*RETURN showing the Quantity and Value of Osmiridium produced during the Years* 1910, 1911, *and* 1912.

| Year. | Quantity. | Value. |
|---|---|---|
| | Ozs. | £ |
| 1910 | 120 | 530 |
| 1911 | 271·88 | 1188 |
| 1912 | 778·77 | 5742 |
| | 1170·65 | 8160 |

## No. 13.

*RETURN showing the Quantity and Value of Shale produced during the Years* 1910, 1911, *and* 1912.

| Year. | Quantity. | Value. |
|---|---|---|
| | Tons. | £ |
| 1910 | 364 | 214 |
| 1911 | 500 | 250 |
| 1912 | — | — |
| | 864 | 464 |

## No. 14.

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

| Year. | Ore Smelted. | Products. | | | Yield. | | | |
|---|---|---|---|---|---|---|---|---|
| | | Silver-Lead Bull'n. | Blister Copper. | Matte. | Copper. | Silver. | Gold | Lead. |
| | Tons. | Tons. | Tons. | Tons. | Tons. | Ozs. | Ozs. | Tons. |
| 1896 | 26,028 13/20 | — | — | 2417 6/20 | 1235 1/20 | 75,951 | 4707 | — |
| 1897 | 90,773½ | — | 3476 12/20 | 257 16/20 | 3583 14/20 | 334,349 | 16,485 | — |
| 1898 | 170,933 | — | 4992 | — | 4783 | 606,123 | 24,418 | — |
| 1899 | 275,239 | 2295 | 8463 | 89 8/20 | 8362 | 1,089,657 | 27,615 | — |
| 1900 | 363,113 | 4817 | 9440 | — | 9341 | 1,215,036 | 26,255 | — |
| 1901 | 355,528 | 1839 | 9982 | 50 | 9880 | 800,317 | 21,717 | — |
| 1902 | 411,736 | 6825 | 7727 | 2882 | 8841 | 1,674,816 | 24,719 | 6654 |
| 1903 | 399,032 | 7560 | 6683 | 3413 | 8094 | 1,855,158 | 25,238 | 7529 |
| 1904 | 433,366 | — | 8371 | — | 8265 | 1,896,134 | 26,809 | 7754 |
| 1905 | 466,578 | 9422 | 8611 | — | 8596 | 2,075,431 | 26,469 | 9086 |
| 1906 | 479,775 | 9380 | 8708 | — | 8613 | 2,150,405 | 24,986 | 9300 |
| 1907 | 472,658 | 10,590 | 8248 | — | 8145 | 2,147,120 | 24,531 | 10,060 |
| 1908 | 440,145 | 7181 | 8834 | — | 8723 | 1,654,350 | 22,008 | 6850 |
| 1909 | 429,549 | 6960 | 8640 | — | 8534 | 1,534,780 | 18,812 | 6696 |
| 1910 | 386,679 | — | 8192 | — | 8093 | 656,793 | 11,851 | — |
| 1911 | 284,038 | 3328 | 6022 | — | 5951 | 747,748 | 10,565 | 3204 |

## No. 15.

*RETURN showing the Average Number of Persons engaged in Mining during the Years 1880 to 1912 inclusive.*

| Year. | Number. | Year. | Number. |
|---|---|---|---|
| 1880 | 1653 | 1897 | 4510 |
| 1881 | 3156 | 1898 | 6052 |
| 1882 | 4098 | 1899 | 6622 |
| 1883 | 3818 | 1900 | 7023 |
| 1884 | 2972 | 1901 | 6923 |
| 1885 | 2783 | 1902 | 5934 |
| 1886 | 2681 | 1903 | 6017 |
| 1887 | 3361 | 1904 | 6194 |
| 1888 | 2989 | 1905 | 6581 |
| 1889 | 3141 | 1906 | 7005 |
| 1890 | 2868 | 1907 | 7516 |
| 1891 | 3219 | 1908 | 6466 |
| 1892 | 3295 | 1909 | 6054 |
| 1893 | 3403 | 1910 | 5770 |
| 1894 | 3433 | 1911 | 5247 |
| 1895 | 4062 | 1912 | 5566 |
| 1896 | 4350 | | |

## No. 16.

*RETURN showing the total Number and Area of Leases issued during the Year ending 31st December*, 1912.

| Mineral. | No. of Applications. | No. of Sluiceheads. | Area. |
|---|---|---|---|
| | | | Acres. |
| Asbestos | 6 | ... | 398 |
| Clay | 1 | ... | 10 |
| Coal | 6 | ... | 1504 |
| Copper | 18 | ... | 762 |
| Gold | 37 | ... | 477 |
| Guano | 1 | ... | 3 |
| Iron | 2 | ... | 96 |
| Limestone | 2 | ... | 325 |
| Machinery Sites | 4 | ... | 21 |
| Minerals | 58 | .. | 3001 |
| Pyritic Ore | ... | ... | ... |
| Shale | ... | .. | ... |
| Silver | 6 | ... | 629 |
| Tin | 215 | ... | 5711 |
| Wolfram | 3 | ... | 11 |
| Dredging Claims | 18 | ... | 279 |
| Water-rights | 78 | 274 | 579 |
| Mining Easements | 13 | ... | 114 |
| | 468 | 274 | 13,920 |

## No. 17.

*RETURN showing the total Area of Land and Number of Sluiceheads of Water applied for during the Year ending 31st December*, 1912.

| Mineral. | No. of Applications. | Area. | Sluiceheads. |
|---|---|---|---|
| | | Acres. | |
| Coal | 11 | 2619 | ... |
| Copper | 15 | 575 | ... |
| Flux | 1 | 2 | ... |
| Gold | 38 | 566 | ... |
| Guano | 1 | 5 | ... |
| Limestone | 6 | 688 | ... |
| Minerals | 110 | 5405 | ... |
| Nickel | 1 | 41 | .. |
| Silver | 14 | 1224 | ... |
| Shale | 1 | 100 | .. |
| Scheelite | 1 | 80 | ... |
| Tin | 285 | 7032 | ... |
| Wolfram | 2 | 300 | ... |
| Dredging Claims | 16 | 328 | ... |
| Machinery Sites | 8 | 31 | ... |
| Water-rights | 151 | 268½ | 449 |
| TOTAL | 661 | 19,264½ | 449 |

## No. 18.

*RETURN showing the Number and Area of Leases held under "The Mining Act," in force on 31st December, 1905, 1906, 1907, 1908, 1909, 1910, 1911, and 1912.*

| Nature of Lease. | In force on 31st December, 1905. | | In force on 31st December, 1906. | | In force on 31st Dec., 1907. | | In force on 31st Dec., 1908. | | In force on 31st Dec., 1909. | | In force on 31st Dec., 1910. | | In force on 31st Dec., 1911. | | In force on 31st Dec., 1912. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Area. | No. | Area. | Nov. | Area. | No. | Area. | No. | Area. | No. | Area. | No. | Area. | No. | Area. |
| | | Acres. | | Acres. | | Acres. | | Acres. | | Acres. | | Acres. | | Acres. | | Acres. |
| For Minerals, Silver, Tin, &c. | 944 | 34,325 | 1307 | 43,036 | 1844 | 65,047 | 1269 | 44,099 | 1143 | 41,637 | 1141 | 44,001 | 1025 | 41,311 | 960 | 36,157 |
| For Coal, Slate, Shale, &c. | 45 | 7185 | 35 | 6025 | 45 | 7962 | 45 | 8745 | 51 | 10,590 | 50 | 10,608 | 58 | 13,049 | 37 | 8854 |
| For Gold | 195 | 2087 | 167 | 1836 | 222 | 2671 | 111 | 1344 | 87 | 1265 | 76 | 1159 | 73 | 1220 | 73 | 1344 |
| Dredging Claims | 51 | 1196 | 91 | 2027 | 79 | 1494 | 64 | 916 | 47 | 712 | 35 | 441 | 42 | 647 | 42 | 489 |
| Mining Easements | 45 | 282 | 47 | 298 | 75 | 436 | 88 | 453 | 92 | 464 | 84 | 484 | 99 | 606 | 133 | 606 |
| Machinery Sites | — | — | — | — | — | — | 33 | 133 | 32 | 129 | 33 | 121 | 37 | 145 | 39 | 149 |
| Water-rights Mineral and Gold | 251 | 1477 sluice-heads | 391 | 1606 sluice-heads | 490 | 1978 sluice-heads | 511 | 1003 & 2000 sluice-heads | 550 | 1022 & 2210 sluice-heads | 511 | 1094 & 1751 sluice-heads | 502 | 1060 & 1845 sluice-heads | 550 | 1640 & 2043 sluice-heads |

## No. 19.

*RETURN showing the Total Number of Leases in force on 31st December*, 1912.

| Mineral. | Number. | Sluiceheads. | Area. |
|---|---|---|---|
| | | | Acres. |
| Asbestos | 3 | ... | 158 |
| Barite | 2 | ... | 160 |
| Clay | 1 | ... | 10 |
| Coal | 23 | ... | 6343 |
| Copper | 73 | ... | 3283 |
| Gold | 73 | ... | 1344 |
| Guano | 2 | ... | 5 |
| Iron | 6 | ... | 328 |
| Limestone | 5 | ... | 672 |
| Lithographic Stone | 1 | ... | 97 |
| Minerals | 122 | ... | 11,484 |
| Manganese | 1 | ... | 63 |
| Nickel | 1 | ... | 20 |
| Ochre | 1 | ... | 80 |
| Phosphate Rock | 4 | ... | 15 |
| Silver | 59 | ... | 4061 |
| Slate | 1 | ... | 240 |
| Shale | 7 | ... | 1502 |
| Tin | 675 | ... | 16,364 |
| Wolfram | 9 | ... | 106 |
| Zinc-Lead | 1 | ... | 40 |
| Machinery Sites | 39 | ... | 149 |
| Mining Easements | 133 | ... | 606 |
| Dredging Claims | 42 | ... | 489 |
| Water Rights | 550 | 2043 | 1640 |
| | 1834 | 2043 | 49,239 |

## No. 20.

*RETURN showing the Average Number of Miners employed during the Year ending 31st December*, 1912.

| | Europeans. | Chinese. |
|---|---|---|
| Northern and Southern Division ..... | 536 | ... |
| North-Eastern Division..... | 596 | 65 |
| Eastern Division..... | 456 | 32 |
| North-Western Division ..... | 973 | ... |
| Western Division ..... | 2908 | ... |
| | 5469 | 97 |

## No. 21.

*RETURN showing the Amounts paid in Dividends by Mining Companies during the Year ending 31st December*, 1912.

| Mines. | Dividends. |
|---|---|
| | £ s. d. |
| Copper ..... | 45,066 0 0 |
| Gold ..... | ... |
| Tin ..... | 161,335 0 0 |
| Silver ..... | 7996 0 0 |
| Coal..... | 1812 0 0 |
| TOTAL ..... | £216,209 0 0 |

## No. 22.

*RETURN showing the total Amount of Rents, Fees &c., received by the Mines Department during the Year ending 31st December*, 1912.

| Head of Revenue. | Amount. |
|---|---|
| | £ s. d. |
| Rent of Auriferous and Mineral Land..... | 16,392 3 5 |
| Fees, ditto ditto ..... | 1247 16 6 |
| Survey Fees ..... | 2509 5 3 |
| TOTAL..... | £20,149 5 2 |

## No. 23.

*RETURN showing the Mining Companies registered during the Year ending 31st December, 1912.*

| Number of Companies. | Capital. |
|---|---|
| 17 | £125,762 10s. 0d. |

In addition to the above, 13 Agents for Foreign Companies, and 3 Syndicates, under 60 Vict. No. 51, were registered.

---

## No. 24.

*RETURN showing Quantity and Value of Minerals and Metal raised in Tasmania from 1880 to 1912 inclusive.*

| Mineral or Metal. | Quantity. | Value. |
|---|---|---|
| | | £ |
| Gold ..... ozs. | 1,738,660·744 | 6,914,132 |
| Silver-lead ore ..... tons | 950,613·473 | 5,488,286 |
| Blister Copper..... „ | 122,912 | 9,728,833 |
| Copper Matte ..... „ | 6227 | 133,736 |
| Copper and Copper Ore... „ | 35,135·67 | 536,014 |
| Tin ..... „ | 109,915·285 | 10,884,922 |
| Iron Ore ..... „ | 42,762 | 25,701 |
| Coal ..... „ | 1,312,459·75 | 1,057,700 |
| Wolfram ..... „ | 402·15 | 36,033 |
| Bismuth ..... „ | 43·61 | 14,961 |
| Asbestos ..... „ | 374·5 | 521 |
| Shale ..... „ | 864 | 464 |
| Osmiridium ... ..... ozs. | 1170·65 | 8160 |
| Unenumerated prior to 1894... | ... | 31,988 |
| Total ..... | ... | £34,861,451 |

Diagram showing the Annual Value of Minerals & Metals raised in Tasmania from 1880- 1912

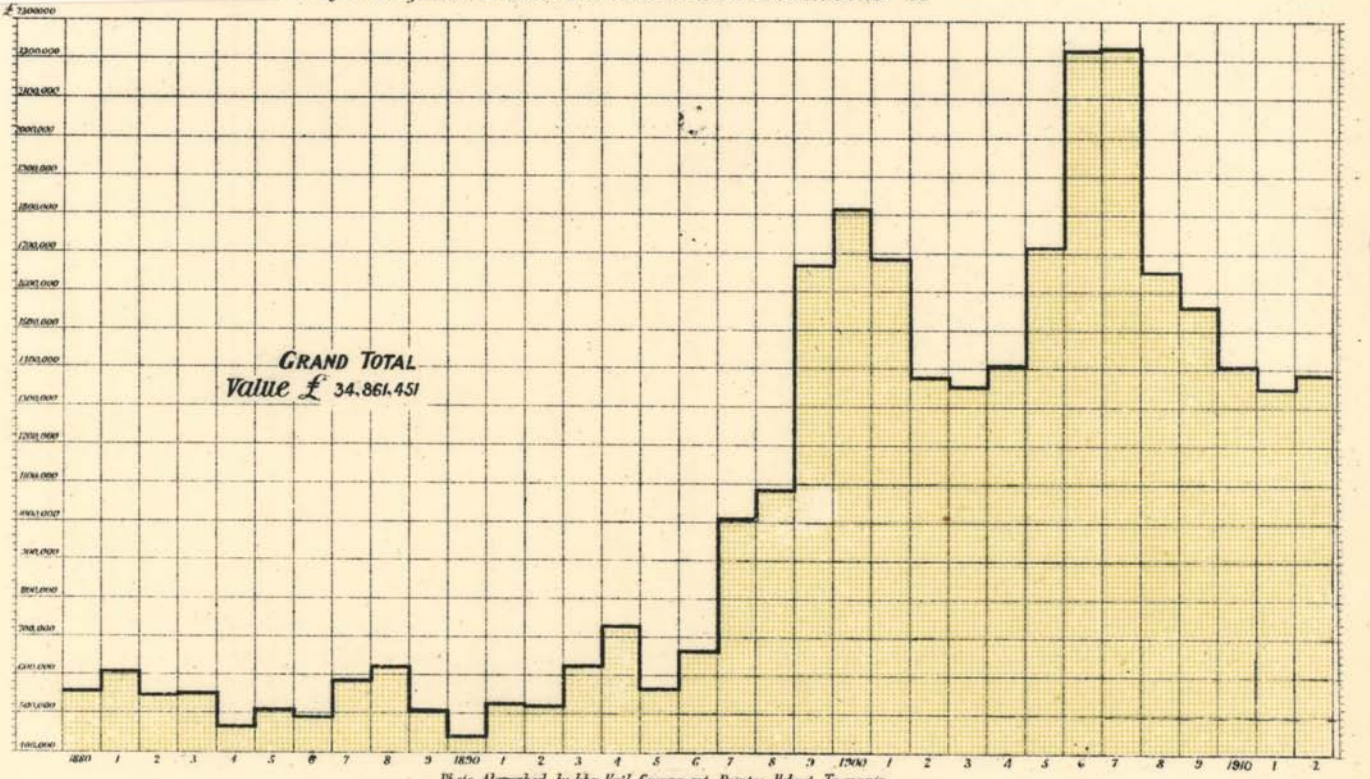



Photo Algraphed by John Vail, Government Printer Hobart Tasmania

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## No. 25.

*COMPARATIVE Statement of Revenue from Mines, being Rents, Fees, &c. (exclusive of Survey Fees) paid to the Treasury for the Years ending 30th June, from* 1881 *to* 1903, *and for Six months ending* 31*st December*, 1903, *and for the Years ending* 31*st December*, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, *and* 1912.

| Year. | Amount. | | | Year. | Amount. | | |
|---|---|---|---|---|---|---|---|
| | £ | s. | d. | | £ | s. | d. |
| 1881 | 20,936 | 5 | 5 | 1898 | 33,661 | 13 | 9 |
| 1882 | 23,077 | 1 | 9 | 1899 | 24,696 | 10 | 5 |
| 1883 | 15,439 | 14 | 5 | 1900 | 28,380 | 11 | 10 |
| 1884 | 6981 | 11 | 10 | 1901 | 21,569 | 5 | 2 |
| 1885 | 11,070 | 5 | 7 | 1902 | 19,471 | 0 | 1 |
| 1886 | 12,523 | 10 | 4 | 1903 | 17,776 | 14 | 3 |
| 1887 | 14,611 | 11 | 5 | 1903, 1 July to 31 Dec. | 14,758 | 17 | 1 |
| 1888 | 23,502 | 8 | 4 | 1904, Jan. to Dec. | 16,631 | 8 | 2 |
| 1889 | 17,254 | 9 | 0 | 1905 | 20,208 | 17 | 0 |
| 1890 | 26,955 | 4 | 9 | 1906 | 24,136 | 12 | 5 |
| 1891 | 37,829 | 16 | 5 | 1907 | 24,794 | 7 | 7 |
| 1892 | 17,568 | 18 | 4 | 1908 | 20,311 | 3 | 0 |
| 1893 | 16,971 | 9 | 2 | 1909 | 22,804 | 1 | 5 |
| 1894 | 16,732 | 7 | 7 | 1910 | 22,221 | 18 | 0 |
| 1895 | 15,323 | 1 | 9 | 1911 | 20,556 | 15 | 10 |
| 1896 | 20,901 | 13 | 2 | 1912 | 17,639 | 19 | 11 |
| 1897 | 25,631 | 0 | 3 | | | | |

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

# REPORT OF THE MOUNT CAMERON WATER-RACE BOARD FOR THE YEAR ENDING 31ST DECEMBER, 1912.

Gladstone, 5th February, 1913.

SIR,

WE have the honour to submit the report of the Board for the year ending 31st December, 1912.

*Repairs.*—With the exception of a creep in the hillside at the northern end of No. 2 Syphon pipe, no repairs of any consequence have been made. The race is now in good order from intake to outlet end, and, with ordinary care and attention, it is not likely to cost much for repairs for some considerable time.

*Syphon Pipes.*—These are working satisfactorily. The two steel pipes are carefully examined by the manager and channel-keepers, and whenever the coating shows any sign of chipping it is removed, and recoated. The two wooden syphons are not likely to give any cause for anxiety for many years to come.

*Renewal Works.*—At the close of the last year the only works remaining to be completed were the laying of the wooden pipes at the Little Mussel Roe intake and the building of a new bank at No. 1 Dam. These have now been finished. The storage capacity of the dam has been slightly increased by excavating and by raising the height of the bank. This dam is used for the purpose of storing water on Sundays, to keep up the supply to customers during the summer months.

The pumping plants are at work raising water from the race to the higher levels for the purpose of working ground which previously could not be profitably worked; and two gravel pumps—one worked by steam and the other by pelton-wheel—have been erected for the purpose of raising and treating dirt from the lower levels.

The total expenditure during the year, inclusive of the amount expended under 9 Edw. VII. No. 51, was £1748 10s. 11d.

The revenue amounted to £1645 0s. 8d., being an increase of £276 10s. 2d. as compared with the previous year

Statistics for the year are as follows:—

Average per week of claims supplied, 15.
Greatest number supplied in any one week, 20.
Total number of heads supplied—

| | |
|---|---|
| Under fixed or cash scale ... ... ... | 1825 |
| Under royalty or credit scale... ... | 1781½ |
| Total ... ... ... ... | 3606½ |

Tin ore raised for the year:—Royalty scale, 14 tons 18 cwt. 2 qr. 25 lb.; fixed scale, 49 tons 17 cwt. 2 qr. Total, 64 tons 16 cwt. 0 qr. 25 lb.

Average number of men employed per week, 35.

Total receipts for the year:—Water sold, fixed scale, £1090 15s. 1d.; water sold, royalty scale, £546 0s. 7d.; miscellaneous, £8 5s. Total, £1645 0s. 8d.

*Expenditure.*—Cost of maintenance and management:—

| | £ | s. | d. |
|---|---|---|---|
| Salaries and wages ... ... ... ... ... | 507 | 5 | 8 |
| Insurance ... ... ... ... ... ... ... ... | 6 | 3 | 0 |
| Cost of survey of blocks for channel-keepers' residences... ... ... | 14 | 0 | 0 |
| Cleaning and repairs to race ... | 71 | 1 | 6 |
| Stores and tools ... ... ... ... ... | 14 | 7 | 0 |
| Stationery and printing... ... ... | 4 | 18 | 11 |
| | 617 | 16 | 1 |
| Renewal and repairs (9 Edw. VII. No. 51) ... ... ... ... ... ... | 1130 | 14 | 10 |
| | £1748 | 10 | 11 |
| Paid to Public Debts Sinking Fund for the year ending 30th June, 1912 (including moiety of rents of mineral land served by the race, £20 17s. 6d.)... ... | £883 | 5 | 8 |

We have the honour to be,

Sir,

Your obedient Servants,

W. H. WALLACE, Chairman.

W. H. TWELVETREES,
CHAS. BARNES,
S. HAWKES,
} Members.

The Honourable the Minister for Mines.

# MINE MANAGERS' EXAMINATION.

## MARCH, 1912.

### METALLIFEROUS.

SUBJECT.—MINING.

1. A lode has been traced through the greater part of a 40-acre section, and has been proved to contain payable deposits at fairly regular intervals throughout that distance. What points would you take into consideration when determining size and position of a main shaft?
2. A contact deposit consists of lenses of ore 50 to 60 feet wide; timbering is required. Describe how you would open up and work out same and method of timbering, and what chutes, passes, &c., you would recommend.
3. It has been decided to place a 12-inch single-acting Cornish lift with 12-inch diameter plungers, 8-feet stroke in a vertical shaft which is to be used for raising ore from a depth of 1000 feet. What would be the dimensions of compartment of shaft required for pumping purposes? Make sketches of shaft as it would be when completed.
4. What do you consider the best type of safety grip for cage, and best type of appliance for landing cage at various levels in a vertical shaft?
5. What general or particular precautions would you take with reference to the proper ventilation of a mine?
6. Describe and sketch different types of chutes for use underground.
7. Briefly describe all the systems of stoping with which you are familiar, stating the conditions which are more or less peculiar to each system.
8. It is required to sink a main shaft to work a lode 20 feet wide and dipping 50 degrees. State, with reasons, where you would sink, and the type of shaft you would put down.
9. A new winding rope and cage have just been installed. State fully what precautions you would take before putting the new plant into commission.
10. A low-grade copper proposition averaging 30 feet in width has been proved by bore holes for a depth of 1000 feet to contain 2,000,000 tons of ore. State briefly how you would develop the property in order to mine and deliver to surface-bins 1000 tons of ore daily. The surrounding country is flat, and there are 2,000,000 gallons of water to be pumped daily.
11. Describe, with sketches, how you would drive through running ground.
12. Discuss the respective advantages and disadvantages of the following pumping systems when handling 10,000 gallons of water per hour. Water is non-corrosive:—
    (*a*) Cornish system.
    (*b*) Electrically driven force-pump.
    (*c*) Direct acting air-driven pump.
    (*d*) Direct acting steam-driven pump.

SUBJECT.—ORE-DRESSING AND SAMPLING.

1. Galena concentrating plants consist essentially of crushings, sizing, and separating appliances. State why the sizing appliances are necessarily more elaborate in some galena plants than in others.
2. Sketch the flow diagram of a model plant for concentrating any one commercial mineral found in Tasmania. State the name and sizes of the mineral particles in the crude ore to be treated, and the character of the gangue.
3. A lode carrying galena unevenly distributed is well opened up by means of drives, rises, and crosscuts. How would you sample the lode with a view of determining its commercial value?
4. Give sketches of different forms of jigs, and state for what limited purposes you consider them best suited.
5. Describe what you consider the best form of slime-settler.
6. Describe vacuum filtration methods, and state which you consider the best, and why.

SUBJECT.—SURFACE WORK.

1. Give sketches of a strong windlass for shaft-sinking, safety-hook, and arrangements for lowering timber.
2. Give sketches of appliances, provided, to prevent accident from overcrowding on (*a*) cage and (*b*) pit-head gear.
3. Show by neat sketches how you would attach a $2\frac{3}{4}$-inch winding rope to (*a*) the drum, (*b*) the cage, and show how to estimate the safe working load.
4. Describe the various methods of signalling between the underground workings and the engine-house.
5. Give an account of the various methods of transmitting power from the surface underground.
6. You wish to supply steam for a high-pressure steam-engine indicating 150 horse-power. What size Lancashire boiler would you consider necessary?
7. What fittings would you require on the abovementioned boiler?
8. If the abovementioned boiler is designed for a pressure of 80 lb. per square inch, what would be its total weight, including fittings?
9. What would be about the weight of the fittings?
10. You wish to parbuckle the abovementioned boiler up an incline of 1 in 4, by means of a single wire rope. What size rope would you recommend for this if the distance to be traversed is 50 feet?

SUBJECTS.—ARITHMETIC, MENSURATION, AND MINE ACCOUNTS.

1. Find the volume of a log of squared timber which is 10 feet in length, and measures 6 inches by 4 inches at one end and 8 inches by 5 inches at the other end.
2. A tunnel is 300 yards in length, and its total rise is 101 feet 6 inches. What is its rise per horizontal yard, and what is the gradient?
3. How many cubic yards of rock are taken out in driving a level 60 yards long, 7 feet wide, and 6 feet high?

4. If a cubic yard of solid ore weighs 7000 lb., what is the specific gravity of the ore? (Weight of a cubic foot of water = 62·5 lb.)
5. Extract the square root of ·5 to five places of decimals.
6. Describe the books of account which you would keep at the mine, and give illustrations of the forms of statistical returns to be sent in periodically to the head office.
7. Show how you would dissect expenditure, and apportion it to revenue and capital (or suspense) accounts respectively. What data do you require for the purposes of efficient management? Illustrate by a dissected working cost sheet.

SUBJECT.—MINING SURVEYING.

1. When chaining on an incline how would you obtain true horizontal distances? What corrections per chain are necessary for inclines of 1 in 50, 1 in 30, 1 in 7?
2. How would you use a miner's dial in the presence of local magnetic attraction? Describe your work in detail, with an example of field notes.
3. A large regular lode has a north and south strike and 45° dip.

   At No. 1 level No. 1 crosscut, 300 feet south of shaft, measures 100 feet between walls.

   At No. 1 level No. 2 crosscut, 400 feet south of shaft, measures 100 feet between walls.

   At No. 2 level No. 1 crosscut, 350 feet south of shaft, measures 100 feet between walls.

   At No. 2 level No. 2 crosscut, 450 feet south of shaft, measures 100 feet between walls.

   Find the tonnage of ore between the levels, and bounded by planes through the No. 1 crosscuts and No. 2 crosscuts. Specific gravity of ore to be taken as 3·00.
4. How would you adjust your theodolite for collimation, knowing the horizontal axis is out of adjustment?
5. Describe careful levelling in rough country. Give an example of level book, with the usual checks.
6. How would you transfer a surface bearing and level to the bottom of a shaft?
7. Show how to use a traverse table in checking a closed traverse. It is found in a traverse of a closed figure that the bearing of one line and length of another, not contiguous, are missing. How would you calculate these quantities?

SUBJECT.—MINING GEOLOGY

1. State Zimmerman's law for recovering the faulted portion of a lode.

   Suppose that in driving north-east on a lode it is found to be displaced by a fault which has a strike of N.W.-S.E. and dips S.W. at an angle of 50°. The lode dips N.45° W., also at an angle of 50°. Show by a sketch in which direction you would seek the faulted portion of the lode.

2. How do you proceed when estimating the tonnage of ore in a solid block of lode? Give an example.
3. State what you know about the vertical distribution of ores and by what factors is it affected?
4. Enumerate and describe the chief ores of lead and copper.
5. Explain the following terms: "Horse," "schist," "slickenside," "stockwork," "anticline," "metasomatism."
6. Name and describe the different kinds of pyrites.
7. Give an account of the geology of any ore-deposit with which you may be acquainted.

SUBJECT.—MINING LAW.

1. What is the penalty for damaging, misusing, or failing to use, when necessary, any appliances for the prevention of dust, fumes, or smoke?
2. What quantity and under what conditions may gunpowder be stored in a mine?
3. Under what circumstances may a bulled hole be loaded with a further bulling charge?
4. May a higher explosive compound be used for igniting a fuse?
5. How may a fuse be "spitted"?
6. What protection for the men is required during shaft-sinking operations?
7. What space is allotted between the rungs of a mine ladder?
8. What is the minimum distance allowed between the ladder rungs and the side of the shaft?
9. What weight is required to be used when testing cages?
10. What speed is allowed when raising or lowering men by means of a bucket?

## COLLIERY.

SUBJECT.—MINING.

1. State the chief dangers in using "electricity" underground, and the precautions you would take.
2. What are the two most common of the objectionable gases met with in coal mines? How and where would you find them?
3. Discuss fully the "exhausting" system and the "blowing" system of ventilating mines. Under what conditions would you prefer one to the other?
4. State the precautions you would take when driving a room towards old workings.
5. State and illustrate how you would ventilate a room the face of which had been extended some distance ahead of the last crosscut.
6. Describe, with illustrations, the principles of working on the Room and Pillar system and the Long Wall system. Give the features which are peculiarly favourable to each system.
7. A colliery, with an output of 10,000 tons per month, is worked through a shaft 800 feet deep. Describe arrangements for handling tubs at top and bottom of shaft.

8. What are the relative advantages of round and rectangular shafts?
9. Describe a system of underground rope haulage.
10. Describe what you consider the best coal-cutting and shearing machines, and your reasons for selecting them.
11. In working long-wall, how would you determine length of stall and direction of working?
12. Describe a self-acting haulage plane for underground use, with full details for construction and erection.

SUBJECT.—MINING GEOLOGY.

1. Describe and sketch the different kinds of faults met with in coal mining. Explain how to pick up the faulted part of a seam which is lost in working.
2. Describe the following varieties of coal: cannel coal, bituminous coal, anthracite. Give their leading characteristics and their commercial uses.
3. State the rule for calculating tonnage contents of a seam by means of the specific gravity of the coal.
4. In prospecting for coal in Tasmania or Australia, how do you assure yourself of the geological horizon of the strata by means of fossils?
5. Describe the whole process of boring for coal (from choosing sites to keeping the register) in such a way that it may be seen by what considerations your practice is governed.
6. What injurious impurities are liable to be present in coal? Mention how they affect its marketable value.
7. Give a short description of the distribution of coal in Australia and Tasmania in time and in space.

SUBJECT.—SURFACE WORK.

1. Give sketches of a strong windlass for shaft-sinking, and a suitable safety-hook and shackle for lowering timber.
2. Give sketches of the appliances provided to prevent accident from overwinding on (*a*) the cage, (*b*) the pit-head gear.
3. Show by neat sketches how you would attach a 2¾-inch winding rope to (*a*) the drum, (*b*) the cage, and show how to estimate the safe working load.
4. Describe the various methods of signalling between the underground workings and the enginehouse.
5. Give an account of the various methods of transmitting power from the surface underground.
6. What quantity of water, and from what depth, can you raise by means of a pumping engine placed underground, having a 28-inch cylinder, with a 60-inch stroke, working a 10-inch pump, both double acting, the mean steam pressure being taken at 35 lb. per square inch?
7. What size Lancashire boiler would you require to operate the abovementioned engine?
8. Give a full description of the "pulsometer," and state what are its uses, advantages, and disadvantages.
9. Describe a "syphon" and its method of operation.
10. Describe the appliance called a "water-gauge" used as a draught indicator in mines.

SUBJECTS.—ARITHMETIC, MENSURATION, AND MINING ACCOUNT.

1. How many tons of coal are there in a block of seam 300 yards long and 200 yards broad, when the seam is 6 feet 6 inches thick, and the coal has a specific gravity of 1·27?
2. Divide 4789 tons 18 cwt. 2 qr. 16 lb. by 28.
3. How much air passes, per minute, through an airway measuring 8 feet by 7 feet, when the anemometer registers 400 revolutions per minute; and what is the area of an airway through which 200,000 cubic feet of air pass with a velocity of 50 feet per second?
4. Apportion £96 freight to three items so that the proportions charged to each item may be as the numbers 3, 4, 5.
5. Find the difference between $3\frac{1}{2}$ and $9\frac{1}{4}$; multiply $2\frac{1}{3}$ by $167\frac{1}{2}$; express 30·0125 as a vulgar fraction in its lowest term; divide 159·134 by ·0136.
6. Describe the books of account which you would keep at the mine as a colliery manager, and give illustrations of the forms of statistical returns to be sent in periodically to the head office.
7. Show how you dissect expenditure and apportion it to revenue and capital (or suspense) accounts respectively. What data do you require for the purpose of efficient management? Illustrate by a dissected working cost sheet.

SUBJECT.—MINING SURVEYING.

1. When chaining on an incline how would you obtain true horizontal distances? What corrections per chain are necessary for inclines of 1 in 3, 1 in 5, and 1 in 8?
2. How would you use a miner's dial in the presence of local magnetic attraction? Describe your work in detail, giving an example of field notes.
3. Bores are put down from a perfectly level surface. At a point A coal is struck at 100 feet, at B 500 feet east of A it is struck at 110 feet, at C 500 feet south of A it is struck at 120 feet. At what depth would you expect to strike coal from a point 500 feet south of B? Calculate the angle of dip, and direction of dip of the seam.
4. A seam dips due south. A bore at A goes through coal from 100 feet to 107 feet; one at B, 500 feet south of A, goes through coal from 300 feet to 307 feet. Calculate the true thickness of the seam and the quantity of coal per acre, assuming a level surface and specific gravity of coal, 1·25.
5. How would you transfer a surface bearing to the bottom of a shaft?
6. Describe clearly, with example of field notes, how you would make a complete survey of a small colliery worked from an adit.
7. Show how to use a traverse table in checking a closed traverse. It is found that in such a traverse the bearing of one line is missing, and the length of another, not contiguous, is also missing. How would you calculate these missing quantities?

SUBJECT.—MINING LAW.

1. When may an uncertificated manager have charge of a mine?
2. What is a manager required to do before the commencement of each shift?
3. What is he required to record in the mine-book?
4. What is a manager required to do when inflammable gas is found to exist in a mine?
5. What size pillars must be left when seams of less than 4 feet are worked?
6. May a high explosive be used for igniting a fuse?
7. How may a fuse be "spitted"?
8. What space is allowed between the rungs of a mine ladder?
9. What is the minimum distance allowed between the ladder rungs and the side of a shaft?
10. What weight is required to be used when testing cages?

# MINE MANAGERS' CERTIFICATES.

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

*SERVICE Certificates of Competency granted by the Board of Examiners.*

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

*CERTIFICATES of Competency granted by the Board of Examiners.*

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

*CERTIFICATES of Competency*—continued.

| No. of Certificate. | Name. | Date of Certificate. | Class of Certificate. |
|---|---|---|---|
| 42. 1904 | Martin, Edward Patrick | 17 Feb. 1904 | First class |
| 43. 1904 | Herman, Hyman | 29 Apr. 1904 | First class |
| 44. 1904 | Murray, Russell Mervyn | 29 Apr. 1904 | First class |
| 45. 1904 | More, George Allan | 14 Oct. 1904 | First class |
| 46. 1905 | Beamish, William Abraham | 3 Jan. 1905 | First class |
| 47. 1905 | Andrews, Thomas J. | 1 May,1905 | Second class |
| 48. 1905 | Hitchcock, William E. | 1 May,1905 | First class |
| 49. 1905 | Smith, George Oliver | 18 July,1905 | First class |
| 50. 1906 | Rockett, Hildreth Peyton | 23 Apr. 1906 | Second class |
| 51. 1906 | Hales, Richard Chilman | 23 Apr. 1906 | Second class |
| 52. 1906 | Debenham. Arthur John | 28 June,1906 | First class |
| 53. 1906 | Coote, Charles Edward | 18 Oct. 1906 | First class |
| 54. 1907 | Marks, Oscar Sidney | 8 Mar. 1907 | First class |
| 55. 1907 | Phelan, Bernard Fredk. | 23 Apr. 1907 | Second class |
| 56. 1907 | Moline, Arthur Howard Pritchard | 23 Apr. 1907 | First class |
| 57. 1907 | Macartney, Ross Kenneth | 23 Apr. 1907 | First class |
| 58. 1907 | Williams, Thomas James | 8 May,1907 | First class |
| 59. 1908 | Hooke, Arthur Warner | 18 Mar. 1908 | First class |
| 60. 1908 | Adams, Oliver Linley | 25 Apr. 1908 | First class |
| 61. 1908 | Seal, Leonard Presley | 19 Nov. 1908 | First class |
| 62. 1909 | Watt, William Shand | 20 Apr. 1909 | First class |
| 63. 1909 | M'Intyre, William Keverall | 20 Apr. 1909 | First class |
| 64. 1909 | Bruschle, Conrad C. | 8 May,1909 | Second class |
| 65. 1909 | Reid, William Daniel | 30 June,1909 | First class |
| 66. 1909 | Brook, Reginald H. T. | 5 Aug.,1909 | First class |
| 67. 1910 | Martin, A. E. | 17 Feb. 1910 | Second class |
| 68. 1910 | McKenny, S. D. | 24 Mar. 1910 | Second class |
| 69. 1910 | Smith, Chas. Lonsdale | 30 June,1910 | First class |
| 70. 1910 | Allen, Douglas Vernon | 9 Sept. 1910 | First class |
| 71. 1910 | Alabaster, Rupert Cecil | 28 Sept. 1910 | First class |
| 72. 1910 | Bedford, Max E. | 24 Nov. 1910 | First class |
| 73. 1911 | Rough, John H. | 24 Apr. 1911 | Second class |
| 74. 1911 | Vandean, Henry Alexander | 25 May,1911 | First class |
| 75. 1911 | Garrett, James Edward | 6 June,1911 | First class |
| 76. 1912 | Gudgeon, Cyril Wayth | 17 Apr. 1912 | Second class |
| 77. 1912 | James, Eric Lisle | 17 Apr. 1912 | First class |
| 78. 1912 | Jakins, George Fredk. | 17 Apr. 1912 | First class |
| 79. 1912 | Barkley, E. | 17 Apr. 1912 | First class |

*COLLIERY Certificates of Competency granted by Board of Examiners.*

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

# GEOLOGICAL SURVEY OF TASMANIA.

## REPORT OF THE GOVERNMENT GEOLOGIST.

Geological Survey Office,
Launceston, 20th March, 1913.

SIR,

I HAVE the honour to present my report for the year ended 31st December, 1912.

The general work of the Survey was interrupted greatly by Mr. Ward's departure at the termination of the previous year. The appointment of new officers involved some delay in picking up the threads of work. Mr. Ward's successor, Mr. L. L. Waterhouse, B.E., arrived on the 22nd May; and a second appointment, that of Mr. Loftus Hills, M.Sc., was subsequently made, Mr. Hills taking up his duties on the 1st November.

Mr. Waterhouse is of Tasmanian extraction, but received his training at the University of Sydney. Mr. Hills is a native of Tasmania, and graduated at the University in Hobart. Both have entered upon their work with the enthusiasm which makes for efficiency, and the work which they have done already has shown that we have acquired officers who will render us good service.

The field movements of the staff during the year were as follows: —

Government Geologist.—January 16 to March 29, in the Middlesex, Black Bluff, Mt. Claude, and Lorinna districts. July 31 to August 8, at the mining conference at Zeehan and at Renison Bell. October 11 to 26, at Queenstown and Hobart, at the time of the fire at North Lyell. December 10 to 23, at Queenstown, attending the Royal Commission of enquiry into the fire at North Lyell.

Mr. Waterhouse.—July 16 to November 1, in the Stanley River district.

Mr. Hills.—December 2 to 29, at Wynyard and Preolenna.

I beg to append Mr. Waterhouse's yearly report. He is now engaged in preparing a bulletin covering the results of his examination of the Stanley River district.

Mr. Loftus Hills has completed an examination of the Preolenna Coalfield and the supposed coal country at Wynyard. Since the close of the year his bulletin (No. 13) has been prepared and forwarded for publication. The coalfield at Preolenna, though the seams are small, will apparently be able to produce coal of a high quality and moderate quantities of shale very useful for gas-enriching. The proposed tramway into the Flowerdale will afford the marketing facilities which are indispensable if these seams are to be worked.

Mr. W. D. Reid, who has acted for some years as supernumerary draftsman and clerk, was appointed in May last as a permanent member of the service. He is the holder of the full diploma of the Zeehan School of Mines and of a Tasmanian

mine manager's certificate. Mr. Reid has made a close study of mining methods, and is available for emergency mine inspections. During Inspector Griffin's absence from the State he conducted the departmental inquiry into the mining accidents at Beaconsfield in October and November last.

*Middlesex and Mt. Claude Districts.*

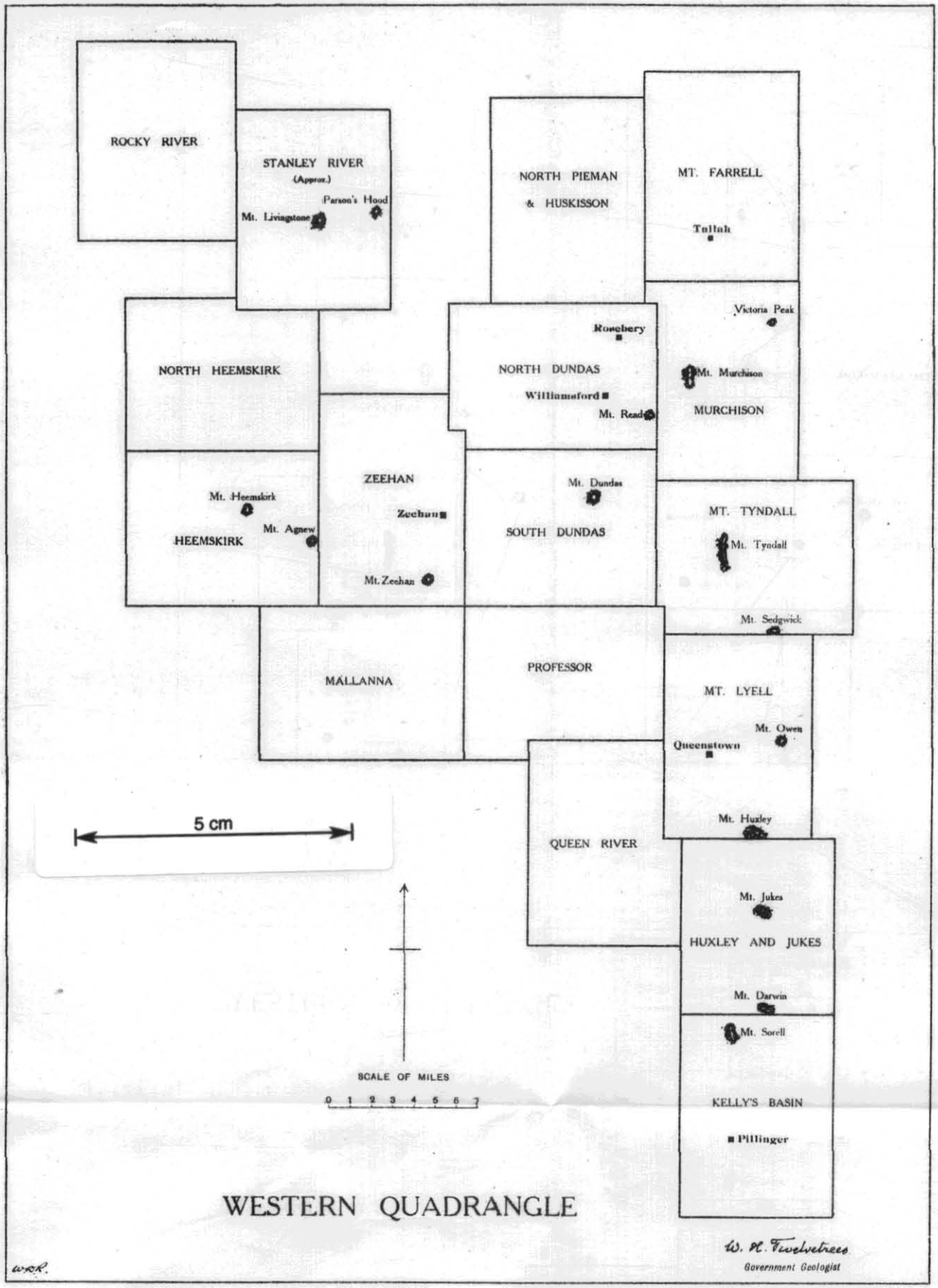
The preparation of the Middlesex bulletin has been unavoidably delayed by the interruptions to work mentioned above. It is in progress, but cannot be issued for some time yet.

The area covered by the inspection is an extensive one, but accounts of the various mining properties visited were prepared soon after returning from the journey, and published in the daily press. These need not be recapitulated here, as fuller descriptions will shortly appear in the bulletin. It is sufficient here to note that the district has greatly improved during the last few years as an ore-producer. The establishment of the magnetic separation plant in Launceston for treating tin-wolfram-bismuth ores has put new life into mining at and near Moina.

The S. and M. Mine is producing ore profitably, and appears to be in a strong position, having good ore reserves available. Gurr and Castles' wolfram mine on the Narrawa Fall is doing well; and Adam and Davie's show, the Iris, is an active producer and is disclosing some good tin and wolfram bearing wash. The Lady Barron Mine has a wolframite lode which has in the past yielded a fair quantity of ore. It is being worked by tributors, and the property invites serious development. Wolfram sections on the Forth Fall (Sayer's and Urquhart's leases) are idle, waiting for investors with capital for testing the long lines of lodes which have been cut into at the surface and at shallow depths. These are preponderatingly wolfram sections, although some good tin has been met with sporadically on Sayer's. This great stock of wolframite and tin-bearing granite crosses the Forth River, and has as its appanage a complex of veins and disseminations of ore in the country known as the Tin Spur. No active mining is proceeding there at present; the patches of tin ore which have been found so far are irregular, and the ore itself is very fine as a rule, but from the position of the ground with regard to the granite it is worth prospecting. The old Dolcoath ground west of the Forth is another area which should be prospected. Nothing payable is visible there at present, but indications are favourable for the existence of ore.

The goldfield at Bell Mount is deserted, the payable alluvial having been apparently worked out. The source of the gold won at the diggings has not been established. but the metal must have been released from veins in the country immediately adjacent. The tin and wolfram country would seem to be excluded as a possible source, owing to the notable absence of those ores from the wash.

A somewhat peculiar lode of specularite-pyrite has been prospected by Reardon and Day in the belt of Dove River granite south of Lorinna. Up to the present it has not proved of any value for economic minerals.




# WESTERN QUADRANGLE

W. H. Twelvetrees
Government Geologist

W.H.R.

Photo Algraphed by John Vail Government Printer Hobart Tasmania.

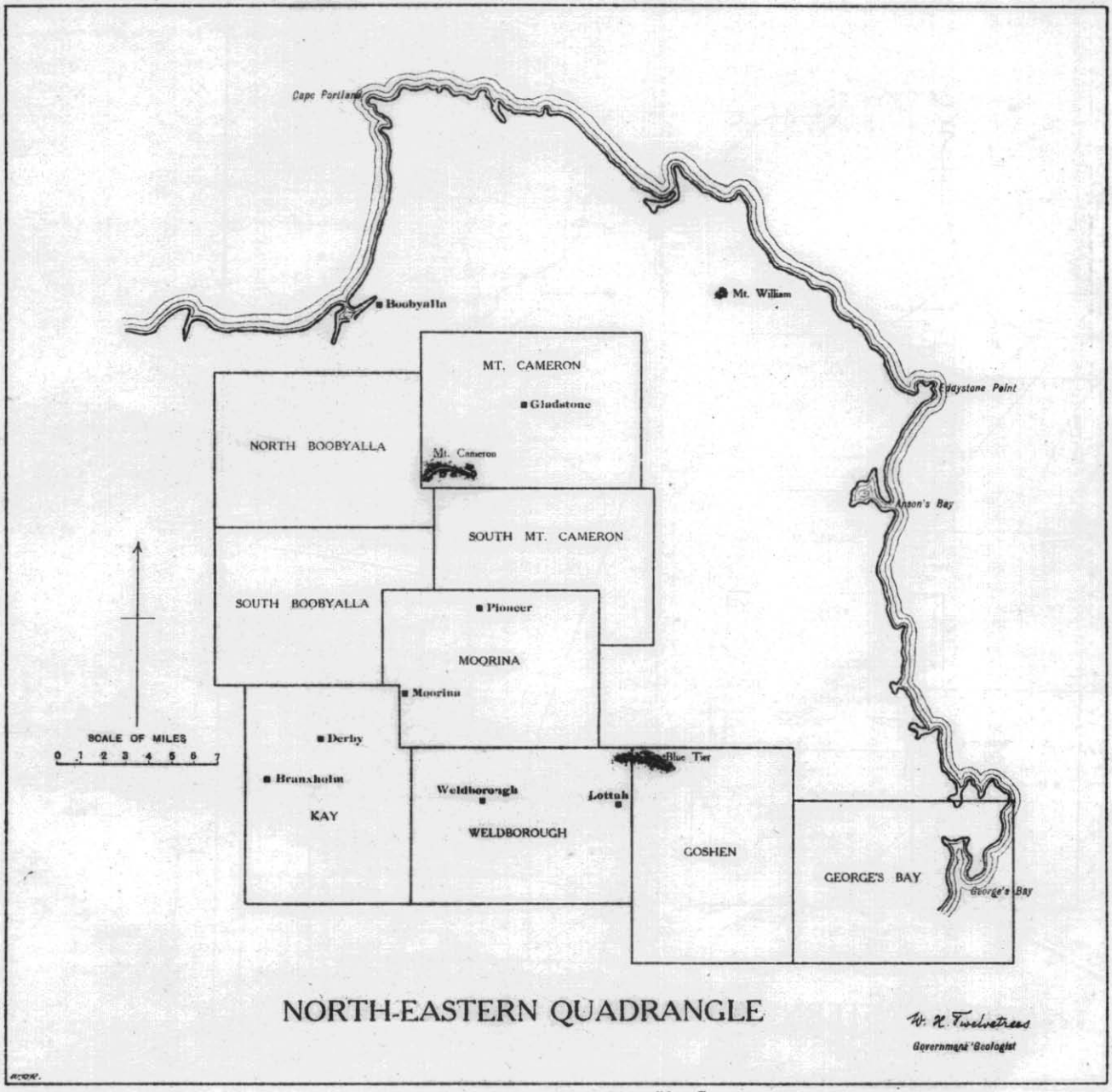



Photo Algraphed by John Vail Government Printer Hobart Tasmania.

5 cm

The Devon Mine is idle. It has sent to market intermittently good clean galena with an appreciable gold content, but has had to contend with high transport rates owing to its inaccessible position and difficult roads. The projected Wilmot railway will be of assistance to it, and very welcome to the other mines of the district.

The Round Hill Silver-lead Mine at Mt. Claude is being worked on tribute, and the tributors are doing fairly well. Capital is needed to properly develop this property, which seems to possess the elements of success. All the mineral country south of the Round Hill is now easily accessible by means of the new road to Lorinna.

*Geological Survey Maps.*

To properly realise the nature of the work of the Survey, it is essential to bear in mind that the economic needs of the State are paramount, and hence the economic side of geology must be the one to receive our principal attention. Accordingly the main endeavour is to make a presentation of our mineral resources and to keep up a continuous description of mining fields. These fields are scattered and extensive, and while irregular and special inspections of them are required by circumstances which may arise from time to time, the full examination and elucidation of their structure and resources can only be carried out with profit systematically and in pursuance of a properly considered plan.

While, owing to the highly mineralised nature of large tracts of the West Coast, that part of the island must in any intelligent survey scheme receive preponderating attention, the eastern mineral fields cannot be neglected. The Geological Survey therefore proposes a well-balanced programme, which shall do justice to the claims of both sides of the island.

In submitting this scheme, which is illustrated by the accompanying charts, I wish to avoid anything which is too ambitious for present requirements, and to restrict our aims to what is practicable in the immediate future.

It is highly desirable to issue geological maps of connected mineral areas. The two plans which accompany this report will show how definite quadrangles on both sides of the island will be surveyed by degrees until the issue of two complete maps of the areas in question becomes possible.

It is proposed that Mr. Waterhouse and Mr. Hills work at the West Coast quadrangle until it is completed, taking the sectional parts in such order as may seem best from time to time.

As for the North-East Coast, I would submit that I be allowed to take in hand the area delineated on the chart in the course of brief journeys at such times as I can spare from my other duties. In this way I think more can be done than by waiting until time can be spared for long field journeys.

Of course, there are areas requiring examination outside these quadrangles, and circumstances may happen which will necessitate special visits to them; but the programme now suggested will form the regular plan of work for the present.

By steadily adhering to such a plan as this I hope that the preparation of complete area maps will be ultimately achieved; and I do not see how it could be as readily accom-

plished in any other way. On the West Coast some real progress has already been made by the surveys of the Farrell, North Dundas, Zeehan, and Stanley River fields. These will be supplemented in the coming year by field work in the Jukes-Darwin, Heemskirk, and Point Hibbs districts. If towards the end of the year the Gladstone district can be visited, a beginning will be made with serious charting in the north-east.

*Geological Map of Tasmania.*

During the past year the journeys to Mt. Claude, Middlesex, Stanley River, and Wynyard permitted the collection of further material for this map. I also desire to thank Mr. C. F. Heathcote, general manager of the Tasmania Mine, for some valuable information which he has kindly placed at our disposal relating to the geology of the country round Beaconsfield.

The geology of much of the island between the separate mining fields, and especially in the agricultural parts, is still very imperfectly known, and our knowledge of great unexplored regions in the west and south-west is still more defective. But the numerous enquiries for a geological map of the island more recent than the one now in print make it eminently desirable that another general sketch-map be issued without waiting for the accumulation of further detail. During the past few years information which will be of service in this respect has been accumulating in my office, and by the end of the present year I hope to be able to prepare a map which, though it must necessarily be defective in many respects, will at any rate embrace the latest additions to our knowledge of the geology of the island.

*Iron Ore Resources.*

My early report on the Blythe iron ore deposits is now out of print, but inquiries for it are received from time to time; and the issue of my report on the iron ore near Beaconsfield is also nearly exhausted. The advances which are being made in the treatment of iron ores make it desirable to review the possibility of utilising our deposits. It is intended this year to revise the former reports, and issue a bulletin containing the latest information on the subject.

*Programme of Work for this Year.*

The following appears to be the most likely distribution of work during the coming year, subject to such deviations as may be found necessary from time to time:—

Government Geologist—
- (*a*) Completing the Middlesex bulletin.
- (*b*) Preparing bulletin on iron ore resources.
- (*c*) Completing new geological map of Tasmania.
- (*d*) Visit to Gladstone country if time permits.

Mr. L. L. Waterhouse—
- (*a*) Completing bulletin on Stanley River district.
- (*b*) Survey of Mt. Heemskirk country.

Mr. Loftus Hills—
- (*a*) Survey of Jukes-Darwin country.
- (*b*) Survey of country south of Macquarie Harbour.

*Geological Survey Records.*

No. 1 of these publications, which are designed to give information on matters relating more particularly to the scientific side of the work of the Survey, consists of a description of fossils from the Mersey tasmanite shalefield, written by Mr. W. S. Dun, Palæontologist to the Geological Survey of New South Wales. It has been sent forward for publication, and will appear shortly. It is intended, in accordance with the usual practice, to enlist the assistance of scientists of repute in their respective subjects in the way of contributing at intervals to these records.

*Museum.*

Four new cases have been placed in the Victoria Museum during the year, and the exhibits of ores have been correspondingly enlarged. The collections continue to attract the attention of visitors. The work of arrangement has devolved on Mr. Waterhouse, and has proceeded as far as the available time permitted.

*Assay Laboratory.*

It has been decided by the Hon. the Minister to have a laboratory attached to the Geological Survey, primarily for the encouragement of prospectors in their search for useful minerals and for the benefit of the mining industry generally. This will be erected during the present year, when prospectors and others will have no difficulty in obtaining authoritative determinations of the value of their discoveries. Certain conditions will have to be complied with, however, and these will be published when things are in readiness for a start. The laboratory will be also of advantage for carrying out standard assays of well-known ores and minerals, as well as for such research work as is necessary for the publications of the Survey and as the officers may have time to prosecute.

*Government Prospecting.*

The appointment of the State Mining Engineer to the control of Government prospecting parties has made some inroad on my time in the way of preparing suggestions for the scheme of operations and in other directions.

*Office.*

Departmental work during the year has been heavy, and has taken up much time. The correspondence has comprised 3000 letters, reports, bulletins, &c., in and out. Our acknowledgments are offered to proprietors of the Australian and Tasmanian newspapers, &c., for the usual supply of office copies. Our office accommodation has been increased by two additional rooms in the Public Buildings; the want of these had been greatly felt.

I have, &c.,

W. H. TWELVETREES, Government Geologist.

W. H. WALLACE, Esq., Secretary for Mines.

## REPORT OF THE ASSISTANT GOVERNMENT GEOLOGIST.

Geological Survey Office,
Launceston, 10th March, 1913.

SIR,

I HAVE the honour to present the following report on the work upon which I have been engaged during the year ended 31st December, 1912.

I joined the Tasmanian Government Service towards the end of May, and for two months was occupied at headquarters in Launceston. During this period the library of the Geological Survey, with various reports, charts, and maps which had accumulated and could not be set out for lack of space were classified and arranged, and so made available for reference, in the new rooms provided. Also, the whole of the Survey collection of rocks and minerals at the Victoria Museum was rearranged.

Acting on instructions received, I proceeded on 16th July to the West Coast, in order to undertake the geological survey of the Stanley River district. Owing to the bad weather experienced, and a slight mishap in the field, this examination was not completed until the end of October. Reporting at headquarters on 1st November, I proceeded at once to compile my preliminary report, summarising the results of my field work, this report being completed on 28th November, and printed in the daily papers a few days later.

A commencement was then made with the preparation of maps for the complete bulletin, and several days were spent in determining various minerals brought in by prospectors who had come to town for the Christmas season.

### *Notes on the Stanley River District.*

The following is a brief summary of observations made in the Stanley River district:—

The field presents many points of similarity to other West Coast tinfields. Situated at the junction of Devonian granite with an older series of rocks, the lodes occur partly in the intrusive granite and partly in the surrounding sedimentary formations. This tin-bearing granite forms the southern extremity of the huge Meredith Range massif, and was intruded at the same time as the stanniferous granite in many other parts of the island.

In addition to the acidic rocks, we have a development of basic eruptives, gabbro and pyroxenite, now largely converted to serpentine, forming the country between the Harman and Wilson Rivers, and extending in a long and comparatively narrow belt in a south-easterly direction. These rocks appear to be older than the granite, and have intruded Silurian strata. This occurrence confirms observations made by officers of the Geological Survey in other districts; both basic and acidic eruptives are derived from the one parent magma, the former being intruded slightly before the latter, although both are of Devonian age. It is in connection with these rocks that tin is found in the Stanley River Field.

The oldest rocks represented in the district appear to be the series of quartz-schists, mica-schists, and quartzites which form Mt. Livingstone and the button-grass country to the west and south-west. There is no direct evidence to fix the age of this series, but it is believed to be older than the Cambro-Ordovician slate series, and is tentatively classed as Pre-Cambrian. The rocks are, lithologically, similar to Pre-Cambrian schists which occur in other localities. These rocks are intersected by innumerable small veins of quartz which appear to be connected with the Devonian granite. Should this supposition be correct, tin may be expected in this portion of the district. A few chains west of the alluvial flat, being worked by the Stanley Reward Company, an outcrop was noticed on a spur from Mt. Livingstone of a banded black and white rock, which is really a banded quartz tourmaline, in which the material of the schist has been metasomatically replaced by quartz and tourmaline. Tin has not been found here, but the locality merits careful prospecting.

Between the Stanley and Wilson Rivers is a development of rocks highly altered by the granite intrusion. These are representatives of the Cambro-Ordovician slates and sandstones so typically developed at North Dundas; associated with them are members of the igneous porphyroid suite. The original slates and sandstones are scarcely recognisable as such; they are tilted to a high angle, and in appearance and fracture closely resemble igneous rocks. This Cambro-Ordovician series forms the country rock at the Mt. Lindsay Mine.

Fossiliferous Silurian sediments, sandstones, slates, and limestones occur east of the Wilson River. The Mt. Merton Mine is situated in this area, close to the contact with the basic intrusives.

The invasions of basic and acidic igneous rocks in Devonian time has been referred to.

There is a break in the geological record from Devonian times, the only other formation represented being the alluvial deposits along the banks of the Pieman, Wilson and Stanley Rivers, part of those on the latter now being worked by the Stanley Reward Tin Mining Company. These unconsolidated sediments may probably be referred to Pleistocene age. River erosion had reached a mature stage, and the grade had become too flat to allow the river to carry off the detrital matter; consequently, this was deposited. With the rock debris, the cassiterite derived from the disintegration of the Meredith Range granite was deposited, originally at a higher level than it now occupies, as shown by remnants of older terraces. After a subsequent elevation the river cut down its bed once more, and a reconcentration of the heavier constituents of the wash took place, alluvial deposits being formed at lower levels.

The Stanley Reward Company has not met with the success it deserves. In common with the other mining companies in the district, a serious handicap has been the lack of transport facilities. The property is about 15 miles from Renison Bell railway-station, and packing charges of £12 to £14 per ton have to be paid. The pack-track being badly graded in many places, no pieces of heavy machinery can be sledged out. In bad weather the track becomes practically impassable even for sledges. Nevertheless, a sluicing plant with hydraulic elevators was erected, water being obtained from the Upper Stanley

by a race between 3 and 4 miles in length, 300 feet of head being obtained. The variable water-supply, the difficulty of obtaining experienced men, and the high rate of wages, have all militated against success. Although the wash carries no large boulders, the excessive amount of shingle which it is necessary to move adds considerably to working costs.

With regard to the future of the property, there is good reason to believe that there are values which will assure some years' work at a profit under careful management. The lode formation which occurs in the north-west corner of Section 133M, a contact deposit, should certainly be vigorously developed. It carries good tin values in the surface outcrop, and there are indications that the formation is a large as well as a rich one. Immediate attention should be given to this formation. The property was being worked by tributers at the time of my visit.

The Mt. Lindsay ore-body is being developed by crosscuts and adits, but has not yet reached the status of a tin-producing mine. The formation is a large one, and is a metasomatic replacement ore-body.

There is a considerable development of gossan, carrying payable tin in sufficient quantities to warrant the erection of small mill without delay. The main sulphide ore-body needs systematic sampling before the payable width can be definitely determined. The question of the treatment of the sulphides needs careful investigation by the company. Still further development work is necessary, especially of the south-eastern ore-body, at depth, but on the whole the present prospects of the mine are encouraging.

At Mt. Merton tin occurs disseminated through Silurian sandstones, and in the surface detrital material derived from these by weathering processes. The property is being prospected. The overburden appears to carry tin in sufficient quantities to pay for sluicing.

A little tin has been won from the various creeks flowing into the Stanley River. Several stanniferous quartz-tourmaline veins and dykes have been located.

Reviewing the district as a whole, it is one which deserves further and more careful prospecting than it has hitherto received. The granite of the Meredith Range is certainly tin-bearing, though the rugged, inaccessible nature of this country is a deterrent to systematic prospecting. The button-grass country west of the Meredith Range may also be reasonably expected to reward the efforts of the prospector. A little osmiridium is being won from the borders of the serpentine belt between the Wilson and Huskisson Rivers, and doubtless several of the other creeks heading in this country will be found to carry this metal in payable quantities. Gold has been found in the Wilson River and in some of the creeks flowing into it from the Silurian country to the east; payable gold or tin may be located in this portion of the district. The country between the Wilson and Stanley Rivers is also likely to carry tin.

Reference should be made to the possibility of utilising the water of the Stanley River for power purposes. As I understand that this matter is being dealt with by the State Mining Engineer, it is unnecessary to go into detail in this report.

With regard to the possibilities of the district other than mining, there are clumps of pines at various points along the Stanley and Wilson Rivers, though not in very great abundance. On the Wilson, also, several large clumps of magnificent gum and blackwood trees were noticed. The majority of the timbered country is open myrtle forest, with very thick undergrowth in places. A portion of the area between the Wilson and Stanley Rivers, comprising some of the southern foothills of the Parson's Hood Mountain, appears very suitable for grazing if cleared.

My complete report on the Stanley River district, with geological maps and sections, will shortly be ready for printing, and will be published as a bulletin of the Geological Survey of Tasmania.

I have, &c.,

L. LAWRY WATERHOUSE, B.E.,
Assistant Government Geologist.

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

# REPORT OF THE CHIEF INSPECTOR OF MINES.

Launceston, 18th March, 1913.

SIR,

I HAVE the honour to submit my report on the inspection of mines for the year ending 31st December, 1912. The accompanying statistical tables and diagram relate to accidents which have happened during the year under review.

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

The average number of men employed during the year at the mines and smelting works throughout the State was 5566. The number of fatalities, owing to the dreadful disaster at North Lyell, reached an unprecedented total of 53. Non-fatal, but recordable, injuries were 53. The death rate from accidents and the abovementioned catastrophe was for the year 9·522 per thousand, against 0·762 per thousand in 1911. If the fire at North Lyell had not exacted its toll of human life, the death ratio would have been 1·976 per thousand.

The minor events of the year dealt with in the inspectors' reports were overshadowed by happenings at Mt. Lyell. By an unexpected fall of ground at the No. 6 level in the Mt. Lyell Mine on the 21st September, three men lost their lives and two were injured. This occurrence was followed on the 12th October by a fire in the North Lyell Mine, which caused the death of forty-two miners—a disaster in Australasian mining annals second in magnitude only to the catastrophes of Bulli in 1887, Greymouth (New Zealand) in 1896, and Mt. Kembla in 1902, in which 83, 65, and 90 perished respectively.

It will perhaps be well for me to place here these events on record, dealing with bare facts. At the coronial enquiry which was held into the loss of life from the fall of the roof at the Mt. Lyell Mine a verdict of accidental death was returned. On the 25th September complaints were made in the House of Assembly by mining members to the effect that rumours were in circulation that the shaft and certain stopes in both the Mt. Lyell and North Lyell Mines were not as safe as they should be. About the same time disquieting reports to the same effect appeared in the public press. At this juncture, to allay the general feeling of insecurity and to ascertain the facts of the case, the Hon. the Minister for Mines, recognising the seriousness of the position which had developed, appointed on the 11th October a commission of inspection (consisting of Mr. A. H. Merrin, M.C.E., Chief Inspector of Mines for Victoria, Mr. Basil Sawyer, B.E., Acting Chief Inspector of Mines for New South Wales, and myself), which he charged with the task of inquiring into and reporting upon the mining methods adopted at Lyell and the general safety of the workings. This commission arrived at Queenstown at 6.30 p.m. on the 12th October, but the fire had broken out in the mine at the 700-feet level between half-past 10 and a quarter to 11 that morning

We proceeded to the mine, and in company with the general manager and the company's officials and the district inspector, examined the various openings at the adit level and surface. A meeting was then held to devise plans of rescue, when it was agreed that Mr. Murray, the engineer in charge of the mine, and Mr. Sawyer should take control of the underground work. Briefly, the plan of operations comprised: (1) Holing through the second shaft, which was done in 36 hours, giving a second travelling way from top to bottom of the mine and access to all the levels from the 700-feet level down; (2) bringing smoke and oxygen helmets and diving-dress on the scene of operations, enabling men to descend into smoke and noxious fumes; (3) bratticing the various levels in the engine-shaft, so as to control the air-currents; (4) attempting to descend through the smoke into the mine with a view of reaching the imprisoned men, of whom there were ninety-six.

After the consultation meeting at the mine office Mr. Merrin telegraphed to his Department respecting the shipment of the Government smoke helmets, and these were conveyed to Burnie with other appliances by special steamer. Assistance rushed in from all sides. Messrs. A. L. Campbell and Co., Melbourne, sent a Draeger outfit and pulmotor, which arrived on Tuesday, October 15. Two expert firemen, Messrs. Caldwell and Moore, were sent by the Metropolitan Fire Brigade, Melbourne, and the directors of the company brought further appliances by the Melbourne-Launceston steamer "Loongana," which had been diverted to Burnie for the purpose.

On the evening of the 14th Mr. H. Trousselot, Superintendent of the Hobart Fire Brigade, who had been sent by the Tasmanian Government, arrived with smoke-helmet and 1100 feet of piping. Mr. W. J. McElwee, Superintendent of the Launceston Fire Brigade, came also on the scene with smoke-helmets; and Mr. S. J. Dawson, the colliery owner at Ida Bay, who had had fire-fighting experience at the Mt. Kembla disaster, was despatched by the Minister for Mines, and rendered great assistance. Some divers from the vicinity also lent their aid.

On the 13th four men came up in the cage from the 500-feet level, where they were working.

A damaged skid prevented one of the cages from descending much below the 600-feet level. Repeated attempts were made to free the obstruction, but in vain, and finally efforts in this direction were abandoned.

On the same day communication was opened with 50 men in a stope at the 1000-feet level by means of a line down the main shaft.

The decision to put men on to open the winze was one of crucial value. It was holed through on the 14th, after 36 hours' work. The way was then open, barring fumes, to all the levels.

The first explorers at the 700-feet level were beaten by the fumes, and an unsuccessful attempt was made with diving apparatus, but the hose proved too heavy to manage properly. Chickens were sent down to the 850-feet level and then a couple of men descended. Chickens were lowered to the bottom of the mine, but were in a bad way on being brought up again. Helmet men descended to the 850-feet and

the 1000-feet. At the latter level they conversed with the men in the stope, and explained to them the arrangements being made for their rescue. On the 16th, at 12.40 p.m., the first of the men rescued from the 1000-feet level reached the adit-level at the mouth of the engine-winze, and the last of the fifty came up at 7 o'clock that evening.

Further exploration by helmet men resulted in the discovery of bodies at the 850-feet level.

When the fire broke out 170 men were in the mine. Of these, 74 came up at the time, and subsequently 54 survivors were recovered. The death roll is thus 42. The names of those who have thus lost their lives are, as per the official list supplied by the company, as follow:—

Bray, Sampson R.
Burke, Louis
Bowden, Jno. Andrew
Bourke, John
Bolton, Wm. John
Creedon, John
Davey, Jas.
Guy, Hy. or Harold
Green, Chas.
Gays, Thos.
Hall, Jas.
Horne, Wm.
Hill, Roy
Jones, Wilfred Henry
Jenkins, J.
Lewis, Zephaniah
Leeman, John
Moore, Peter
Maher, Thos.
Mitchell, Herbert
McCarthy, Jos.
McCulloch, Edmond
McLoughlin, Bernard Peter
McMasters, Arthur
McCasland, Augene Felix
O'Day, J. (*alias* G. F. Gard)
O'Keefe, Cornelius
Park, John Robert
Rolf, Jas.
Rolf, Francis
Rielly, Patrick
Studwell, John
Saunderson, Thos.
Scott, Leonard
Smith, Jas. Wm.
Smith, John Thos. (Speewa)
Treverton, Richard John
Tregonning, W.
Tregonning, J.
Wright, Henry
Bianchini, Valentine (B. Valentine)
McGowan, Jas.

During the rescue work numerous instances were witnessed of men despising deadly peril when it was a question of saving life. Albert Gadd was on the 850-feet level at the time of the fire, and on reaching the plat and the cage which was ready to take him to safety, rushed back to the stopes to warn all he could. Again coming back to the shaft, he found men absent, and returned to the stopes and afterwards knocked up the cage till he could endure no longer, and finally reached the surface in an exhausted condition. The following day Mr. Gadd and another went down the mine, when he cleared one of the passes to the 500-feet level; and he continued throughout those days of rescue effort exposing himself with heroic recklessness to the poisonous carbon monoxide gas. The fatal vapour completely possessed itself of his system. He never recovered from its effects, and eventually he succumbed in St. Margaret's Hospital, Launceston, on the 19th February, 1913.

Robert Cox, the underground foreman of the mine, was another intrepid member of the band of rescuers. He also was in a stope at the 850-feet level at the time of the fire. He went to the shaft, returned to warn men in the stopes, and

stuck to his post at the shaft ringing the cage away each trip until overcome with the smoke. He was dragged into the cage and ascended to the surface in a serious state. He recovered and took his part as an officer of the company in the subsequent rescue work. A man with his experience and knowledge of the mine, combined with a strong sense of responsibility, was invaluable at such a time as this.

J. Pearton, the underground foreman from the Mt. Lyell Mine, led repeated parties down with absolute fearlessness. But it would be invidious to mention any of the many deeds of heroism here, for I am not acquainted with all that transpied during this time of stress. Among those who perished were men who nobly sacrificed their lives for their comrades.

The following are the names of those who have been selected by the Mt. Lyell Company as recipients of medals for bravery on this occasion:—R. W. Murray, B. Sawyer, Robert Cox, John Pearton, J. Kinsella, W. Edmonds, J. Lees, M. Lonergan, John Ryan, H. Williams, O. Fowler, A. M. Gadd, J. Smedley, J. Smith, W. Dunn, S. Simonds, H. de Goldie, F. Patterson, G. Tilley, R. O'Connor, Geo. Bass, W. Brown, F. Luttrell, F. J. Burton, F. Chambers, P. Peasnell, W. Johnson, Hartwell Conder, H. Trousselot, S. Dawson, C. Moore, C. Brown, Fireman Moore, and Fireman Caldwell.

Mr. Hartwell Conder assisted in the underground exploration, taking chickens down to test the air for gas and aiding in the bratticing. Mr. Coote was brought from the company's Lake Margaret works to take part in the work.

It must be mentioned that Mr. R. M. Murray, the engineer in charge, was absolutely fearless and indefatigable in the operations underground during this terrible time, and continued his efforts to the extreme point of exhaustion. With him was associated Mr. Sawyer, who, though ignorant of the workings of the mine, bravely penetrated as far as the fumes would allow, and continued to work unintermittently throughout the rescue operations. During his efforts he was badly gassed.

Mr. Merrin's assistance in procuring helmets and proposing to brattice the mine had results of the highest importance. Mr. Sticht, the general manager, remained at the mine day and night, and the directors of the company were constantly on the spot.

Many of the men who did not know what was being done and were unfamiliar with the effects of gas and smoke chafed at the delay in achieving results, and wished to take charge themselves and descend in the deadly fumes to the rescue of their mates. They were, however, calmed and restrained by their official leaders, who realised that what it was humanly possible to do was being done.

Messages of sympathy during these sad days were received from His Majesty the King, the Prime Minister of the Australian Commonwealth, the various Governments of the Australian States, and from individuals too numerous to mention.

After it had become apparent that hope of the survival of any more of the imprisoned men could no longer be entertained, attempts were started to recover the bodies of the dead, but insuperable difficulties were encountered. The gas and smoke derived from fresh extensions of the fire made it too hazardous to persist further for the time. Eventually the mine had to be flooded.

A Royal Commission was appointed to inquire into the cause of the fire and the loss of life resulting therefrom. The Commission was opened at Zeehan on November 27, and resumed its sitting at Queenstown on the 12th December. On the 19th December it adjourned till the 6th January in the new year. The findings of the Commission do not come within the period covered by the present report, and I therefore refrain from referring to them. I may, however, quite independently record certain facts and impressions of interest and importance.

(1) The fire evidently broke out in the pump-house at the 700-feet level, but how it happened remains a mystery. We may hazard conjectures, but to no purpose. It seems, therefore, useless to enumerate the hypotheses which have been advanced. An automatic electric pump was working in the pump-house, but experts confidently state that the fire did not originate electrically. There was cotton-waste at hand in a bucket, and the pump-house was lined with pine. By what accident the fire commenced we shall now never know.

(2) The man who attended to the pump on the 700 and 1100 feet levels was absent from the 700-feet level when the fire broke out. At other mines it seems also to be the practice for one man to attend several electric pump motors.

Some doubt has been expressed as to whether the Tasmanian "Mining Act" allows an attendant to absent himself from an electric pump during working hours. Rule 44 of the first schedule provides that "no person in charge of any winding or other engine or boiler, winch, or generator used in connection with the working of any mine shall under any pretext whatever, unless relieved by a competent person for that purpose, absent himself or cease to have continual supervision," &c. When the rule was framed the employment of electricity in this way was not contemplated, and consequently is not included in the regulation. Where one man looks after more than one machine, it would seem specially desirable to use fire-resisting construction materials and to avoid strictly any practice that might contribute to danger.

(3) Heroic efforts were made to warn the men, but all could not be warned, and some of those who were warned did not realise the seriousness of the fire until it was too late to escape. Plans for promptly warning all men out, in large mines not an easy matter, will have in future to be most carefully considered.

(4) The passes became chimneys for the smoke and gas. There is hardly any doubt that on occasions ordinary passes, constructed with regard to the exigencies of exploitation, may prove quite inadequate for rescue in the event of fire. Smoke travels quicker than men can climb ladders; the best auxiliary to the main shaft is a straight through pass with cages.

(5) The passes above mentioned were means by which men could have been saved in the event of any other accident than fire. It is necessary to make it a rule of the schedule that all such passes shall be mounted with ladders and kept in a state of efficiency as travelling ways.

(6) Engine-winze, to form an auxiliary exit, was in course of preparation, but not quite finished by the day of the fire. In the beginning of July the Lyell inspector interviewed the engineer in charge with reference to the exit from the mine

and the supply of water for the rock-drills. He received the assurance that the engine-winze would be reclaimed, and not only would a permanent water-supply be taken down that way, but it would be a cageway giving a second direct communication with all parts of the mine from adit-level to the bottom. The engineers started early in July, the miners got below towards the end of that month. The inspector anxiously watched the progress of this work, and it was nearly completed at the time of the disaster.

(7) Having regard to the uncertain state of the mine after the trying ordeal it was going through and with a view of leaving nothing undone that could be done to minimise danger, the Hon. the Minister issued orders to both the Lyell and the Lyell Blocks Companies to connect their workings at the 1000-feet levels. The Blocks Company has driven to its boundary in accordance with this order. When the connection is completed it will assist the ventilation of the Blocks Mine and may prove advantageous to both companies in the future as a means of egress in the event of accident. It will, however, by no means be an ideal exit in the case of fire, as the Blocks shaft opens into an adit 500 feet below the surface and over 2000 feet from its mouth.

(8) The use of the chickens did not appear to be fully appreciated; but small, warm-blooded animals, preferably canaries or white mice, should be kept in readiness at large mines. These little animals are universally recognised as tests of great value in exploring underground workings in which carbon monoxide is present. Canaries are considered by some as superior indicators to mice, inasmuch as they readily fall from their perch, while mice are apt to remain motionless and require to be prodded.

*Amendment of "Mining Act."*

The "Mining Act" contains no provisions specially dealing with outbreaks of fire underground. The recent disaster makes it incumbent upon the Department to effect a revision of the general rules so that such outbreaks can be guarded against, coped with when they occur, and facilities for escape provided. I have scrutinised the existing rules, and beg to suggest alterations and additions as follow:—

(1) The owner and mine manager of every mine shall see that adequate precautions exist both underground and at surface against an outbreak of fire, and for its prompt extinction in the event of its occurrence. In the event of an outbreak of fire underground it shall be an absolute rule that all men are to be immediately warned and brought to surface without delay. All provisions against fire shall be subject to the approval of an inspector of mines, who shall give such orders in this respect as in his opinion may be advisable.

This is a general, and should be an effective, rule, which does not specify precisely what particular precautions are to be adopted, for these will differ in different mines, but enacts that they must be efficient and under the surveillance of the inspector, who may supplement them by such orders as he deems necessary to give.

(2) The manager of the mine or works, or the person in charge of the mine or works, shall immediately notify to the nearest inspector of mines any outbreak of fire, whether underground or at surface, and also any collapse of or serious damage or interruption to or diversion of any underground travelling way which is intended or used as a way of escape.

(3) When ordered by an inspector of mines approved rescue apparatus and first-aid appliances shall be kept in readiness at a mine, and men shall be drilled periodically in their use. The order relating to rescue apparatus shall apply only to mines situate in a district which is unprovided with a properly-equipped rescue station established or subsidised by the Government.

(4) All persons employed underground shall be kept properly informed in respect of the auxiliary exits, and the word "Escape" shall be painted conspicuously, and kept painted, in white letters at all entrances to levels, rises, and passes used or intended to be used as exits, and directions to such exits shall be painted at each plat.

(5) The mine manager of every mine shall see that all passes or rises intended for rescue purposes or as means of egress are fitted with ladders and are maintained in a state of efficiency as auxiliary travelling ways and exits from the mine.

(6) Addition to and alteration of General Rule 1:—

Whenever the underground workings of different mines are within 300 feet apart, the inspector of mines for the district shall inform the Chief Inspector of Mines thereof, and shall transmit to him a recommendation advising their connection by means of drives or rises as the case may be for the purpose of escape or ventilation, or he shall furnish reasons for postponing the construction of such connections. Upon receipt of these recommendations or of these reasons the Chief Inspector shall forthwith transmit the same to the Minister.

Upon the order of an inspector of mines authorised by the Minister, owners shall construct such connecting drives or rises where the works are not more than 300 feet apart for escape or ventilation at their joint expense; and where deemed necessary for escape or ventilation by the inspector of mines, the surface and all levels shall be connected with each other by means of rises or winzes upon the order of such inspector authorised by the Minister. These rises and winzes shall be provided with ladders and shall be kept always in a state of efficiency as travelling ways, so as to furnish in each such mine a means of egress in addition to the shaft or adit as the case may be.

It seems also to me a very desirable thing that every large mine should have two shafts (downcast and upcast, if possible) if the passes connecting with each level do not form a

direct travelling way from bottom to top. Care, however, must be taken to avoid extreme legislation. The differential legislation providing two or more outlets for coal mines is based upon the great horizontal extension of the seam as contrasted with the vertical extension of a metalliferous lode, and it cannot be extended indiscriminately and without qualification to metalliferous mines without infringing the canons of justice and common sense. There are only infrequently metalliferous mines in which the ramifying workings approach somewhat in extent those of collieries. Power might be reserved to the Minister to order a second cage shaft in special cases.

A fire in another metalliferous mine, the Tasmania Gold Mine, occurred in July, also of unknown origin, but surmised to have been caused by the falling of a lighted candle from a truck on some brattice-cloth in rubbish which was being dumped into a pass. The men were immediately called out on its discovery, and the fire was extinguished with difficulty after a couple of shifts' work. This shows again how fires may break out in the most unlikely mines.

*Further Precautions Against Danger.*

There are several means of minimising the liability of fire and its effects, which I suggest as being entitled to consideration:—

(1) There is no doubt that the general dampness of conditions in metalliferous mines tends to induce carelessness in the use of candles. Lighted candles close to timber should not be left unprotected. Where left at plats and other places they should be provided with metal protectors.

(2) Proper and safe provision ought to be made for warming food or drink underground.

(3) Where machinery is placed in chambers underground, these, if lined, should be lined with some fire-resisting material, so as to prevent fire from spreading to other parts of the mine.

(4) Waste used in cleaning machinery should be placed in covered vessels, so as to prevent ignition by carelessness with candles or the throwing away of a match.

(5) It has been suggested that fireproof or semi-fireproof doors might be placed in levels at appropriate points where they would be deemed likely to confine a large fire to a limited space. The practicability of this depends largely on the nature of the mine and the workings.

(6) A system of watchmen would be useful in seeing that chips, shavings, waste wood, paper, or other rubbish are not allowed to lie about and accumulate.

(7) A system of simultaneously signalling "all men out of the mine" is admittedly difficult to devise, but it is a desideratum.

(8) Some system of inspection for fire-inspection at suitable times each day should be adopted.

*Rescue Apparatus.*

The occurrence at Lyell has directed the attention of the Department to the subject of breathing-appliances designed for the purpose of rescue from mine fires.

This subject, so far back as 1824, was taken up by the French Government. In that year the French Department of Mines issued to mineowners a recommendation to use one of the appliances then before the public, one of which (consisting of a nose and mouthpiece with pipe connecting with the open air) had been used already in 1785. The French inventor, Galibert, in 1864 originated the notion of partially regenerating expired air by passing it through an absorbent of carbonic acid; and Regnard, about 1884, applied the principle of renewing the oxygen supply and absorbing the carbonic acid by means of pumice saturated with caustic potash solution. Owing, however, to serious defects in these early appliances, their use in France fell off. In the second half of the nineteenth century England, Austria, and Germany applied themselves to the question, and developed the ideas underlying these inventions to a stage which enabled a fresh start to be made.

A French commission in 1906-7, inquiring into the use of breathing apparatus in collieries, considered at that time that it would be premature to impose its use on the owners of the numerous small coalmines in France employing only a restricted number of workmen, and where delicate apparatus would run the risk of not being kept in a perfect state for use, and might for that reason, on the day it was wanted, prove to be more dangerous than useful. They consequently proposed that regulations with special regard to breathing apparatus should only apply to mines where more than a hundred workmen are employed underground on one shift; adding a reservation by which the Minister can impose special requirements in exceptional circumstances.

The following extract from the report of the commission shows how far short of the present-day improved types the apparatus in use on the Continent must have been even such a short time ago:—

"It is one of the defects of portable breathing apparatus that none of them admit of protracted work; but it is to be hoped that with an apparatus constructed so as to allow an hour's stay in an irrespirable atmosphere it will be possible to work for 30 or 40 minutes, which would suffice in many cases to bring a victim into a respirable atmosphere, to open or shut a ventilating door, to fix a brattice for directing a ventilating current, or to explore a gallery for some hundreds of metres. It would be misleading to reckon on more important results than these. As M. Weiss very truly remarks in his report on his visit to Germany, it is impossible by means so insignificant to counteract the effects of great disasters."*

In England a breathing apparatus (Fleuss) was first put to practical use underground at the Seaham Colliery, Durham, in 1881, but the general use in coalmines of these instruments did not develop until about 1900. The first rescue-station in the United Kingdom was established in 1902. The principal appliances in use were tested, and reported on to the 1907 Royal Commission on Mines by Dr. A. E. Boycott, of the Lister Institute, and that commission came to the conclusion that the devices were satisfactory, the types having undergone a marked improvement as compared with the earlier forms.

* First Report of the Royal Commission on Mines, London, 1907, p. 52.

It recommended the establishment of central rescue-stations for providing the necessary training and practice, and that where collieries are at great distances from one another each colliery should store and maintain a certain number of appliances.

The makers of the Fleuss apparatus (Messrs. Siebe, Gorman, and Co. Ltd.) reproduce an extract from an article by Dr. W. A. Hatton, Surgeon of the Hultonn Colliery, where an explosion took place in 1911, where 150 rescue men went to work to recover the bodies from gas-contaminated workings. The Fleuss apparatus was used, and in one day had 123 bodies out, and in five days 270.

About 1899 breathing apparatus of one sort and another (among which was the Draeger) were introduced into use in Austria, but a good deal of experience had to be gained in their application while they were being perfected.

In Germany about the same time the Draeger and other apparatus were being used in mines, but the results attained in practical rescue work were not altogether satisfactory, and the need for improvements in the appliances showed itself. As I shall show later on, these improvements have been since effected.

While it may be conceded that the various types now in general use are by no means fixed, and that advances are still to be made in the direction of lightness and convenience and general reliability, yet the appliances have attained a practical value which was not so manifest in the earlier forms.

At North Lyell the Draeger oxygen apparatus proved to be efficient; the ordinary smoke-helmets and diving-jackets had a more limited range of usefulness.

The principle of this apparatus is that the breath passes through a substance which absorbs the exhaled carbon dioxide, and that the air is rendered again respirable by the addition of compressed oxygen carried in a steel cylinder. The exhaled breath of the wearer of a Draeger apparatus passes from the lungs through a mixture of caustic potash and caustic soda in the form of granules arranged on trays, which are so fixed that the largest possible surface of the absorbent is exposed for taking up the surplus water-vapour and the exhaled carbonic acid. Then the discharged air free from carbon dioxide is revivified with fresh oxygen from the cylinder at the rate of 120 cubic feet per minute. The air is thus rendered again respirable and the process repeats itself. A couple of oxygen cylinders charged to a pressure of 125 atmospheres will be sufficient for two hours' work. A new pattern has lately been introduced with a larger potash cartridge and only one oxygen cylinder. The cartridge and the cylinder in this improved pattern can be exchanged for fresh ones while the wearer is still in the smoke. The pressure register is worn on the chest, so that the wearer can see for himself how the oxygen-supply is holding out. It is considered that the user should not continue strenuous work for more than two hours at a time. Messrs. A. L. Campbell & Co. are the agents in Melbourne for the Draeger apparatus. It is used at various British, American, and Continental rescue stations in connection with collieries, enabling wearers to penetrate into foul and dangerous situations both for life-saving and fire-extinguishing purposes.

The Draeger people publish striking cases of rescues in colliery disasters by means of their oxygen apparatus.

In January, 1907, at the Reden Colliery, 23 miners were rescued by members of a corps trained in the use of these appliances. One of the brave rescuers crept on by himself through the whole of the gallery 4400 yards long.

In March, 1907, in a disaster at the Klein Rosseln Colliery, in which 80 men perished, the rescue party, with Draeger helmets, brought up several survivors.

In September, 1907, at the Merlbach, Saar and Mosel Colliery, eight survivors were brought up by a rescue party of twelve men equipped with the same appliances.

In October, 1908, in a pit fire in the State colliery at Koenigshuette, Upper Silesia, 14 men were rescued with this apparatus.

In November, 1909, at the Cherry Mine in Illinois, 78 survivors were rescued by this means after the lapse of a week.

A somewhat similar apparatus is that made under the Fleuss-Davis patents. Caustic soda is the absorbent used. Its weight fully charged is 32 lb. It has the reputation of being a very compact and comfortable appliance. Special attention is invited by the makers to its compactness and applicability to low underground workings. It also has been successfully used in disasters at a number of British collieries. It is in use at the rescue-stations of the Lancashire and Cheshire Coal-owners' Association, and by the North Staffordshire Coal-owners' Association, as well as at numerous other collieries and rescue stations both in the United Kingdom and the United States. Messrs. A. E. Evershed and Co., Launceston, are the agents in Tasmania for the Fleuss-Davis appliances.

Both the Draeger and Fleuss appliances are frequently kept at the same rescue stations. Both are evidently efficient apparatus.

While it would be desirable to adopt one form as a standard, instruction might advantageously be given in the use of both. Their use can be easily and quickly learned; but where they are kept a rescue corps should be trained and periodically drilled. A drawback in the employment of the helmets at North Lyell was that the men who came with them were not familiar with the mine workings; and on the other hand there were no miners to be had who had been drilled in the use of the helmets.

Both makers supply also other useful apparatus, such as the Pulmotor and Salvator, designed for resuscitating men rescued in an unconscious state or for rescue work of short duration. Other makes of breathing apparatus are the "Shamrock," "Weg," and "Pneumatogen," but I have no recent accounts of these (*i.e.*, later than 1907).

Patent smoke-helmets with air-tubes supplying a current of air driven from a pump or air-compressor or hand-worked bellows have a more restricted applicability to mine work.

In order to show the measures taken by large collieries on the American continent in this matter, I quote the following from a recent description of the Dominion Coal Company's mines in Nova Scotia:—

"For more adequate protection against underground fires and as provision against the effects of a mine explosion, the

company has provided a rescue-station near No. 2 Colliery, equipped with 35 sets of Draeger apparatus, motor-driven oxygen refill pump, two Pulmotors, stretchers, electric hand-lamps, and first-aid appliances. A number of live canaries are also kept here. If the necessity should ever arise, these would be used to test the life-sustaining quality of the mine air after an explosion or fire. In addition to the equipment at the central station, sufficient sets of apparatus are distributed at the outlying collieries. A new substation has recently been opened to serve the Lingan collieries, equipped with ten apparatus, refill-pump, Pulmotor, and other necessary accessories. At the central chamber a smoke chamber is provided in which the teams practise weight-lifting and other strenuous exercises in thick smoke and high temperature. The work of training men has now been in constant progress for the past four years, and the company has now a large body of trained men on whom they could rely for good service with the Draeger apparatus."

The disaster at Lyell teaches the necessity for our large mines to have oxygen helmets in stock (at least two), and for men to be kept drilled in their use. Such mines should also possess resuscitating appliances of the Pulmotor or Salvator type. A few smoke-helmets should likewise be kept.

To fulfil the requirements of a complete scheme for the island these appliances ought to be available at the following centres:—

(1) At a station on Mt. Nicholas, for the Cornwall and Nicholas Collieries.
(2) At the Tasmania Mine, for the Beaconsfield district.
(3) At Lyell, for the Lyell district.
(4) At Zeehan, for the surrounding districts (say, under the control of the Zeehan School of Mines).
(5) At Waratah, for Mt. Bischoff, Magnet, and Heazlewood districts.
(6) At Tullah, for the Farrell district.
(7) At the Hobart Fire Brigade station, for mines in the south of the island.
(8) At the Launceston Fire Brigade station, for mines in the north-east and north.

How far some of these should be wholly Government rescue stations, and how far some should be subsidised, would be a matter for consideration.

It would be very desirable to have one properly-equipped rescue station in the State, where men could be trained as members of rescue corps. These men, with certificates of training, would, it may be assumed, be sought by employers of mine labour.

Zeehan would be a suitable place for a station of this kind, and the instruction could be controlled by the officers of the School of Mines, assisted, perhaps, by the local fire brigade.

The theoretical instruction would include the phenomena of respiration and the principles underlying the use of the rescue instruments. The practical instruction would include the use of the instruments and actual work in smoke and heat carried

out in a practice-room properly prepared for that purpose. Such rooms are usually fitted up so as to reproduce some of the actual conditions obtaining in mines, *e.g.*, with low-roofed galleries heaped with stone for crawling practice, with ladders, &c. The building would require several rooms, for office, bathroom, store, workshop, practice-gallery, &c.

On completion of the course the student would have to submit himself to an examination in practical work, during which he would move about in a smoky atmosphere for two hours continuously and exhibit his familiarity with the working of the appliances. He could then be registered and receive a certificate from the State training school.

In receiving candidates for rescue corps, individual points are usually studied very strictly. They must be young, of good physique, and enjoy good health; of non-alocholic habits, temperament cool and not impulsive, and character good.

The cost of equipping the abovementioned centres with two oxygen-helmets each and four smoke-helmets and one resuscitating apparatus would be, approximately, £200 each station—apart from buildings and maintenance charges.

The above must be regarded as a rough preliminary indication of the lines along which I consider our thoughts should travel.

*Inspecting Workmen.*

I mentioned in my last annual report that the amendment of the "Mining Act" had resulted in giving effect to the principle of the recognition of the right of miners to call the attention of the manager to anything unsafe in the mine, and thus to claim the services of the Government inspector in a regular and authorised way. I pointed out that it would be advantageous to regulate the mode of appointment in order to prevent uncertainty and irregularities and to provide the Department with reliable information.

The provisions of the section itself seemed at the time to be pretty full and complete, but in the absence of the necessary machinery clauses for governing the procedure in making appointments, some difficulty arose at Lyell.

Two inspecting workmen were appointed by the underground workers at the Lyell Mine and two at the North Lyell, but the company, desirous of waiting for the procedure regulations to be issued, declined at first to allow the elected men to enter on their inspection until they could give satisfactory proof that they had been duly elected according to the Act. In my opinion the company would not have suffered any harm by waiving its technical rights, pending the issue of regulations; as was done ultimately, but too late to prevent a certain amount of friction. The inspecting workmen eventually reported on the mine workings, but the fire broke out four days after their inspection, and prevented for the time the investigation of the complaints formulated.

The Inspecting Commission appointed by the Government has been dissolved, owing to one of its members being no longer available; but it is understood that a new one will be formed, when the inspecting workmen's report will, so far as it is applicable to the actual condition of the mine, come under its notice.

The new regulations governing the election of inspecting workmen in mines where the number of men working underground exceeds twenty provide that it be conducted before a warden of mines or some other person to be appointed by the Minister.

*Prosecutions.*

Seven persons were proceeded against by Inspector Griffin for breaches of the Act, particulars of which will be found in the inspector's report. The inspectors are seized with the necessity for instituting proceedings in all cases where there is any serious violation of the provisions of the "Mining Act."

I have, &c.,

W. H. TWELVETREES,
Chief Inspector of Mines.

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

*COMPARATIVE Table of Statistics of Accidents in and about the Mines of Tasmania from 1st July, 1892, to 31st December, 1912.*

| Period. | Number of Miners employed. | Number of Accidents. | Number of Persons. | | Total Killed and Injured. | Average per 1000 Killed and Injured. | Average per 1000. | |
|---|---|---|---|---|---|---|---|---|
| | | | Killed. | Injured. | | | Killed. | Injured. |
| 1 July, 1892, to 30 June 1893 | 3295 | 28 | 4 | 25 | 29 | 8·8001 | 1·214 | 7·586 |
| „ 1893 „ 1894 | 3403 | 25 | 7 | 20 | 27 | 7·934 | 2·057 | 5·877 |
| „ 1894 „ 1895 | 3789 | 26 | 4 | 24 | 28 | 7·390 | 1·058 | 6·332 |
| „ 1895 „ 1896 | 4160 | 22 | 7 | 16 | 23 | 5·529 | 1·682 | 3·847 |
| „ 1896 „ 1897 | 4303 | 36 | 7 | 31 | 38 | 8·831 | 1·627 | 7·204 |
| „ 1897 „ 1898 | 5530 | 36 | 13 | 33 | 46 | 8·318 | 2·351 | 5·967 |
| „ 1898 „ 1899 | 6180 | 35 | 9 | 34 | 43 | 6·957 | 1·456 | 5·501 |
| „ 1899 „ 1900 | 6834 | 19 | 7 | 16 | 23 | 3·365 | 1·024 | 2·341 |
| „ 1900 „ 1901 | 7017 | 29 | 8 | 23 | 31 | 4·417 | 1·140 | 3·278 |
| „ 1901 „ 1902 | 6438 | 38 | 7 | 35 | 42 | 6·524 | 1·088 | 5·437 |
| „ 1902 „ 1903 | 6484 | 44 | 6 | 43 | 49 | 7·557 | 0·925 | 6·632 |
| „ 1903, to 31 Dec., 1903 | 5604 | 27 | 8 | 20 | 28 | 4·977 | 1·428 | 3·569 |
| 1 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 |

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

## Rate per 1000 men employed.


Photo Algraphed by John Vail Government Printer Hobart Tasmania.

5 cm

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*TABLE showing Rate per Thousand Killed and Injured in the different Divisions for the Year* 1912.

| 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 | 536 | 11 | 2 | 10 | 12 | 22·388 | 3·731 | 18·656 |
| North-Eastern | 661 | 8 | 2 | 6 | 8 | 12·102 | 3·025 | 9·077 |
| Eastern | 488 | 8 | Nil | 8 | 8 | 16·393 | Nil | 16·393 |
| North-Western | 973 | 5 | Nil | 5 | 5 | 5·138 | Nil | 5·138 |
| Western | 2908 | 28 | 49 | 24 | 73 | 25·103 | 16·850 | 8·253 |
| | 5566 | 60 | 53 | 53 | 106 | 19·044 | 9·522 | 9·522 |

*ANALYSIS of Statistics for the Western Division.*

| Division. | Average Number of Men employed. | Number of Accidents. | Number of Persons. | | Total Number Killed & Injured. | Average per 1000 Killed and Injured. | Average per 1000. | |
|---|---|---|---|---|---|---|---|---|
| | | | Killed. | Injured. | | | Killed. | Injured. |
| Mount Lyell | 1564 | 18 | 48 | 15 | 63 | 40·281 | 30·690 | 9·590 |
| Zeehan, &c. | 1344 | 10 | 1 | 9 | 10 | 7·440 | 0·744 | 6·696 |
| | 2908 | 28 | 49 | 24 | 73 | 25·103 | 16·850 | 8·253 |

*TABLE showing the Number of Persons Killed and Injured in and about the Mines of Tasmania during the Year* 1912.

| Place or Cause of Accident. | Inspection Districts. | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Northern and Southern Division. | | North-Eastern Division. | | Eastern Division. | | North-Western Division. | | Western Division. | | | | Total. | |
| | | | | | | | | | Zeehan and other Districts. | | Lyell District. | | | |
| | Killed. | Injured. | Killed. | Injured. | Killed. | Injured. | Killed. | Injured. | Killed. | Injured. | Killed. | Injured. | Killed. | Injured. |
| Underground— | | | | | | | | | | | | | | |
| Falls of ground ..... | ... | ... | ... | ... | ... | 1 | ... | ... | ... | 4 | 4 | 5 | 4 | 10 |
| Fire ..... ..... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 4 | ... | 42 | ... |
| *Shaft Accidents*— | | | | | | | | | | | | | | |
| Things falling down shafts | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| Haulage ..... | ... | ... | ... | ... | ... | | ... | ... | ... | ... | ... | 1 | ... | 1 |
| Falling down passes and shafts..... | 2 | 2 | ... | ... | ... | ... | ... | 1 | ... | ... | ... | ... | 2 | 3 |
| Total ..... | 2 | 3 | ... | ... | ... | ... | ... | 1 | ... | ... | ... | | 2 | 5 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Miscellaneous (underground).* | | | | | | | | | | | | | | |
| Haulage— | | | | | | | | | | | | | | |
| Trams, &c. | ... | ... | ... | ... | ... | 1 | ... | ... | ... | ... | ... | 1 | ... | 2 |
| Sundry accidents | ... | 3 | ... | ... | ... | ... | ... | 2 | ... | 2 | ... | 2 | ... | 9 |
| Explosives | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Total | ... | 3 | ... | ... | ... | 1 | ... | 2 | ... | 2 | ... | 3 | ... | 11 |
| *Total Underground* | 2 | 6 | ... | ... | ... | 2 | ... | 3 | ... | 6 | 46 | 9 | 48 | 26 |
| ON SURFACE— | | | | | | | | | | | | | | |
| Smelting-works | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 | ... | 1 | ... | 2 |
| Machinery | ... | 1 | ... | 1 | ... | 1 | ... | ... | ... | ... | ... | 1 | ... | 4 |
| Falls of stone | ... | ... | 2 | 1 | ... | ... | ... | ... | ... | ... | 1 | 1 | 3 | 2 |
| Tramways | ... | ... | ... | ... | ... | ... | ... | 1 | ... | 1 | ... | 1 | ... | 3 |
| Falls of persons | ... | ... | ... | ... | ... | 1 | ... | ... | ... | ... | 1 | ... | 1 | 1 |
| Explosives | ... | ... | ... | ... | ... | ... | ... | ... | 1 | 1 | ... | ... | 1 | 1 |
| Miscellaneous | ... | 3 | ... | 4 | ... | 4 | ... | 1 | ... | ... | ... | 2 | ... | 14 |
| *Total Surface* | ... | 4 | 2 | 6 | ... | 6 | ... | 2 | 1 | 3 | 2 | 6 | 5 | 27 |
| GROSS TOTAL, 1912 | 2 | 10 | 2 | 6 | ... | 8 | ... | 5 | 1 | 9 | 48 | 15 | 53 | 53 |
| Total during 1911 | ... | 22 | 1 | 11 | ... | 2 | 2 | 11 | ... | 15 | 1 | 16 | 4 | 77 |

# REPORTS OF INSPECTORS OF MINES.

MR. INSPECTOR GRIFFIN (Launeston) reports:—

I have the honour to submit my report as Inspector for the Northern and Southern, North-Eastern, and Eastern Divisions of the State, for the year ending 31st December, 1912.

Number of accidents, 26; casualties—fatal 4, non-fatal 24; total, 28.

I very much regret having to report that 4 fatal accidents have occurred in the above divisions under my inspection during the year.

*Fatal Accidents.*—Thomas Floyd, a married man, age 45 years, and Murdoch Frazer Stuart, single, age 22, were both killed through falling out of an ascending cage at Hart's shaft in the Tasmania Gold Mine on the morning of the 17th October, 1912.

They got into the cage with 6 other men at the 1370-feet level at change of shift on the morning in question, and were being hoisted to the surface. They stood face to face near the open end of the cage. When within about 370 feet from the surface both men suddenly fell out, or were dragged out of the cage, and instantly killed, their bodies being shockingly mutilated. None of the other men in the cage could say how the accident happened or what caused the unfortunate men to leave the cage so suddenly. One of the knocker-lines in the shaft had parted at the quadrant beneath the upper brace a short time before the accident happened. Some loops of this hung over the staples at one or two places for the first couple of hundred feet down the shaft, but could not, as was subsequently shown by careful inspection and enquiry, have had anything to do with the cause of the accident. Two or three cages had been hoisted with men on after the knocker-line parted and before the accident happened. One man stated in evidence at the inquest that he was touched by a part of the broken knocker-line when ascending in the cage just before the accident happened. This statement was not borne out by other men who were in the cage at the same time, and who neither saw nor felt the broken line.

The coroner's inquest touching the deaths of these men lasted over 10 days. Quite a number of persons gave evidence, and everything possible was done to try and elucidate the cause of this shocking accident, but without avail. The actual cause will forever remain a mystery. The fact of the knocker-line having been found broken a second time, and just about where the men are supposed to have left the cage, proves only that this second break was rather a result of the accident than that it had anything to do with the origin of it. A more likely theory would be that one of these men fainted, and in falling clutched the other, and that both left the cage in this way. The verdict of the jury was to the effect that there was not sufficient evidence to enable them to say what caused the accident that resulted in the deaths of these two men. They added, as a rider, that "we are unanimously of opinion that

a broken knocker-line is very dangerous, and under no circumstances should a cage run with men in it whilst a knocker-line is broken, excepting any travelling necessary to locate the break."

Ah Sue, a Chinaman, employed by You Hen and Hee Sung on their tin section at Southern Cross Creek, near Pioneer, was killed by a fall of earth while working alone in the open-cut face on the night of 20th October, 1912.

From evidence adduced at the inquest, which was held at Pioneer, it would appear that on the day of the accident one of the partners, He Sung, who usually worked with deceased, had to go to Gladstone on business, and before leaving told Ah Sue not to go to work in the face until he returned on the following day. These instructions were apparently disregarded, for at about 11.30 p.m. You Hen, going into the claim to take up his shift, found deceased lying dead within about 8 feet of the face, with a fall of ground lying round him.

Mr. C. G. Ryan, manager of the Pioneer Tin Mine, was (in my absence on leave) appointed, pursuant to Section 183 of the "Mining Act." to investigate and report upon this accident. He (Mr. Ryan) concurs in the verdict of the jury, that no person is to blame for the accident. The ground being worked was from 1½ to 2 chains in width, and from 8 to 12 feet in depth. There was sufficient pressure on the nozzle to allow the man using it to keep well away from the face. Deceased appears to have been a man of careless habits, and apt to run into danger.

The fourth accident: Augustus Arnold Brooks, age 19 years, was employed on wages in the South Garibaldi Tin Mine Company's claim near Bradshaw's Creek, and was on the afternoon shift on the 18th December, 1912, working in the open-cut sluicing the face, when he met with injuries from a fall of earth and logs resulting in his death on the following day when being conveyed to Launceston. Deceased, who was leader of shift, went on with his mate, James Creighton, at 4 p.m.. There was also a lad, R. Warren, who looked after the pump. A narrow strip 14 feet wide of ground was being sluiced off the entire length of the western face. The depth of face was about 18 feet, and the whole (10 to 12 feet of overburden and about 6 feet of wash) was being taken up in the one operation. This was a departure from the usual and safer practice of removing the overburden first. The place where these men worked was very cramped for room. Log-work on one side breasted up a heap of stones 3 to 4 feet high, and on the other hand the full depth of the side-face—a place quite unsafe for men to work in. The mine manager in his evidence at the inquest stated that he was on the spot when the men went to work at 4 p.m., and gave Brooks instructions not to sluice up to or bring down a certain large tree-fern that stood on the bank in about a line with the side-face, as he did not want it in the face. This tree-fern was reached, however, as the upper part of the face sloped back a good deal from where the two men worked forking out stones. The face was fairly well lighted by the ordinary acetylene gas-lamp used by miners in open-cut workings. At 9 o'clock a slip of earth occurred, bringing away with it the tree-fern and a couple of logs of

fairly large size, from 10 to 12 feet in length and about 14 inches in diameter; also some limb-wood. Brooks was caught by one of these logs and pinned against the end of a large chock projecting from the stone-heap log-work. He was badly crushed about the hips and lower part of his body, and succumbed to the injuries he received when being conveyed by train to the Launceston General Hospital on the following day. An inquest was held before Mr. Coroner Whitfeld at Launceston without a jury, and a verdict of accidental death recorded.

It is, I think, a matter for regret that all inquests in connection with mining fatalities cannot be held in the immediate neighbourhood of where the accident took place, and where a jury composed in part of practical miners would have an opportunity of visiting the spot and seeing for themselves what the workings are like.

This unfortunate young fellow, not 20 years of age, lost his life through being required to work in a confined place without any proper or easy means of escape in times of danger. The excuse put forth by the mine manager, that deceased was foreman of the shift, and should have seen that everything was safe and in order about the top of the face before nightfall, is not acceptable. The logs that fell with the tree-fern must have been easily visible before the manager left the face at 5 p.m., and would probably have been taken down by the deceased and his mate had it not been for the order of the manager "not to meddle with the tree-fern."

Of the non-fatal accidents:—Moses Ogilvie, working in the open-cut face of the Barnes and O'Neill Tin Mine, near Gladstone, ventured too near the face, and was boring a hole in a ledge of pug when a sudden fall of earth occurred, knocking him down and breaking his left thigh. He has only himself to blame for the accident. There were only two of them working in the face, and he was supposed to be in charge during the absence of the manager. No man of common sense would go to work in such a place.

John Dyer, foreman of a gang of gravel-pump and pipe-shifters, employed at the Briseis Tin Mine, Derby, was holding a steel bar for another man to strike with hammer. A small sharp-pointed fragment of steel flew from the head of the bar, striking and penetrating the ball of his right eye. The doctor did not think there was any steel in the eye. Inflammation set in, and after a few days he was obliged to come to Launceston, where Doctor Hogg found it necessary to remove the eye.

Robert Henry Zeehan Bosk, employed as a miner at the Tasmania Gold Mine, was shifting ladders from one compartment of a pass to another, and was assisted by Edward Ryan. They commenced at the top instead of at the bottom. A couple of lengths were removed, and both men were standing on these, when they gave way, both ladders and men slipping down the footwall 30 or 40 feet. Bosk got his shin-bone fractured through his leg slipping between the rungs of the ladder. Ryan got off with a few bruises. If these men used proper ladder-dogs instead of wire nails the accident would probably not have happened.

Ernest Quinn, employed at the Anchor Mine, drove a pick into his foot and was off work over four weeks as a result of the injury received.

Thomas Thomas was coming down a ladder in Block 354, Tasmania Gold Mine. He slipped, and falling 12 feet, ricked himself badly. Was off work 37 days.

David Baker, attending to a small crushing-mill at the Guiding Star Tin Mine, got his hand in the cog-wheels and got the ends of two fingers jammed off and a third one injured.

Wm. Hocking was trucking firewood at the Tasmania battery. He made a false step when crossing over fluming, fell between the tram sleepers, badly bruising his right leg, also his right side. Was off work 38 days as a result of this accident.

W. B. Trotter, employed by the New Roy's Hill Tin Mining Company, was helping to dismantle machinery at the Togo Mine. A sling broke and he was hit on the head by a block. The injury was not considered very serious. He was not, however, in good health at the time, and the accident may have had something to do with the cause of his death, which took place six months later.

I. W. Page was climbing a stope in the Tasmania Mine. He slipped and fell across a split log, breaking two of his ribs. He was off 25 days.

James Williamson, while working in Ringarooma overburden face at Briseis Mine, jarred his thumb, and as a consequence was off work for 30 days.

Timothy Smith was spalling rock at the Anchor Tin Mine, when he was struck in the eye by a fragment of stone. The local doctor considered the injury rather serious. Smith went on to Launceston to Dr. Hogg. He did not return to work at the mine.

Charles Noble, a miner, employed in the Mt. Nicholas Colliery, was caught by a fall of coal, and received a deep cut on the shin of his right leg. He was attended by the local doctor, and sent to his home at St. Marys. Noble has only himself to blame for this accident. Like many other careless coal-miners, he neglected to "spragg" or secure the upper coal whilst holing. He was off work 58 days as a result of the injuries he received.

A. E. Davis, employed at the Anchor Tin Mine, was turning a drill when he received an accidental blow from the striker's hammer, smashing the thumb of his right hand. He was off 51 days as a result of the injury he received.

J. R. Simmons was cutting timber for the Anchor Tin Mine. A limb on which he was standing gave way, and he fell on to a rock, fracturing his shoulder. He left the mine three weeks after the accident happened. It is not known whether he had quite recovered then.

C. K. Beven was assisting at repairs to machinery at the Anchor Mine battery, when he got the top joint of one of his thumbs jammed right off between the cam shaft collar and block. He had not returned to work at the expiration of 15 days from time of accident happening.

Arthur Mansfield, when working on the roof of boiler-house at the Tasmania Gold Mine, slipped and fell 9 feet on to a piece of 4 by 3 timber lying on the ground. He got his right thigh badly bruised, and was off work 27 days as a result.

The remaining eight of the non-fatal accidents were not of a very serious nature, and are recorded more from the fact that the sufferer was absent from his usual employment for over 14 days than otherwise.

*Ventilation.*—On the whole the ventilation of metal mines has been good. At the Tasmania Gold Mine there are at times inrushes of gas at the bottom levels. These occur generally when the level is being driven west, and when the atmospheric conditions at the surface are unfavourable. Every care is taken to guard against accident, and the men are at once removed from these level ends and from the stopes above them when there is any danger of their being overcome by the carbon dioxide gas. Apart from these inrushes of gas at the bottom levels, there is no cause to complain of the ventilation of the mine, for in every other part it is good, more than adequate in most places.

The North Tasmania Mine is only worked occasionally by the tributers on account of the frequent presence of carbon dioxide. The men employed there run no risks; they know from surface indications when it is safe to venture below.

In some of the mines worked from adit levels, such as the S. and M. Mine and the Round Hill, the air currents are so strong that it is at times difficult to keep candles alight.

*Dust from Rock-drills.*—The Tasmania Gold Mine is the only mine in my district in which machine-drills are used. No means of destroying dust as required by the Act is provided, for the very good reason that, so far, there is no appreciable dust to destroy. The drills are used in the crosscuts and levels and in some of the stopes. There is as a rule so much moisture in the lode and in the enclosing country rock that dust from the drill is scarcely noticeable. The company is now introducing small drills of the Hardy Simplex Hammer type, which can be handled by one man. These drills have each a means of spraying or producing a water-jet attached, and are very suitable for use in rises or in confined places. No complaint has been received from any man employed in the mine and working a machine-drill of dust-nuisance. Miners generally would rather work without these dust-destroyers, and it is only in cases where the rock is exceptionally dry that they can be got to use them without protest. If, however, there is discovered any dust to an extent that would be likely to injure the health of the men employed, a means of destroying it must be provided.

*Sanitation.*—This is fairly good; the conveniences provided are generally satisfactory.

*Health of the Miners.*—I think there is every reason to believe that the health of these men is above the average. Cases of phthisis or pulmonary disease are not frequent.

*Magazines and Explosives.*—The magazines used on the mines, both on the surface and underground, are well constructed and cleanly kept. The S. and M. Syndicate have obtained permission to store their whole supply, 2000 lb. of gelignite, underground. The magazine is well away from all present workings, and is in even a safer position than the old one on the surface.

A quantity of gelignite, about 80 lb. was condemned at the Round Hill Silver and Lead Mine. It had been stored in the magazine too long, and was no longer safe for use.

*Prosecutions.*—Six men employed in the Tasmania Gold Mine were proceeded against under Section 177, Subsection II., of "The Mining Act, 1905," for that they failed to notify to the person under whose immediate direction and control they worked the occurrence of an incident, to wit, a man fainting in a haulage-cage in which they were all being hoisted to he surface from the 1370-feet level—Hart's shaft. The informations were heard at Beaconsfield before E. L. Hall, Esq., Warden of Mines. All the defendants pleaded guilty, and were each ordered to pay a fine of 5s., with 2s. court costs.

A seventh man was proceeded against for having, on the same date, 23rd October, and at the same place as the above, taken tools (shovels) into a cage in which he and other men ascended from one level to another, contrary to General Rule 25 of the first schedule, Part I., of "The Mining Act, 1905." He also pleaded guilty, and was fined £1, with 7s. 6d. court costs.

Prosecutions in the foregoing cases were rendered more imperative from the fact that the offences committed took place just one week after the two men, Floyd and Stewart, were killed by falling out of the ascending cage in the same shaft. A copy of the general rules and of the abstract is supplied to every man by the owner or manager of the mine in which he works, and there is no excuse for not knowing the law. Yet carelessness or indifference to rules and regulations is only too prevalent. Prosecution will invariably follow any breach of the regulations unless such is of a very trivial nature. This is not what the inspector would like; but there appears to be no other way to make some miners, as well as some managers, obey the law.

*Fire in the Tasmania Gold Mine.*—A fire occurred in this mine on 8th July. Fortunately it was discovered before any serious damage was done. Some men were employed at the 600-feet level in the old main shaft, which is now used exclusively for ventilation purposes. They were cleaning out and doing repairs about the Riedler pump chamber, from which the machinery has long since been removed. They dumped a lot of stuff into a pass going down from the end of the chamber to the next level. Everything was apparently safe when the men knocked off at 5 p.m. At 10 o'clock smoke was detected spreading downwards to the stopes and bottom levels. All the men were immediately called out. The seat of the fire was soon located, and after 16 hours' strenuous work it was extinguished. A hose was passed down the shaft, and after considerable difficulty water was got into the pass within the limits of which the fire was still confined. The origin of the fire is not known, but it is surmised that some old pieces of brattice-cloth dumped with other rubbish into the pass must have caught fire from a lighted candle carried on the truck.

*Complaints.*—No complaints from persons employed in or about any mine have been made directly to the inspector. Complaints have, however, reached the Hon. the Minister for Mines, alleging insecurity, and even grave danger in some mines and quarries. Investigation has shown these complaints, so far as mines are concerned, to be without foundation. In the case of quarries there was justification for some of the complaints made.

*Machinery, Equipment, &c.*—Ropes, chains, shackles, and safety appliances have had due care and attention paid to them. No serious accidents to machinery have occurred. A case of overwinding was reported from the Tasmania Mine. A driver at Hart's shaft made a mistake; the cage went 10 feet above the brace, and was arrested by the steam-trip gear No damage was done.

The Lebrina Gold Mine Company commenced operations during the last half of the year. The old plant (winding-engine boiler, and poppet-heads) of the Wyengatta Gold Mine was purchased, removed, and re-erected at the Lebrina Mine. A 10-head battery (old machinery from the Tasmania Mine) has also been erected. Everything was in readiness to commence work with the new year. The main shaft was already sunk 40 feet by windlass.

At the Golden Mara, since the new company has been floated, the main shaft was sunk to a depth of 43 feet. The old winding and pumping plant at O'Brien's section, formerly owned by the New Golden Gate G.M. Company, has been purchased, and preparations were being made to remove it to the Golden Mara at the close of the year.

The Royal George Tin Mining Company (Avoca) commenced to open up their big tin-lode. An adit crosscut has been put in, and the lode driven on for a distance of 246 feet, Air-shaft sunk 40 feet, and a winze 40 feet. Five open-cut faces opened on line of lode, ready for breaking stone.

*Machinery Erected.*—At adit, multitubular boiler, air-compressor, rock-breaker, and steam winch for hauling on incline tramway.

*Reduction Works.*—Twenty-head battery and concentrating plant complete, two Galloway boilers and two stationary engines, one dynamo and electric plant; also electric motor and centrifugal pump at St. Paul's River, 50 chains distant from the battery. Most of this machinery is from the old Mt. Rex Tin Mine. Some was also obtained from the "Gate" and "Consols" plants at Mathinna. Crushing operations are to commence early in the new year.

*Coal Mines.*—Mt. Nicholas Colliery.—A large boiler and engine purchased at Mathinna has been removed and re-erected at the "bank top," to replace the old haulage plant. The up-cast furnace has been renewed and enlarged, and has greatly improved the ventilation of the pit, which is now very good. Other improvements have been made in the way of straightening return airway, retimbering main heading, &c. The colliery is now in good working order, with a long-wall face of over 500 yards in length. It is capable of nearly doubling the present output if called on to do so.

Cornwall Colliery.—The opening up of the new pit was fraught with difficulties owing to the faulting of the seam. Several breaks of roof occurred, and timber for packs and cogs had to be freely used. A connection has been made with the old workings, and the air-current is now in this direction passing down an old back heading to the electric fan near the mouth of the old tunnel. Machinery, tramways, and electric haulage are maintained in a satisfactory condition. Ventilation of the colliery is generally good.

Catamaran Coal Mines.—An attempt was made to open up by means of a dip heading from the surface instead of continuing to work from the old 30-feet shaft. This work carried out under the supervision of the owner, Mr. E. C. James, was badly bungled. A collapse of part of the heading took place in July. Other portions were unsafe. Mr. James was then prohibited from making any further attempt to win coal until such time as the mine could be put in thorough and safe working order, under the supervision of a competent manager. No work has been done since. It is now understood that the property has passed into the hands of the South Broken Hill (N.S.W.) Company.

*Inspection of Quarries, Excavations, &c.*—The following have been inspected, viz.:—Ridgeway Reservoir works, Hobart Municipal Council brickworks, quarry at Knocklofty, Crisp & Gunn, Hobart; Hobart Brick Company's quarry, Foster-street, New Town; Hydro-Electric Company's power-station, Ouse River, Bothwell. I only inspect quarries or excavations for the first time when it has been made known to the Department or to me that danger exists. It would be impossible to make even a single inspection of each of such places in the time at my disposal apart from mine-inspection work.

Appended will be found tabulated lists of mining accidents; also of accidents in quarries.

*LIST of Accidents in Inspector Griffin's District for Year* 1912.

Casualties—Fatal, 4 ; non-fatal, 24 ; total, 28.

| Date of Accident. | Name of Mine. | Locality. | Cause of Accident. | Name of Sufferer. | Married or Single. | Nature of Injuries. | Particulars. |
|---|---|---|---|---|---|---|---|
| 1912. | | | | | | | |
| 11 Jan. | Anchor Tin Mine | Lottah | Pick slipping | Quinn, Ernest | Married | Wound in foot from pick-point | Was using a pick in open-cut work, and accidentally struck his foot with point of pick |
| 12 Jan. | Tasmania Gold Mine Ltd. | Beaconsfield | Slipped and fell coming down ladder | Thomas, Thomas | Ditto | Ricked himself : had some old trouble in way of rupture | Was coming down a ladder-way, when he slipped and fell 12 feet and ricked himself |
| 29 Jan. | Guiding Star Tin Mine | Branxholm | Caught in machinery in motion | Baker, David | Single | Ends of two fingers cut off, a third finger injured | Was attending to small crusher-mill ; inadvertently placed his hand on cog-wheel in motion |
| 16 Feb. | South Mt. Cameron Dredging Company | South Mt. Cameron | Rush of stuff from drop-chute on dredge | Long, William | Married | Bruises about legs and feet | Employed as engine-driver on the dredge ; he tried to free a drop-chute and was caught by a rush of stuff |
| 20 Feb. | New Roy's Hill Tin Mine Co. | Avoca | Block falling from derrick tackle | Trotter, Wm. B. | Ditto | Two cuts on head, rather severe | Was assisting to dismantle machinery at old Togo Mine ; a sling broke, and block of tackle struck him on the head |
| 21 Feb. | Tasmania Gold Mine Ltd. | Beaconsfield | Slipped when running truck-load of wood | Hocking, Wm. | Ditto | Right leg and ribs of right side badly bruised | Was running truck-load of wood into furnace house, made a false step when passing over fluming, and fell between the sleepers |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 16 May | Briseis Tin and General Mining Co. | Derby | Picking stone, jarred his thumb | Williamson, Jas. | Single | Thumb of left hand jarred | Was picking down stone in Ringarooma overburden in face, and jarred his thumb |
| 17 May | Tasmania Gold Mine Ltd. | Beaconsfield | Slipped when climbing up stope | Page, J. W. | Ditto | Broken ribs | Was warned of firing, attempted to climb stope hurriedly, slipped and fell across split log |
| 28 June | Anchor Tin Mine | Lottah | Fragment of stone flying from spalling hammer | Smith, Timothy | Ditto | Corona of eye pierced by small fragment of stone | Was using a spalling hammer in breaking stone at Australian Mine, and was struck in eye by fragment of stone; doctor reported "serious" |
| 10 July | O'Neil, Barnes, & Rankin Tin Mine | Gladstone | Fall of earth | Ogilvie, Moses | Ditto | Fracture of right thigh | Was working in open-cut face, went too close, and while drilling in pug, a slip of earth took place, and he was caught by the fall |
| 12 July | Mt. Nicholas Colliery Co. | Mt. Nicholas | Coal skip over-running points | Slatter, Reginald | Ditto | Leg badly bruised above the ankle | Was running skip loaded with coal out of face into gate road; it missed the rails and jammed his leg; was off work 18 whole days |
| 15 July | Ditto | Ditto | Fall of coal | Neplem, Chas. | Married | Deep cut on shin of right leg | Was working in coal face in close quarters, neglected to sprag, and was caught by a fall of coal |
| 15 July | Tasmania Gold Mine Ltd. | Beaconsfield | Caught by machinery in motion | White, Alfred | Ditto | First finger of right hand badly crushed | Was cleaning connecting rod of pulp pump in grinding plant while machinery was in motion, and got his finger jammed |
| 17 July | S. & M. Mine Syndicate | Moina | Lifting a truck on to the line | Smith, H. G. | Single | Rupture in left side | Truck got off the line; he attempted to lift it on again and ruptured something in left side |

*LIST of Accidents in Inspector Griffin's District for Year* 1912—continued.

| Date of Accident. | Name of Mine. | Locality. | Cause of Accident. | Name of Sufferer. | Married or Single. | Nature of Injuries. | Particulars. |
|---|---|---|---|---|---|---|---|
| 1912. | | | | | | | |
| 18 July | S. & M. Mine Syndicate | Moina | Stone rolling in stope | Dutton, Thos | Married | Finger badly jammed | Was moving a large stone in stope and got his finger badly jammed |
| 20 July | Anchor Tin Mine | Lottah | Slip of hammer on drill | Davis, A. E. | Single | Right thumb badly smashed | Was turning a drill; the striker's hammer slipped and caught him on the thumb |
| 23 July | Briseis Tin and General Mining Co. | Derby | Splinter flying from steel bar | Dwyer, John | Married | Sight of right eye destroyed | Endeavouring to dislodge stone from gullet of gravel elevator, splinter flew from steel bar he was holding as it was struck by hammer |
| 5 Aug. | Briseis Tin and General Mining Co. | Ditto | Fall of timber | Simmons, J. R. | Single | Fractured shoulder | Was falling a spar; a limb he stood on broke, and he fell, dislocating his shoulder |
| 26 Aug. | Ditto | Ditto | Stone rolling | Dynan, Jas. | Ditto | Bruised ankle | Employed in open-cut face, a stone rolled on to and badly bruised his ankle |
| 6 Sept. | Anc' or Tin Mine | Lottah | Caught in cam of machinery | Bevin, C. K. | Married | Top of thumb jammed off | Was assisting to repair machinery, got his thumb jammed between collar of cam shaft and block |
| 2 Oct. | Tasmania Gold Mine Ltd. | Beaconsfield | Slipping off roof of building | Mansfield, Arthur | Ditto | Bruised thigh | Was working on roof of boiler-house, when he slipped and fell to the ground, striking a piece of 4 x 2 hardwood |

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|---|---|---|---|---|---|---|---|
| 17 Oct. | Tasmania Gold Mine Ltd. | Beaconsfield | Falling out of a cage in motion | Floyd, Thos. | Married | Fatal. Cut to pieces. | Was ascending in a cage at Hart shaft with several other men; suddenly fell out when about 370 feet from surface, and was instantly killed |
| 17 Oct. | Ditto | Ditto | Ditto | Stewart, F. Murdak | Single | Fatal. | Was killed in the same accident as Thomas Floyd; both men left the cage at the same moment and were dashed to pieces |
| 20 Oct. | You Hen & Hee Sung's Tin Lease, 1391M | Bradshaw's Creek | Fall of earth in open-cut face | Ah Shue | Ditto | Fatal Fracture of skull, dislocation of collar bone and other bad injuries | Was working in open-cut face at night time by himself, went too near and got caught by a fall of earth |
| 23 Oct. | Tasmania Gold Mine Ltd. | Beaconsfield | Ladder slipping down pass | Bosk, Robert Henry Zeehan | Ditto | Right leg broken | Was helping to remove ladders from the western to the eastern compartment of rise. Ladder slipped down, and broke his leg |
| 26 Nov. | Ditto | Ditto | Stone falling out of wall of shaft | Hinds, Alfred | Married | Bruised ankle | At work in Grubb shaft repairing; a piece of stone dropped out of wall and struck him on the ankle, badly bruising it |
| 2 Dec. | Ditto | Ditto | Bar slipped when used on clutch-gear | Davidson, John | Ditto | Ruptured himself on right side of body | Was using a bar for taking out clutch-gear of winding engine, and ruptured himself |
| 18 Dec. | South Garibaldi Tin Mine Co. | Bradshaw's Creek | Fall of earth and timber | Brooks, August Arnold | Single | Fatal. Hip broken and internal injuries | Was working in open-cut face (a very confined place); a log rolled down with fall of earth and pinned him |

*LIST of Quarry Accidents in Inspector Griffin's District for the year*, 1912.

Casualties.—Fatal, 1; Non-Fatal, 3; total, 4.

| Date of Accident. | No. | Name of Quarry and Locality. | Owner of Quarry. | Cause of Accident. | Killed. | Injured. | Particulars of Accident. |
|---|---|---|---|---|---|---|---|
| 1912. | | | | | | | |
| 16 Jan. | 1 | Ridgeway Waterworks, excavation for Reservoir Dam, Ridgeway | Hobart Municipal Council; J. F. Cornwell, contractor | Fall of rock and earth from wall of excavation | 1 | — | John Lyden, a married man, aged 41 years, was employed with other men at the bottom of the main excavation. A shaft was being unwatered, and he worked at the windlass with a man named Tonks. The windlass had been removed from beneath good log pent-house protection, and placed on the top, where the men had no protection whatever. The night was stormy and wet; a quantity of rock fragments and wet earth slipped from near the top of a 60-feet face, and struck both men. Lyden's skull was fractured, and he died in the Hobart Hospital the following morning. |
| 16 Jan. | 2 | Ditto | Ditto | Ditto | — | 1 | William Tonks was working with John Lyden, when the latter received fatal injuries as described above; he, Tonks, got cut about the head and face, but was soon all right again. |

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|---|---|---|---|---|---|---|---|
| 30 Aug. | 3 | Hydro-Electric Company's Power Station, Ouse River, Bothwell | Hydro - Electric Company | Explosion of gelignite | — | 1 | David Carson, a married man, age 47 years, was employed excavating rock on the steep mountain side for a pipe column track. A round of holes was fired by Ganger Collidge after the men left off work in the evening. The next day a snowstorm prevented any work being done. On the third day Carson, young Collidge, and another man, cleared off the snow and commenced to deepen a couple of holes only partly drilled on a previous occasion. One of these holes, however, proved to be a "bottom" left, and contained some of the unexploded gelignite of the charge. Carson put a drill into this hole, and Collidge gave it one blow with the hammer. An explosive followed. Carson had his left forearm badly smashed, necessitating amputation when he was admitted to the Hobart Hospital. |
| 30 Aug. | 4 | Ditto | Ditto | Ditto | — | 1 | Percy Collidge, age 19, was working with Carson, as above, and received a rather severe peppering about the face and hands; but no serious injury. |

MR. INSPECTOR HARRISON (Zeehan) reports:—

*Accidents.*—In submitting my annal report on this district, I beg to state that during the year there have been one fatal and 14 non-fatal accidents, a list of which accompanies this report.

*Safety Appliances.*—Ropes, cages, brakes, and other appliances have received attention as required.

*Magazines.*—These have been inspected, and found to be kept clean and in good order.

*Legal Proceedings.*—I am pleased to state it has not been found necessary to take any legal action against either managers or workmen during the year.

*Zeehan.*—The principal mines are keeping up a steady output of ore, and show a considerable increase on the previous year.

*Dundas.*—The Comet Mine still keeps up a good supply of fluxing ores for the Zeehan smelters.

Adelaide Mine.—Prospecting the deeper levels has been going on for some months, with assistance from the Government. I am of the opinion that good results will be obtained if the work is persevered in.

*Comstock.*—Block 10 is sending out pyritic ore, which goes to the Mt. Lyell superphosphate works.

*Mt. Read.*—Hercules is sending out about 2300 tons of ore to the local smelters.

Mr. Read is still prospecting with a few men.

Dunn's Blocks.—These leases have again changed hands, and, I understand, work is to be started in the near future.

*Williamsford.*—Ring Valley Mine: Manager is sending out small parcels of high-grade copper ore.

*Rosebery.*—The Primrose has kept up a constant supply of sulphide ore to the smelters. Output is over 800 tons per month, of good grade.

The Tasmanian Copper Mine is well opened up, and in a position to turn out large quantities of ore when called on by the Metal Extraction Company.

North Tasmanian Copper Mine is being opened up.

North Jupiter.—Nothing has been done for some time, waiting for a market for their ore.

Metal Extraction Company.—These extensive works are nearing completion, and I understand a couple of small parcels of ore have been delivered from the Tasmanian Copper Company's mine. It is arranged that the Extraction Company take ore at the rate of 150 tons per week for the first three months, after which there will be a considerable increase in the delivery. The work of erection has been delayed through shortage of tradesmen.

Five-mile.—The Zeehan and Dundas Blocks Mine is sending out about 200 tons of galena per month from No. 1 level. Manager is busy pushing on the No. 1 crosscut. Water is held under easy control.

*Mt. Farrell.*—North Mt. Farrell Mine: During the year 13,219 tons of ore have been won, of a value of £24,639, exclusive of reduction charges and freight. There has been a difficulty in obtaining miners. Manager is opening up No. 6 level.

Murchison Mine is in the hands of a small party of tributers.

Sterling Valley.—During the last four months the manager has erected a sawmill, cut rails, and laid down about 4 miles of good substantial tram, to connect the mine with the Murchison mill. A regular output can be looked for from this mine in the future.

*North Pieman.*—Chester Mine keeps up a steady output of sulphide ore for the Mt. Lyell superphosphate works.

*Henty River.*—The Queensberry Mine has been taken by a party of tributers, who are putting the tram-line and plant in repair before starting to put out ore. They have a decent prospect of success before them.

*Waratah.*—Mt. Bischoff is going along as usual.

Bischoff Extended is keeping its 10-head battery constantly going, and I understand is getting ready to increase its crushing power.

Magnet is putting out a reduced quantity of ore, with good results.

*Whyte River.*—The manager of the Cleveland Mine is busy erecting steam plant for driving the battery when there is no water-power. Manager has large bodies of ore to work on.

*Heazlewood.*—The Victoria Magnet is still driving.

Jasper Copper Company.—Manager is sending out parcels of high-grade ore from the new find.

*Savage River.*—The fine weather is inducing the iridium miners to return to the river.

*Balfour.*—Very little copper mining is going on. The Reward Mine still continues to send out ore, but the township depends a good deal on the tin-miners.

*Tin-mining of North-East Dundas and Heemskirk.*—The Renison Bell Mine.—The manager is opening up a large area of payable tin-bearing ground on the north side of the Argent River, and maintaining a good output with the 10-head battery.

Boulder Tin Mine.—Manager is treating tailings with his new mill, with satisfactory results.

Montana Tin Syndicate.—Men are employed sluicing the detritus. There has been a delay in the erection of their mill, through water difficulties cropping up.

Dreadnought-Morton Sections.—During the year a Sydney syndicate obtained an option over the leases, and sent a couple of hundred tons of ore to the Bischoff Extended Mine for treatment, and although the saving appliances were not suitable for this class of tin (which is very fine), a recovery of about 3¼ per cent. was obtained. The syndicate, however, felt disappointed, and nothing has been done for the last few months; but I am informed another start is to be made immediately with increased capital.

Penzance.—The dressing appliances in connection with this mine not proving satisfactory, and losses being too great, it was found necessary to close down for the time. Fresh plant has been obtained and better water-supply secured. Another start will shortly be made.

*X River.*—In this district several parties are employed prospecting their properties, and several rich veins have been opened up. I feel confident that this portion of the North-East Dundas field will give a good account of itself before long.

*Stanley River.*—Reward Mine.—Tributers are making a splendid success of this property, where the company failed badly.

There are numerous small parties scattered over the Dundas field. Most of them are doing well; but a good central mill is badly required for the treatment of small parcels of ore. Amongst the leases that could keep such a mill fully employed I may mention the Federal, Dreadnought, Central Renison Bell, and other properties. It will be impossible for every mine to have its own mill, as the water problem for motive-power and dressing purposes in hilly country must prove a serious consideration.

## QUARRIES.

Annual report on quarries in the Western District:—

*Zeehan.*—This quarry is worked by the town council, and precautions are taken to prevent accidents. There has not been any complaint.

*Burnie.*—The quarry is in the hands of the marine board. It is near several large buildings, and special means have to be taken to prevent accident. The principal danger is from light charges.

On June 20 a man named Richard Ward Medley, age 34, native of Victoria, and married, met with a serious accident, through which he died on July 4. Medley was endeavouring to clear a copper pipe of gelignite, with which it was choked. He called on another workman to ram out the explosive with an iron scraper. The result was an explosion, and Medley received very severe injuries to his face and body.

The quarry is worked in benches, and all possible care taken

*LIST of Accidents in Inspector Harrison's District for the Year* 1912.

Fatal, 1; non-fatal, 14; total, 15.

| Date of Accident. | Name of Mine. | Locality. | Cause of Accident. | Name of Sufferer. | Married or Single. | Nature of Injuries. | Particulars. |
|---|---|---|---|---|---|---|---|
| 1912. | | | | | | | |
| 25 Jan. | Chester | North Pieman | Fall | O'Neil, James | Married | Bruised chest | Slipped and fell, and a stone rolled over his chest. |
| 17 Mar. | Tasmanian Smelting Co. | Zeehan | Explosion | Beard, Tasman | Ditto | Loss of eye, severe cuts on face and body | Explosion took place while charging a hole in hot slag, inflicting severe injuries which terminated fatally on 23rd March. |
| 5 June | Mt. Bischoff Mine | Waratah | Struck by aerial bucket | Wright, Henry | Single | Fracture of collar-bone | Allowed the bucket to strike him as it was passing round the unloading platform; it was purely his own fault. |
| y | Magnet | Magnet | Fall | Karlson, A. | — | Bruised chest, not very serious | While getting a piece of timber out of the cage his foot slipped on the plat, and timber fell on his chest. |
| 5 July | Hercules | Mt. Read | Ditto | Curtain, John | Single | Broken rib | While barring down after firing, slipped, and a large piece of rock fell on his chest. |
| 13 July | Tasmanian Smelting Co. | Zeehan | Contact with slag | Sherrin, Alan | Ditto | Burns on face and slight injury to eyes | Put wet ladle into molten slag, when a slight explosion took place. |
| 15 July | Fox Section 1064–M | Ditto | Runaway truck | Mahoney, John Henry | — | Small bone of left arm broken | Truck on which Mahoney was riding started to skid on frosty rail; it jumped the line and he was thrown. |

*LIST of Accidents in Inspector Harrison's District during the Year* 1912—continued.

| Date of Accident | Name of Mine. | Locality. | Cause of Accident. | Name of Sufferer. | Married or Single. | Nature of Injuries. | Particulars. |
|---|---|---|---|---|---|---|---|
| 1912. 1 Aug. | Renison Bell | N. E. Dundas | — | Dhu, Cornelius | — | Bruised leg and cut on head | Bruised leg and cut on head from explosion. Dhu attended a football match on the 10th. |
| 19 Aug. | Hercules | Mt. Read | Fall of rock | Cunningham, James | Single | Right leg broken above the knee | While standing on a stage putting in a hole, a large piece of rock fell on Cunningham, inflicting the injury mentioned. |
| 17 Sept. | Primrose | Rosebery | Fall of mullock | Geard, Herbert Wm. | Married | Right leg broken | A piece of mullock fell from over the cap and rolled over on to his leg. |
| 1 Oct. | Bischoff | Waratah | Fall | Columbine, Albert | Single | Broken arm | While tipping truck Columbine lost his balance and fell about 8 feet. |
| 15 Oct. | Oonah | Zeehan | Fall of stone | Thorne, Alfred | Married | Right leg broken | Thorne knocked out a set of timber, and while making an examination a fall of rock took place. |
| 16 Oct. | Rosebery | Rosebery | Fall of stage | Birkett, Geo. Victor | Single | Broken leg | Stage on which Birkett was standing slipped. |
| 18 Nov. | Magnet | Magnet | Rolling stone | Mawer, William | Ditto | Crushed hand | Mawer was working in No. 9 level when a stone rolled and jammed his hand. |
| 19 Dec. | Bischoff Extended | Waratah | Fall | Blegg, David | Married | Broken leg and scalp wound | Blegg was stepping back from some broken ground when his foot slipped and he fell down a mullock-pass. |

MR. INSPECTOR CURTAIN (Queenstown) reports:—

*Accidents.*—In the list of accidents for the past year the North Lyell disaster overshadows all others. The moist conditions prevailing in the mine excluded any anticipation of the possibility of fire; but events have shown how necessary it is to provide against fire in moist metalliferous mines. The trying ordeal which the shaft and other workings have successfully passed has furnished demonstration of the baselessness of the apprehensions which have been entertained with reference to their alleged insecurity. The general conditions of the mine, in the minds of competent judges, would compare favourably with any other of similar proportions and characteristics in the Commonwealth.

*Health of Miners.*—This, from medical testimony, continues satisfactory, and may be attributed to the normal temperature and exceptional ventilation that prevail in our principal mines. The Lyell Blocks Mine is still sinking, and in pursuance of an order from the Minister, has driven from its deepest plat (1000 feet) to the boundary of the adjoining North Lyell Mine, with whose workings it is to be connected, when this group will be generally improved in the directions indicated.

Dust is allayed in the Mt. Lyell Mine with water-jets, and the same principle is being similarly followed in the North Lyell Mine, with what is expected to provide permanent satisfaction.

*Changing-houses.*—Up-to-date requisites in the shape of hot and cold water baths, showers, separate area spaces, with clothes-pegs for the employees using them, and under the charge of regular attendants, have been provided in each of the Mt. Lyell Company's mines.

*Ropes, Cages, and Ladders.*—These have received periodical trials, tests, and examinations in sympathy with the requirements of the mining regulations, and, where necessary, have been discarded before entering any period of apprehension.

*Candles, Fuse, and Explosives.*—These commodities are procured from reputable makers, under stipulations that each line must be of first-class quality, and in no instance have they been officially reported otherwise.

*Conclusion.*—The year has left painful memories behind, but it is fervently hoped that its bitter lessons will be fruitful in bringing about more stringent provisions for the safety of miners and the mines in which they work.

## *LIST of Accidents in Inspector Curtain's District for the Year* 1912

Fatal, 48 ; non-fatal, 15 ; total, 63.

| Date of Accident. | Name of Mine. | Locality. | Cause of Accident. | Name of Sufferer. | Married or Single | Nature of Injuries. | Particulars. |
|---|---|---|---|---|---|---|---|
| 1912. 24 Feb. | Mt. Lyell Mg. & Ry. Coy. Reduction Works | Queenstown | Head-stock or cross-beam of electric lift broke | Henry O'Connor | Single | Jaw broken and left ankle sprained | O'Connor had control of the sampling floor lift, and was travelling with a loaded truck from one floor to the other when the cross-beam broke, and nullifying the utility of the safety appliances, permitted it (lift) to fall some 14 ft., and produced the injuries which for some time incapacitated him. |
| 28 Feb. | Mt. Lyell Mg. & Ry. Co., Mt. Lyell Mine | Gormanston | Fall of ore, iron pyrites | William James Murphy | Ditto | Fractured skull, and other injuries to head, chest, and body | At the time of the occurrence Murphy was employed shovelling into an ore chute in No. 2 stope on the No. 7 level, when some 4 or 5 cwt. of ore came away, and produced death instantaneously. |

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|---|---|---|---|---|---|---|---|
| 9 April | Mt. Lyell Mg. & Ry. Coy., North Lyell Mine | Gormanston | Fall of ore | James Grant | Single | Injury to back and base of spine that still incapacitates him | Grant, a member of a contracting party, while barring down in 22 stope on the 850-ft. level, was struck by portion of the spoil he was relieving, and received injuries that still detain him in the local hospital. |
| 17 April | Mt. Lyell Mg. & Ry. Co., Mt. Lyell Mine | Ditto | Ditto | Patrick McKendry | Married | Both ankles bruised and injured | McKendry, with others, was removing the waggon rails on the lowest or No. V. bench of the open-cut workings, preparatory to firing, when a boulder came away and pinned him as described. |
| 27 April | Mt. Lyell Mg. & Ry. Coy., Reduction Works, Ry. Dep'tm'nt | Queenstown | Jammed between two full ore-trucks | Edward McMahon | Single | Right foot and ankle cut and bruised | McMahon, a guard or brakesman in the Railway Department, was braking a loaded truck into the sample-floor bins when, it is stated that, owing to the greasy nature of the rails it became unmanageable, and bumping into another, produced injuries that necessitated the man's removal to the hospital. |
| 5 May | Mt. Lyell Mg. & Ry. Coy., North Lyell Mine Timber Shed | Ditto | Lost control of adze | James Sutcliffe | Married | Severe cut on right leg | Sutcliffe was an inmate of the hospital for some time, but made a good recovery, and is again at his usual occupation. |

*LIST of Accidents in Inspector Curtain's District for the Year* 1912—continued.

| Date of Accident. | Name of Mine. | Locality. | Cause of Accident. | Name of Sufferer. | M rried or Single. | Nature of Injuries. | Particulars. |
|---|---|---|---|---|---|---|---|
| 9 May | Mt. Lyell Mg. & Ry. Coy., North Lyell Mine | Gormanston | Flying splinter | George Scales | Married | Right eye affected | Scales was spawling in No. 2 section of 20 stope at the 850-ft. level when a chip flew, and striking his eye, necessitated his proceeding to Melbourne for special advice. |
| 14 May | Mt Lyell Mg. & Ry. Coy., Mount Lyell Mine | Ditto | Fall off rail of full bucket of ore | Norton Christie | Single | Left great toe crushed that necessitated amputation | Christie, a loader at the mine bins, while running a loaded bucket out on the "circuit" had it strike or "kick" against a chute door, that, derailing it, produced his injuries, from which he is still suffering. |
| 4 June | Mt. Lyell Mg & Ry. Coy., North Lyell Mine | Ditto | Inexperience in cage travelling | James Sams | Ditto | Compound fracture of the right arm above the elbow | Sams, with others, was being lowered to the 850-ft. level, and owing to his elbow protruding when passing one of the "intermediate" plats, it came in contact with part of the latter and the safety-bar of the cage, and produced the injuries which might have been much more serious. |

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|---|---|---|---|---|---|---|---|
| 5 June | Mt. Lyell Mg. & Ry. Coy., Reduction Works | Queenstown | Fall into an ore-bin | William Greenway | Married | Comminuted fracture of skull producing death | Greenway was a truck-oiler, and was not actually on duty at the time of his death; but was returning to work after finishing crib, when, from some unaccountable reason, he fell head first into an empty bin, and received such severe injuries that death followed almost instantaneously. |
| Ditto | Mt. Lyell Mg. & Ry. Coy. North Lyell Mine | Gormanston | Jammed hand between lip of an ore-chute and top or frame work of a loaded truck | Edward Oliver | Single | Two middle fingers of left hand bruised | Oliver was a trucker from 20 stope on the 850-ft. level, and, when passing an ore-chute with a somewhat overloaded truck, got the back of his hand and fingers jammed. |
| 26 June | Mt. Lyell Mg. & Ry. Coy., Mount Lyell Mine | Ditto | Slipped off a rock-drill | William Garner | Married | Ribs fractured | Garner was incapacitated beyond the 14 days stipulated by section 181 of the Mining Act, otherwise the occurrence was officially reported as not serious. |
| 23 July | Tasman and Crown Extended | Gormanston-Comstock | Caught in belting | Clarence Bransden | Single | Right arm bruised and twisted | Bransden, while performing his duties as mill-foreman, had the loose sleeve of his coat caught betweeen a running belt and banner pulley. |

*LIST of Accidents in Inspector Curtain's District for the Year* 1912—continued.

| Date of Accident | Name of Mine. | Locality. | Cause of Accident. | Name of Sufferer. | Married or Single. | Nature of Injuries. | Particulars. |
|---|---|---|---|---|---|---|---|
| 1912. | | | | | | | |
| 5 Aug. | Mt. Lyell Mg. & Ry. Coy., Mount Lyell Mine | Gormanston | Struck by a dislodged piece of ore | William Robinson | Married | Lacerated fracture to base of the skull that caused death | The single piece of rock that struck Robinson was dislodged by a fellow workman some height up the face, and, richocheting in a most peculiar manner, struck the unfortunate man on the base of the skull, and killed him. |
| 29 Aug. | Ditto | Ditto | Fall of ore | Leslie Davies | Single | Left leg broken below the knee | Davies was trucking on No. 6 level, and, according to his statement, entered No. 3 stope to procure a mate's hat, when some ore came away and caught him. The mine officials state it was no business of his being in that part of the mine at the time. |
| 21 Sept. | Ditto | Ditto | Fall of rock | George Steele | Married | Skull and body crushed, producing instantaneous death | |
| Ditto | Ditto | Ditto | Ditto | Arthur William Anderson | Single | Body crushed and death instantaneous | These men were working on the afternoon shift in the No. 1 stope of the No. 6 level of the mine, and after finishing |

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|---|---|---|---|---|---|---|---|
| Ditto | Ditto | Ditto | Ditto | Sinclair Stone | Ditto | Ribs broken with internal injuries that produced death on the following day | crib were about to resume work, when with little, if any, warning, a quantity of rock came away from the hanging wall on top of them. |
| Ditto | Ditto | Ditto | Ditto | Patrick Burns | Ditto | Instep of left foot broken | |
| Ditto | Ditto | Ditto | Ditto | Claude Burris | Ditto | Left ankle broken | |
| 12 Oct. | Mt. Lyell Mg. & Ry. Coy., North Lyell | Ditto | Fire | George Studwell | Ditto | Death | Studwell, with a number of men, was working underground when a fire took place on the 700-ft. level, and produced insidious fumes and gases which proved fatal to himself and 41 other employees.* |
| 11 Nov. | Mt. Lyell | Ditto | Fall of rock | Frederick Chennels | Ditto | Small leg bone and two toes broken | Was barring down ground in stope, when a quantity came away and caught him. |

* Full particulars of this occurrence appear in the Report of the Chief Inspector of Mines.



JOHN VAIL,
GOVERNMENT PRINTER, TASMANIA