
# *REPORT of the* INSPECTOR OF MINES *for the Year* 1884.

*Inspector of Mines Office, Launceston, December*, 1884.

SIR,

I HAVE the honor to submit my Third Report as Inspector of Mines, from the 1st of January to the 31st December, 1884, inclusive.

"The Regulation of Mines Act, 1881," 45 Vict. No. 8, having been amended in November, 1884, by Parliament, the results of the administration of both Acts for the time being are now presented for consideration; these include lists of accidents which have occurred in the mines of Tasmania during the year, tables and returns explaining the former, a synopsis of the work performed by the Inspector, as well as diagrams of new and useful mining appliances suitable for the better carrying out of mining operations by means of improved water motors, for which there is so abundant high pressure water power available in Tasmania.

So far as the working of the Regulation of Mines Act is concerned, I have every reason to be satisfied, as there has been a decided improvement in the *character* of the non-fatal accidents, though their total number for the year has increased to 36, as against 35 during the previous year; the number of fatal accidents during the year amounts to the same number as last year,* but they include one case in which the deceased met with his injury at the close of last year, but he died during the present year and the case was never reported. As there is still room for a further reduction in the number of accidents of all kinds, the Inspector's duties will have to be exerted in that direction to bring about so desirable a result.

As reported before, as to the undoubted necessity which exists for the adoption of what is commonly termed the "*primâ facie*" Section, under which "*Any accident occurring in a mine shall be* primâ facie *evidence that such accident occurred through some negligence on the part of the owner*," such a provision has not yet been placed in the Regulation of Mines Act of 1881 and 1884.

The Inspector of Mines has visited, during the year, the following mining districts,—in some cases each several times; viz.—

| *District.* | *Description of Mining.* |
|---|---|
| Mersey | Coal. |
| Mount Bischoff | Tin. |
| Mount Heemskirk | Tin. |
| Corinna | Gold. |
| Long Plains | Gold. |
| Mount Cleveland and Specimen Reef | Gold. |
| Penguin | Silver, Silver-Lead, and Copper. |
| Beaconsfield | Gold. |
| Salisbury (Blue Tier) | Gold and Nickel. |
| Lefroy | Gold. |
| Gladstone to Pioneer Company | Tin. |
| Moorina to Brothers' Home | Tin. |
| Branxholm | Tin. |
| Mount Victoria | Gold. |

* One fatal accident in December, 1883; it was never reported until death intervened in August, 1884, and therefore it should be credited to 1883.

General Rules, sect. 11, clause xv.

The safety hooks and safety cages in use with our deeper mines have given satisfaction, and accident has been reported as having occurred from their use.

General Rules, sect. 11, clause xxi.

During the year, in accordance with the provisions of the Act, 28 steam boilers were exami and subjected to the prescribed hydraulic test, all of which, except three, withstood more t double their ordinary working pressure; viz.—

| | *Boilers.* | *Total.* |
|---|---|---|
| At Lefroy: | | |
| At the end of the first six months | 6 | |
| Ditto second ditto | 4 | |
| | — | 10 |
| At Beaconsfield: | | |
| At the end of the first six months | 10 | |
| Ditto second ditto | 8 | |
| | — | 18 |
| *Total* | | 28 |

These steam boilers thus tested were owned by the following proprietaries; viz.—

| | *Boilers.* | *Total.* |
|---|---|---|
| At Lefroy: | | |
| The Lefroy Pyrites Calcining and Reduction Company (multitubular) | 1 | |
| New Chum Gold Mining Company, pumping, winding, and battery (Cornish flue) | 3 | |
| West New Chum Gold Mining Company (ditto) | 3 | |
| Morning Star Gold Mining Company, winding and pumping (Cornish flue) | 1 | |
| | — | 8 |
| At Beaconsfield: | | |
| The Florence Nightingale Gold Mining Company, winding and pumping | 2 | |
| Tasmania ditto (including Golden Gate), winding, pumping, and battery | 4 | |
| Lefroy ditto ("Drainage Union"), ditto | 4 | |
| | — | 10 |
| *Total* | | 18 |

In one instance the steam-taps were ordered to be repaired; in another the seat of the s valve had to be ground before the requisite test-pressure could be obtained. The battery boil another company, with a usual working pressure of from 35 to 40 lbs. per square inch, coul maintain such pressure. The Inspector eventually found that a leak eight inches in length had fo in the angle iron on the front and crown of the boiler; the boiler was accordingly conde until repaired. Eventually a statutory declaration, sworn to by the Mining Manager, was forw to my office, stating that the boiler had been tested to 60 lbs. per square inch pressure, whic accepted as satisfactory for the time being.

It may be remarked in this connection that a considerable saving of time and expense v accrue by following the custom of other countries. In Great Britain, for instance, the Boile Steam Power Insurance and Employers Liability Companies are now a *sine qua non*, and the ness these companies undertake, such as, for instance, the Manchester Steam Users Associatio Yorkshire Boiler Insurance Company, and the Boiler Insurance and Steam Power and Emp Liability Company of Manchester, comprises the testing and inspection of, in the aggregate, tw four thousand (24,000) steam-boilers insured; and by having proper supervision by properly qu inspectors, explosions, at one time so frequent, have become rare to such a degree that onl boiler explosion occurs in every 8500 boilers insured, whilst the proportion of uninsured is every 1800. The first-named Company, with 4000 boilers under its control, reports "that not had a serious explosion nor the loss of any life for over thirty years." The Yorkshire Con also reports not having had such a mishap for the last ten years; and the last-named proprie Manchester, "which has over 20,000 boilers under its care," reports in a similar strain. All companies have apparently embarked in a very profitable undertaking, their dividends ranging 5 to 30 per cent. per annum, leaving the utilitarian effects of their combined action altogether the question. These companies are established for the following objects; viz.—

1. The inspection of boilers and machinery.
2. The insurance of owners of boilers against any injury that might happen from an exp to the boiler itself and surrounding machinery or property, up to a certain sum determined. With this would be combined periodical inspection and reports f satisfaction of the owner.

3. The periodical inspection and indication of engines and all classes of machinery, with reports advising owners as to best course to be pursued in order to reduce expenses of working and the promotion of economy in every department.
4. The assurance of employés, that is to say, the issue of policies on the lives of engine men and factory hands, for whose safety the employer is liable, and to whom he must pay compensation in cases of injuries arising from explosion of his boiler.

The following extract will, it is hoped, convince employers of steam boilers and machinery that there is a necessity for some such association, one of which, I am informed, will shortly be formed in Victoria, with branches in all the Colonies.

"Not only do employers of labour feel a great weight lifted from their shoulders with regard to the safety of their boilers and engines" (which, here in Tasmania, have acquired a considerable length of "life," and therefore require severer tests and increasing attention), "the care of which is often placed in the hands of men who are not qualified to report as to their deterioration or otherwise, but if an accident should happen they are not only indemnified up to the amount of insurance, but they are also assisting in the protection of human life."

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One quartz-mining company was notified to have dilapidated and unsafe ropes replaced by new ones, also to discontinue the employment of too young and inexperienced engine-drivers and brace-men. One quartz-mining company had special rules granted to it by the Hon. Minister of Lands and Works. Secs. 8 and 9, clause i. Sect. 11, clause xix. Sect. 12.

Five coal-mining companies were directed to properly fence in their shafts and workings. Three gravel (tin) mining companies were instructed, after personal inspection, to carry on their mining operations in hydraulically sluicing "faces," over one hundred feet in height, in a manner better calculated to ensure the lives of their employés; complaints about which had been lodged with the District Commissioner of Mines. Sect. 11, rule vi. Sect. 9.

A quartz-mining company's engine-house was constructed so as to intercept or obstruct the view of the brace by the engine-driver at the winding engine. This was altered at the instance of the Inspector of Mines. Sect. 9.

Another quartz-mining and drainage company was ordered to remove *vertical* ladders placed into their shaft *since* this Act came into force, and replace same by inclined ladders, and to have substantial platforms every thirty feet. Sect. 6. Sect. 11. General Rule xviii.

Information having reached the Inspector of Mines Office of a total collapse threatening two very valuable mining and crushing plants, owing to some mining operations being carried on at inconsiderable depth from the surface, and in close contiguity to, and partly under the dambank of a large filled reservoir of water, those workings were at once stopped, and the whole matter was, at the same time, reported to the Hon. Minister of Lands and Works. Sect. 9.

The mining and drainage company already referred to was likewise instructed to provide proper straps for the miners descending and ascending the buckets used in the working in the shaft. Sect. 11, General Rule xvi.

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Under the provisions of "The Regulation of Mines Amendment Act, 1884," Section 2, the following mining companies have furnished this office with plans and sections from surveys made by authorised surveyors, according to the scale adopted—with some of the more extensive mines the Hon. Minister permitted a modification of the standard scale; viz.—

1. The Mount Bischoff Tin Mining Company, Registered, Waratah.
2. The West Bischoff Tin Mining Company, Registered, ditto.
3. The West New Chum Gold Mining Company, Registered, Lefroy.
4. The Lefroy Gold Mining Company (Drainage Union), Beaconsfield.
5. The Tasmania Gold Mining Company, ditto.
6. The Mount Claude Silver-Lead Mining Company, West Devon.
7. The Little Wonder Gold Mining Company, Beaconsfield.
8. The Stanhope Tin Mining Company, Waratah.

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The total number of miners employed at the various mines, as kindly furnished by the Government Statistician, has been ascertained as amounting to, approximately only, 2923, or, in round numbers, 3000—a reduction of 1100 upon last year.

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*Accidents.*

Since the beginning of 1884 the total number of miners killed and injured whilst following their various avocations is as follows :—

*Fatal Accidents from January to December, 1884, inclusive.*

| Date of Accident. | Consecutive No. | Description of Mining. | Locality. | Married. | Single. | Date of Death. | Compensation. | Age. | Names. |
|---|---|---|---|---|---|---|---|---|---|
| 1884. | | | | | | | | | |
| April 30th | 1 | Tin | Thomas's Plains | ... | ... | May 1st | ... | ... | Ah Fun. |
| May 22nd | 2 | Tin | Ditto | ... | ... | May 22nd | ... | ... | Ah Chang. |
| July 29th | 3 | Tin | Branxholm | ... | ... | July 29th | ... | ... | Gee Jim. |
| Dec., 1883 | 4 | Tin | Thomas's Plains | ... | ... | Aug. 6th | ... | ... | Kee Wee.* |
| August 25th | 5 | Tin | Gladstone | ... | 1 | Aug. 25th | ... | 46 | Ah Ho. |

*Non-Fatal Accidents for the same period.*

| Date of Accident. | Consecutive No. | Description of Mining. | Locality. | Married. | Single. | Date of Recovery. | Compensation. | Age. | Names. |
|---|---|---|---|---|---|---|---|---|---|
| 1884. | | | | | | | | | |
| Jan. 10th | 1 | Gold | Beaconsfield | 1 | ... | Jan. 20th | ... | ... | Wm. Hills. |
| Feb. 5th | 2 | Coal | Tarleton | ... | 1 | March 6th | ... | ... | John Wardley. |
| Feb. 13th | 3 | Gold | Beaconsfield | ... | ... | Feb. 21st | ... | ... | Wm. Bennett. |
| Ditto | 4 | Gold | Ditto | ... | ... | Ditto | ... | ... | Wm. Flanagen. |
| Feb. 20th | 5 | Tin | Gould's Country | ... | ... | ... | ... | ... | John Read. |
| March 11th | 6 | Gold | Beaconsfield | ... | 1 | ... | ... | 18 | Robert Foster. |
| April 1st | 7 | Gold | Ditto | ... | ... | ... | ... | ... | Ed. Rosewarne. |
| April 22nd | 8 | Tin | Frome River | ... | ... | ... | ... | ... | George Pratt. |
| April 26th | 9 | Tin | Gould's Country | ... | ... | ... | ... | ... | David Medwin. |
| Ditto | 10 | Gold | Beaconsfield | ... | ... | ... | ... | ... | Richard Bone. |
| May 5th | 11 | Tin | Gladstone | ... | ... | ... | ... | ... | James Duffy. |
| May 7th | 12 | Gold | Beaconsfield | ... | ... | ... | ... | 56 | Stephen Foster. |
| May 21st | 13 | Gold | Lefroy | 1 | ... | ... | ... | 21 | John Barker. |
| May 27th | 14 | Gold | Beaconsfield | ... | 1 | April 1st | ... | 16 | Elisha Martin. |
| June 12th | 15 | Tin | Ben Lomond | ... | ... | June 16th | ... | ... | Wm. Dodd. |
| June 23rd | 16 | Tin | Mt. Heemskirk | ... | 1 | Ditto | ... | ... | Michael Meara. |
| July 18th | 17 | Tin | Mount Bischoff | ... | ... | ... | ... | ... | Wm. Dickenson. |
| July 21st | 18 | Gold | Beaconsfield | 1 | ... | ... | ... | 22 | Andrew Campbell. |
| July 24th | 19 | Tin | Moorina | ... | 1 | ... | ... | ... | Thos. Brooks. |
| July 29th | 20 | Tin | Branxholm | ... | 1 | ... | ... | 47 | Hip Con. |
| Ditto | 21 | Gold | Mount Victoria | ... | 1 | ... | ... | 28 | Tim. M'Donald. |
| August 4th | 22 | Tin | Branxholm | ... | 1 | ... | ... | 25 | Wm. Talbot. |
| August 8th | 23 | Tin | Mount Bischoff | ... | ... | ... | ... | ... | Hy. Williams. |
| August 9th | 24 | Gold | Mount Victoria | ... | ... | ... | ... | 62 | John Williams. |
| August 25th | 25 | Tin | Mt. Cameron S. | ... | ... | ... | ... | ... | ——————† |
| August 26th | 26 | Gold | Beaconsfield | ... | ... | ... | ... | ... | John Hancock. |
| August 27th | 27 | Tin | Main Creek | ... | 1 | ... | ... | 23 | George Marcell. |
| Sept. 1st | 28 | Tin | Mount Bischoff | ... | 1 | ... | ... | 29 | John Evans. |
| Sept. 10th | 29 | Gold | Beaconsfield | ... | ... | ... | ... | ... | Frank Tregaskis. |
| October 5th | 30 | Gold | Ditto | ... | ... | ... | ... | ... | W. Williamson. |
| October 10th | 31 | Tin | Moorina | ... | ... | ... | ... | 40 | Michael Egan. |
| October 14th | 32 | Gold | Mount Victoria | ... | 1 | ... | ... | 30 | Daniel Stephens. |
| October 16th | 33 | Tin | Mount Bischoff | ... | 1 | ... | ... | 23 | Peter Broadie. |
| October 30th | 34 | Gold | Beaconsfield | ... | 1 | ... | ... | 15½ | Henry Rigby. |
| Nov. 9th | 35 | Gold | Ditto | 1 | ... | ... | ... | 27 | Ed. Rowbottom. |
| Nov. 26th | 36 | Gold | Ditto | 1 | ... | ... | ... | 62 | John Sullick. |

MEMO.—Total fatal accidents during the year, 5; total non-fatal accidents ditto, 36; grand total of all mining accidents, 41.

* This miner was injured in December, 1883, but death overtook him only in 1884.
† The name of this miner has not been ascertained, though he was reported to be a Chinaman.

In analysing the above lists of mining accidents, it would appear that two of the number could not be placed within the category of proper accidents under or within the provisions of the Regulation of Mines Acts; and, by carrying the investigations still further, it likewise becomes apparent that the remaining number of casualties are capable of reduction, which is ascribable to the desire on the part of the mine-owners or mining manager to report any kind of accident in order to be within the law. It is quite certain that at least seven of these accidents are not *serious*, and that one of these was due to gross negligence. If these minor mishaps are eliminated from the above record, then the reduction which has taken place in the number of miners in Tasmania will leave the percentage per thousand of such miners in about the same state as the year before.

*Particulars as to Fatal Accidents.*

Ah Fun was employed in clearing ground for subsequent mining operations, and he charged a hole bored into a log with dynamite. Not understanding this kind of work he went back to the log

too soon, when the charge exploded before he could get out of the way; a piece of timber struck him on the head, which caused his death next day.

Ah Chang, along with some of his countrymen—who had been working at this mine for more than seven years, and who passed therefore as an experienced and careful miner—was engaged in picking at a "face" of gravel but 6 feet high, when, without any warning, about three tons came away burying Ah Chang completely; he was extricated in about half an hour, but had died from suffocation. The mining manager ascribes this accident to have been caused by very heavy rains having followed a severe frost "cracking" the faces, rendering same to be very treacherous.

Gee Jim was killed by a fall of earth at the Cascade River; but beyond the notice by the Superintendent of Police no other particulars could be obtained.

Kee Wee was injured in December, 1883, by a fall of earth, but his accident was never reported. He had lost the use of his lower limbs, and a Chinese doctor attended him till his death in August, 1884, when the Superintendent reported the case to this office.

Ah Ho was also killed by a fall of gravel in a bank which had been undermined by the party of which the deceased formed a member. This bank was from 12 to 14 feet high, resting on soft rock; they cut under this bank to a depth of from three to five feet, leaving small "pillars" as supports, and regular distances apart. Back from the face some six or eight feet an old prospecting shaft had been sunk, then conatining water which had percolated through the gravel, thus loosening the same. When the last of those pillars were knocked away the part adjacent to the old shaft fell over without any warning, and buried the mine in the *débris*. Having had some considerable experience in working similar ground at or near Gladstone, a very little foresight might have prevented this fatality; but Chinamen, as a rule, work without much consideration of what may be ahead of them in working mines of this description, hence so many fatal accidents amongst these people.

*Particulars as to Non-Fatal Accidents.*

These comprise the ordinary classes of mining accidents, ranging from the trivial and easily avoided to the more serious.

One miner, in not sufficiently securing some timber he was lowering to a deeper level was, on the rope slipping, precipitated 50 feet down a "pass." Another rode on a truck down an incline—a practice specially forbidden by the mining manager—and, by falling off, broke his leg. A trucker (16), in filling his truck from a shoot, was struck in the face by a piece of quartz passing, in falling, through the open door. Three men were sinking a shaft, and the one at the windlass allowed the bucket to slip into the shaft; he thereupon caught hold of the rope and fell with it to a depth of 50 feet. All three escaped very severe injuries. A plumb-bob fell on the head of a carpenter engaged in putting in timber partitions of a main shaft. Falls of quartz, rock, and earth caused also several injuries to miners employed. A face of gravel fell after the top soil had been sluiced off; a little more care would have prevented the serious injuries to a Chinaman employed thereat. Gross carelessness was exhibited by a trucker who emptied a truckful of quartz into a "hopper," at the bottom of which a man was engaged to tighten some screw-nuts; the trucker neither looked nor called out, and thus the quartz, falling upon the man, cut him severely about the body and knocked four of his teeth out also. The engineer of another company had a very narrow escape from death. He was caulking a steam joint, and, on turning on the steam pressure very slowly the S piece suddenly burst, depriving him of bis senses for some time.

The Tables and Appendices to this Report for 1884 give in detail the nature of each separate accident, whether fatal or otherwise, and they are shown to be comprised under the following heads; viz.—

| | |
|---|---|
| By fall of earth, trees, timber, &c. | 20 |
| By explosions | 3 |
| By machinery | 12 |
| By falling down shafts or other workings | 6 |
| TOTAL | 41 |

These accidents occurred in the following Mining Districts, and they stand, according to their frequency, in the following order; viz.—

| | |
|---|---|
| Thomas's Plains, Branxholm, Gladstone, Gould's Country, Frome River, Ben Lomond, Mount Heemskirk, Mount Bischoff, Moorina, and Mount Cameron | 21 |
| Beaconsfield, Lefroy, and Mount Victoria | 19 |
| Tarleton | 1 |
| TOTAL | 41 |

In this manner there have been twenty-one mining accidents in the tin, nineteen in the gold, and one in the coal mining districts, or as near as possible the same number as last year.

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*Three-yearly retrospect of Accidents, from* 1882 *to* 1884 *inclusive.*

| | |
|---|---|
| Number of fatal accidents ..... | 17 |
| Ditto of non-fatal accidents ..... | 94 |

Of the former there appear on the records of this office eight for the first year; after the passing of the Regulation of Mines Acts, four for the second, and five, as already explained, for this year. And of the latter class of accidents there were reported eighteen, thirty-five, and thirty-six in each of those three years respectively.

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The number of miners in Tasmania having from various causes decreased to, say, 3000, the following comparisons are of interest:—In Victoria there has been one fatal accident for every 712 miners; in New South Wales, one for every 497; in New Zealand, one for every 625; whilst in the metalliferous mines of England the rate was one for every 1712 miners;—the Tasmanian proportion being one for every 600 miners.

The results of the Regulation of Mines Act, including also the Inspection of Mines and of Mining Machinery, have not always afforded satisfaction to a section of the community which, having become used to the old non-responsible customs, regard these modern enactments as innovations and therefore not required. If, however, the State possesses an indisputable right to protect workmen engaged in a very hazardous and dangerous calling, and obtains by means of legalised regulations (the direct outcome of extensive experience in mining countries) by which the persons most interested are made aware of their grave responsibilities, so desirable a result, then the opinions so often heard as to the utter impossibility of preventing, by the machinery of the law, any mining accident, may be considered as obsolete, and not borne out in the reports of the officers appointed.

The following extract from the Melbourne *Argus* of the 28th of May, 1885, in reference to the Chief Inspector of Mines' Report for 1884, will demonstrate the very beneficial effects achieved by means of the elaborate and stringent Victorian Regulation of Mines and Machinery Acts; so much so has this been the case as to induce the Government to comply with the requests preferred by both the Mine-owners and the Associated Association of Miners to increase the number of Inspectors of Mines already employed:—

"The report by the Acting Secretary for Mines, relating to the regulation and inspection of mines and mining machinery for 1884, contains satisfactory evidence that the safety and well-being of the men engaged in the hazardous operation of mining are being attended to with good results. Miners, like sailors, are often careless and unmindful of the warnings of experience. It is impossible to guard against their recklessness, but there is no doubt that the operations of legislative enactments has largely reduced their liability to mischances. *Fewer deaths occurred through mining accidents in* 1884 *than in any previous year since the passing of the Regulation of Mines Statute*, and in a great many cases the fatalities were distinctly attributable to the wilful disregard of the most ordinary precautions on the part of the men themselves."

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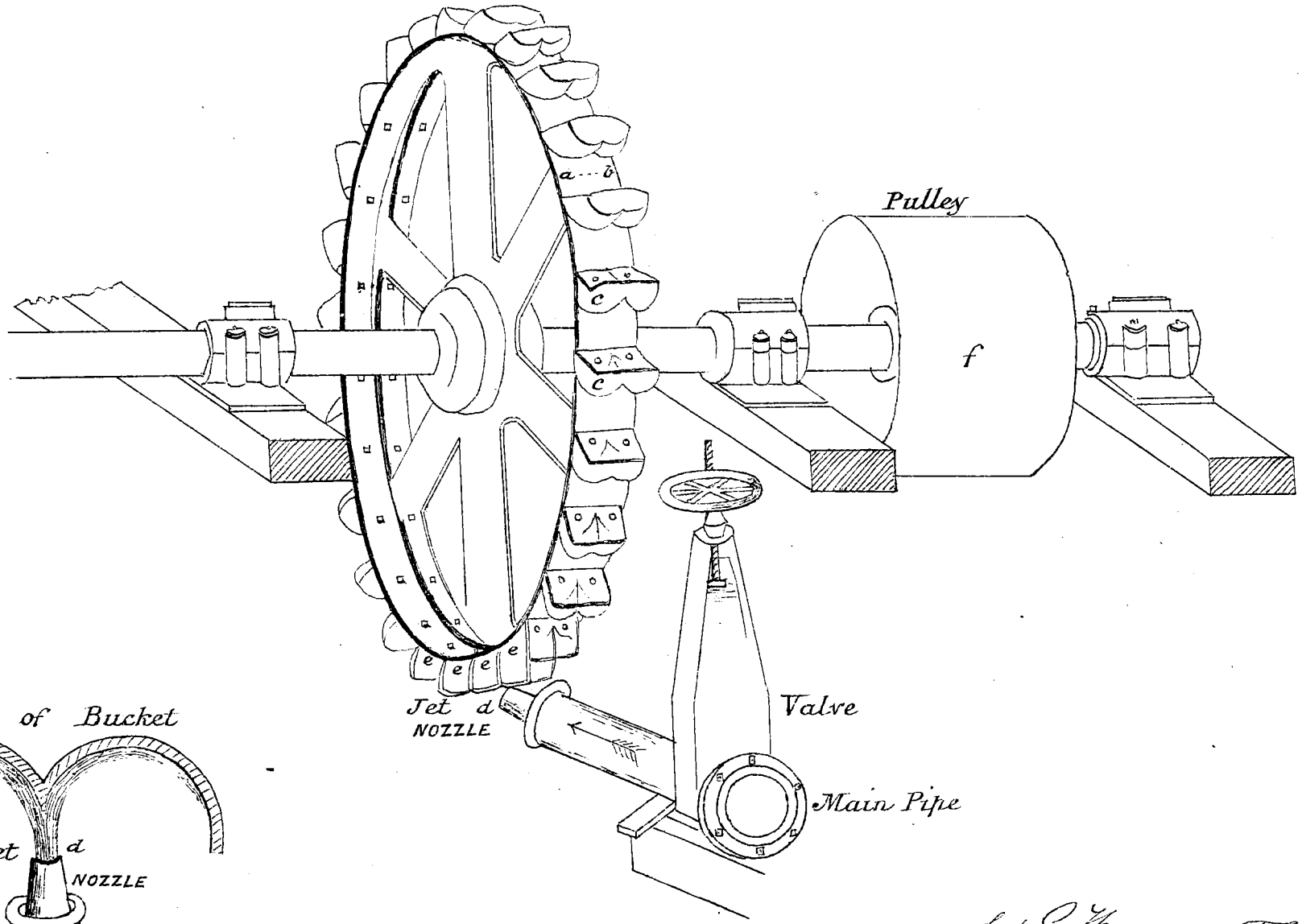
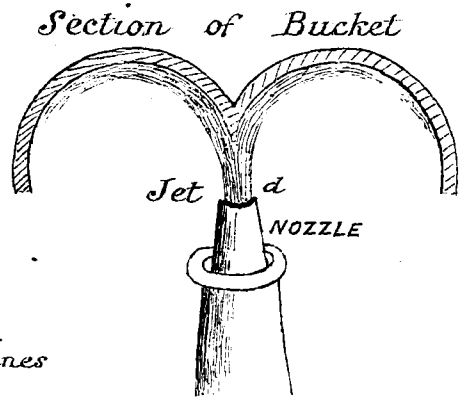
*Improvements in Mining Appliances.—The Pelton Pressure Water-wheel.*

In most of our mining districts in Tasmania a copious supply of water exists, lasting the greater part of each year; and as water when obtainable from high levels forms the cheapest motor for all kinds of machinery, it has been employed in such districts as suitable and preferable to steam. There are about 25 overshot water-wheels employed (equal to from 6 to 800 horse-power), from a few to 60 feet in diameter each, and from two feet to four feet six inches "breast," and they are constructed either of iron or partly of wood. Assuming a *theoretical* horse-power to be as 1·00, the *effective* horse-power of "undershot" wheels would be equal to ·35; of "breast wheels" ·55; of overshot wheels ·68; and of turbines ·70; so that in the case of overshot wheels a (reducible) clear loss of 0·32 per cent. takes place, besides the fact of sufficient water not being available for the full twelve months by a majority of those companies, which loss aggregates to the serious loss of over 254 horse-power per annum. There are also other objections to the exclusive use of such water-wheels; when, for instance, a wheel is constructed for the purpose of working a given number of stamp-heads and other appliances necessary with a mining, crushing, and concentration plant, the failure of water in the dry season has a most injurious effect:—

1st. The supply of water becoming insufficient, causes the number of heads, &c. to be reduced in order to utilise the limited supply of water available.

# THE PELTON PRESSURE WATER WHEEL

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Office of Mines

2nd. As those water-wheels were originally constructed large enough for working a complete plant, it necessarily follows on a failure of sufficient water that the buckets are not filled, nor are they so weighty as to produce even the reduced motive power required, thus resulting in irregularity of revolutions and "lurchings" of the wheels, which most unfavourably affect crushing, amalgamation, and concentration, because the gearing being on the first motion those irregularities are at once transmitted to those appliances. Another drawback is experienced through breakages necessitating repairs, leading to the stoppage of the whole machinery.

3rd. Very rarely can the "head race" be connected with the wheel without the construction of high-level fluming; solid foundations for the massive framework carrying the wheel and gearing are also requisite, as well as the excavation for and walling-in of a wheel-pit with a tail-race, all of which adds to the expenditure.

In order to economise in the direction of construction and the working of such plants in exact proportion to the quantity of the water available at any time, and to restrict the use of that element to the narrowest useful limits, the *Pelton Pressure Water-wheels* have been received of late in America with general favour, to the total exclusion in favourable localities of all kinds of water-wheels and turbines. The latter, owing to their engendering the rapid heating of the bearings from friction due to their excessive rate of speed whilst revolving, have been found altogether unsuitable.

These pressure wheels not only exceed greatly, if certain conditions are observed, the ordinary percentage of motive power obtainable with the same volume of water by other motors, but they ensure likewise the complete utilisation of an irregular supply as conveyed to them in head-races *having but very little fall* from their intake at rivers or creeks; these races supply a reservoir constructed as high above, and as near as possible, to the plant to be worked. From the reservoir a strong galvanised iron pipe of sufficient capacity is laid in a shallow groove cut in the surface to the spot where the water is to be used. This pipe can also be made of black sheet iron, coated with asphaltum in and outside, in from 12 to 18 feet lengths, with "telescopic" joints or overlaps of three inches, and anchored where necessary to strong wooden stakes driven into the ground, by means of loops of half-inch iron wire. At the lowest end this pipe terminates in a nozzle screwed on a diminishing piece, the jet from which having such a diameter as has been computed to be of the necessary force and pressure to work a given plant of machinery. There is no high level fluming or wheelpit required, no heavy framework for the wheels or gearing,—only a tailrace to permit the free egress of the water used from the works.

These pressure water-wheels (see diagram) differ in many respects from the ordinary water-wheels, being much simpler and compact in construction, and very considerably less in diameter or "breast." The machinery is worked off a main pulley by means of a belt. The face or breast *a h* of these Pelton wheels measure, in accordance with their duty, from *four* to *twelve* inches only, and the buckets c—of a peculiar shape—are simply screwed into their position at the termination of the radial lines at the periphery from the central or main shafting, at distances of from 9 to 12 inches apart. The "rim" or breast can be constructed of solid hardwood or sheet iron. If of wood, those portions exposed to the action of the jet should be sheathed with iron to save the wood.

As shown by the diagram, the jet *d* from the nozzle, as supplied by means of the pipe from the high-level supply reservoir, is made to strike or impinge with great pressure upon the back of the buckets at the inner base *e* of the wheel, causing same to revolve, and setting in motion thereby all the heads or other appliances geared by means of the belt working off a main pulley *f* to the main shafting. Of course the actual power evolved depends upon the "head" and quantity of water available, and as this part of the question has been both theoretically and practically tested, the results thereof are shown in the following Tables; viz.—

*Table giving Diameter, Revolutions, Fall of Water, Cubic Feet per Minute, and Horse Power of Pelton P. Wheels.*

| Cubic feet of water per minute. | 8′ | 32′ | 40′ | 60′ | 80′ | 144′ | 300′ | Remarks. |
|---|---|---|---|---|---|---|---|---|
| | Horse-power. | | | | | | | |
| Head of water, in feet. 20 feet... | ·25 | 1·02 | 2·05 | 3·08 | 4·11 | 4·62 | 10·30 | It is practicable to compute by means of this Table that, for instance, a jet delivering 60 cubic feet, or 375 gallons of water per minute, with a head of, say 120 feet, is equal to 18·53 horse-power. |
| 80 feet... | 1·00 | 4·11 | 8·23 | 12·36 | 16·47 | 18·53 | 41·21 | |
| 120 feet... | 1·53 | 6·17 | 12·36 | 18·53 | 24·72 | 27·81 | 61·81 | |
| 200 feet... | 2·75 | 10·30 | 20·60 | 30·90 | 41·20 | 46·36 | 103·03 | |

*Diameter of Pelton P. Wheels, in feet.*

| | Diameter.... | 1½ feet. | 4 feet. | 8 feet. | Remarks. |
|---|---|---|---|---|---|
| | | Working Revolutions per minute. | | | |
| Head of water, in feet. | 20 feet... | 217 | 81 | 40 | This Table shows that, with a greater height of head of water, the smaller wheels have more velocity, which decreases with large diameter of wheels, thus adapting same admirably to crushing machinery. |
| | 80 feet... | 434 | 163 | 81 | |
| | 120 feet... | 532 | 200 | 100 | |
| | 200 feet... | 686 | 257 | 128 | |

The following table gives price (f.o.b., San Francisco, Cal.) and capacity of each Pelton P. water-wheel under various heads of water; viz.—

| Diameter of Wheels, in feet. | 25 ft. head. H. P. | 75 ft. head. H. P. | 200 ft. head. H. P. | Price. | Price includes | Price each of Buckets for Wood Wheels. |
|---|---|---|---|---|---|---|
| 3 feet ..... | 0·4 to 1·5 | 2 to 8 | 8 to 31 | $210 | Shaft, pulley, boxes, gates, and nozzle. | $1·25 |
| 5 feet ..... | 1·0 to 4·0 | 6 to 22 | 23 to 90 | $370 | | $2·00 |
| 6 feet ..... | 1·5 to 6·0 | 24 to 96 | 33 to 130 | $420 | | $2·50 to 4·00 |

The above tables being the result of very careful tests, as already mentioned, may be relied on fully as to the great advantages conferred by the adoption of this simple, yet powerful, kind of motor. At that trial other and similar wheels were tested against each other, but the Pelton was the most successful of the whole. A Pelton P. wheel of but 6 feet in diameter, 12 inch face or breast, under a surveyed "head" of 386½ feet, with a supply of a little over 163 cubic feet, or 982¾ gallons, of water per minute, developed 119·471 *theoretical* horse-power, equal to 107·58 *actual*: the wheel revolved 254½ times per minute, and exhibited, out of a possible 100 per cent., 90·04 of efficiency, as against 55·00 of overshot wheels, nearly *two* of which would be required of *sixty feet in diameter*, with a 4 *ft.* 6 *in. breast*, in order to achieve similar results. In consequence of this unequalled result, the leading quartz mining company "Idaho," at Grass Valley, Cal., which, at the time of my visit in 1877, employed steam only, has thrown steam boilers and engines aside, and instead adopted the Pelton P. wheels exclusively, *i.e.*, three of such wheels for pumping, four of same for hoisting from their deep levels, one for crushing, one for air compressor, one in the machine shop, and two for the air-blowers, or twelve altogether; whereby that proprietary has been enabled to effect, beside other advantages, a very considerable saving in their general mining and reduction expenditure.

This new system of using small water-pressure wheels has caused already a modification in the way they are used for mining and crushing purposes. It has been found, amongst other things, that, in order to utilise the water existent in any district to the fullest extent, it is more economical and advantageous to have a number of small wheels working the various sets of machinery instead of, as is now the case, one large wheel doing the whole work. As each of these wheels can be controlled to the greatest nicety by the valves shutting off or turning on any amount of pressure required, it follows that, in the same ratio, various kinds of speed may, at the same time and with the same means, be obtained. For instance, a new crushing mill has been erected for the Alaska G. M. Co., Douglas Island, British North America. This has been designed to crush 360 tons of quartz per diem, the number of stamps amounting to 120, and each of these weighing 900 lbs. The plant comprises, beside three of Blake's Rock-breakers, 48 Frue's Concentrators, and other appliances, the requisite motive power for which, aggregating to nearly 300 horse-power, is obtained by means of a head of water of 386 feet, working two pressure water-wheels *six feet only in diameter each*, the supply pipe for which being bifurcated at the end in order to furnish the two nozzles required. In order to develope a similar amount of motive power, two overshot water-wheels would be necessary over 40 feet in diameter each, and a breast of from four to five feet at least.

At Mount Victoria it has been decided by a company to substitute for the portable steam-engine in use an overshot water-wheel for crushing with 18 heads, and, as their supply of water is intermittent only, both steam and water will have to be used as occasion arises. The new wheel is to be 32 feet in diameter, breast 4 feet, and is stipulated to have 30 horse-power; the nominal "head" of water, from the intake of the river to the *basal* periphery of the wheel, being as follows:—90 feet (vertical) to top of wheel; 32 feet (ditto) height of wheel, added to which 20 feet which can be got by giving the head-race that much less fall,—or a total of 142 feet; and if the pressure is calculated as derivable from a largish high level supply reservoir, 150 feet. According to the above tables a

6-feet wheel would, with such a head of water, produce a mean average of 39 horse-power, and, besides other advantages, become the means of utilising that water for a considerably longer period each year than would be the case with the more wasteful overshot wheel.

As to the difference in price of these two motors, I am informed that the overshot wheel in question will cost £600; against which, as shown in the table, and allowing a very large margin for extras, the Pelton Pressure Wheel, with everything complete, would cost as follows:—

| | £ | s. | d. |
|---|---|---|---|
| One 6-ft. Pelton Pressure Water-wheel ..... | 87 | 10 | 0 |
| Freight from California to Tasmania, say..... | 35 | 0 | 0 |
| Timber, iron, and piping, say ..... | 120 | 0 | 0 |
| Sundries (labour, &c.), say..... | 60 | 0 | 0 |
| TOTAL..... | £302 | 10 | 0 |

There has been no necessity for prosecuting any person or persons engaged in mining under the provisions of the Regulation of Mines Act, 45 Vict. No. 8, 1881, or, under the Regulation of Mines Amendment Act, 1884.

As already stated, the duties performed by the Inspector of Mines during 1884 included the careful inspection of most mines in the various mining districts, as well as the furnishing of plans and sections of particular localities, in accordance with the instructions of the Head of the Mining Department, in his capacity as a Mining Geologist. An exhaustive report, with elaborate plan and sections, was thus supplied, on the feasibility or otherwise of bringing a copious supply of water from the heads of the Boobyalla, Ringarooma, and Mussel Roe Rivers to serve the requirements of mine-owners at Brothers' Home, Moorina, and Gladstone, inducing the Government to get a proper survey made of same.

In 1884, 969 letters, telegrams, and memos. were dealt with in this office, as against 320 in 1883; mine accidents, 200 as against 140; steam-boiler certificates, 15, as in the previous year; and general correspondence and reports, 151, as against 213 in 1883, showing an increase of 377 for this year,—viz. 1883, 958; 1884, 1335.

*Conclusion.*

The various inspections of mines, both on the surface and underground, and the examinations of steam-boilers and of mining machinery, have clearly demonstrated that the mining managers and engineers have been more careful in their supervision of their employees and the works or machinery entrusted to their care. A peculiar feature is observable, however, in connection with the excessive number of fatal accidents to the Chinese as principally employed in our alluvial tin mines; during the last three years these amount to ten out of seventeen, and judging from the manner in which this loss of life occurred, some restraint appears as necessary when and wherever Chinamen are being employed by Europeans as wagesmen or tributers. Their employers should more frequently examine the workings, or where they are all Chinaman, an experienced European should be appointed to do so.

*The Mineral and Metalliferous Deposits.*

Having now for more than four years examined the various Mining Districts of Tasmania, and having become thoroughly conversant with their extent, value, and other characteristics, a few remarks on these very important subjects may not be deemed out of place.

*Coal Measures.*—These exist in the south, east, and north-west of the island. The more bituminous classes of this valuable fuel of the Sandfly, Port Cygnet, Mount Nicholas, and Fingal Districts are of a very promising character, and doubtless, when the different seams of coal are opened systematically, the supply from same for home requirements will, in a few years, render this Colony independent of any imported coal. At Mount Nicholas, Fingal, and neighbourhood, where quite a number of seams occur under each other, varying from 14 feet to a couple of feet in thickness each, the advent of the new railway nearing completion does not appear, so far, to have stimulated lease or property holders to extend their workings in order to get at the more superior quality which alone would secure them customers for their commodity. At Sandfly and Port Cygnet the means for transportation are as yet inadequate, and the above applies to them as to the opening of mines, &c. as well.

*Tin Ores.*—The deposits of these may be divided into the vein or lode, and the alluvial, shallow or deep, *i.e.*, recent and prehistoric. As regards the former, existent at Ben Lomond, Mount

Bischoff, Blue Tier (Gould's Country,) Mount Heemskirk, and elsewhere, it is apparent that the mining, dressing, and other processes of same have not as yet been so successful as the percentage of metallic tin in the ores would warrant. That most valuable tin lodes occur at the places mentioned admits of not the slightest doubt, but, at the same time, it is also true that persons only slightly, or almost wholly accustomed to the working and dressing of *other than tin ores*, have had the sole control of affairs (West Coast), and that the planning or selection of ore-dressing machinery has been, by them, of a kind resulting in the erection of unsuitable plants; all these matters militated, disastrously almost, against the profitable outcome of this description of vein or dyke mining. After the excessive expenditure which has been unfortunately incurred, would it not be advisable for persons interested to regard their mines as requiring *specially skilled labor* by means of which these ores would receive proper treatment on recognised principles?

With regard to those peculiar and deeper tin deposits at Mount Bischoff, they still maintain the front rank as regards ores in sight and production of metallic tin, and there is every evidence of such continuing for years to come.

Next to it, that valuable cluster of alluvial (pliocene) gravel mines, styled "Brothers' Home" in the Ringarooma district deserves every attention; with a height of tin-bearing gravel exceeding 80 feet, by a width of from three to ten chains in places, and a proved* extension of these sub-basaltic deposits for more than eight miles towards Gladstone—all virgin ground—it would appear that the extent of the workings and the means employed for washing down these immense deposits are not at all on a par with the great scope of tin-bearing country that can be worked thereabouts. To see the puny attempts made, with one exception (B. H. No. 1), of *hydrauliching* this gravel with jets from $1\frac{1}{2}$ to 2 inches in diameter only, and considering the small number of men employed at all of these mines, and still obtaining such very satisfactory results, the completion of the North-Eastern Water Scheme can alone bring about a more satisfactory state of affiairs, beneficial alike to the mine-owners and the Colony at large.

At the Blue Tier and vicinity (and recently also at Mount Heemskirk) alluvial tin is still obtained in considerable quantities from shallow workings; eventually this production must more or less cease altogether, as those deposits, so very rich formerly, approach exhaustion, and thereupon the tin-bearing veins, lodes, dykes, and impregnations will require to be taken in hand for a more equable and permanent yield.

*Gold.*—A similar classification obtains here as with the tin deposits Of the former, the "Tasmania" Reef at Beaconsfield still stands pre-eminent on account of its richness, permanency, and extent, especially at their lower level, placing same in a very high position amongst the profitable auriferous lodes in the world. The Florence Nightingale Company, adjacent, also continues to raise rich stone from their deeper levels. At Lefroy some of the mines have been abandoned, and, with the exception of the New Chum Line of reef, operations have been reduced seriously, so as to depreciate property and reduce the number of miners and inhabitants very considerably. Speaking generally, the cause of this desertion of so many mines which, not very long ago, gave profitable employment to a large number of miners and others, cannot be attributed to the sudden discontinuance of the auriferous matrices, except in a very few instances. And, it may be stated, this that is no exception to the general behaviour of gold-bearing quartz reefs elsewhere; only here, in Tasmania, there exists a feeling of doubt and uncertainty as to the *recurrence* of such lodes at deeper levels, the same as it did in Victoria before the rich Sandhurst reefs were rediscovered beneath a stratum (320 ft.) of non-quartziferous schists and no sign of gold. There existed there the same as here, a want of confidence on the part of the management, and, in consequence, all available profits having been incontinently divided amongst the shareholders, leaving no money in hand as a reserve for sinking the shafts deeper in order to exploit the deeper ground. With such an example as is afforded by the present opulent Bendigo (Sandhurst) quartz-mining district before us, where, besides other objections, the mining at deeper levels had been decried on *theoretically scientific* (?) grounds as totally oppose to principle, every effort that could legitimately be made should be undertaken with a view of testing the deep-lying strata for auriferous lodes which, in my opinion, will be found to occur, as already indicated, in the bottom of the New Native Youth Gold Mining Company's shaft, at a depth of 812 feet from the surface, where a well-defined quartziferous formation has been intersected, carrying a little gold, and in a level at 800 feet gold has also been seen. Considering that the last payable quartz was worked at and above the 320 feet level, this re-appearance or occurrence of gold-bearing quartz is certainly an auspicious feature.

*At the New Chum Line of reef* the West New Chum Company have been persevering with the extension of their deep workings; the present depth of their shaft is 424 feet; in the bottom levels the shoots of gold still continue in depth, and numerous spurs of veins of quartz dip in the direction of the reef at both walls, which is always considered a very promising feature. This line of reef has been very regular in its value from the surface to the present depth, and if any deep sinking should in future be authorised, the prospects here are very promising for eventual success.

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* See Report, No. 99, 1884.

*The Specimen Reef*, at the head of Long Plains, near Mount Cleveland, West Coast, is a very regular formation of auriferous quartz; the occurrence of the gold, however, is most peculiar, as same is near the surface, embedded in a black ochreous substance filling the cellular cavities of the quartz, and found to be extremely rich; similar rich "shoots" of quartz have been found in the two adits driven from lower levels, where the gold, however, occurred enclosed in chiefly undecomposed arsenical pyrites. The company are opening the mines systematically previous to the erection of suitable crushing machinery.

*The King River Company*, near Lynch's Creek, have also discovered very rich quartz at and near the surface; they are now thoroughly testing the reef, which is improving from almost barrenness at greater depths, and the gold appears as more equably distributed through the lode than before.

*The deep alluvial (pliocene)* sub-basaltic deposits have been tested both at Lefroy and Back Creek by means of the diamond drill; the geological features were found to be, in both cases, most encouraging for the existence of deep gold-bearing gravels in well defined "leads" or "gutters;" the lower beds of quartz-gravel and conglomerated wash as intercalated by other beds, composed of black clays interspersed with large trunks of trees (lignites), are in every respect, lithological or mineralogical, closely allied to those found in Ballarat, Creswick's Creek, Malmsbury, and in California. Unfortunately, for some reason or another, the proprietaries failed, after boring with the diamond drills, to practically prove the real value of these deposits by means of shafts or other prospecting operations, so that these *dormant goldfields** still remain *in statu quo*. The shallower workings in several districts continue to give employment to a number of miners, with average results. A new discovery was made on the Dorset River, between Alberton (Mount Victoria) and Upper Ringarooma, which gave at first good yields of heavy gold; but these pseudo diggers from the neighbouring farms appeared to lack that necessary perseverance to follow the runs of gold,—they lost it, and now the place is abandoned.

*The West Coast* still presents the most favourable inducements for adventurous gold—alluvial—miners; wherever they have (in so small numbers) succeeded in penetrating that very difficult and almost inaccessible gold country their earnings have, in almost every case, been very satisfactory and, in several instances, from year to year, extremely remunerative. As a matter of fact, the actual gold yields cannot be ascertained, but sufficient information has transpired of its being scarcely surpassed by any other similar goldfield in the other Colonies. All that is wanted is a larger population, main tracks from one deposit to the other, and facilities for provisions, in order to develop this extensive and rich goldfield, to which I drew attention in my first Report of 1881, and which stretches from Mount Cleveland to beyond Mount Donaldson in the north, to the north west of the King and probably of the Gordon Rivers in the south.

*Silver and Silver-Lead Ores.*—All the samples or specimens of these metals were found to contain both metals; in some instances copper was also present (fahlore.) Rich silver ore is reported to have been found at the Scamander River, East Coast; and at Mount Claude, West Devon, a belt of rich ore occurs; a long adit has been driven, but the ore was found small; now they are following the veins in open faces in order to test same thoroughly. Another rich deposit has been discovered near Mount Zeehan recently.

*Iron.*—Large quantities, it is well known, of such ores obtain at Ilfracombe, the Blythe River, and near Penguin; the former, however, contains a small per-centage of chromium, which was found to deteriorate the iron; this admixture has not been found in America an obstacle to its utilisation.

*Manganese.*—Ferro-manganese occurs at Mathinna, Mount Victoria, and other places; near Mount Zeehan, West Coast, an immence deposit has been discovered assaying over 43 per cent. of manganese; in California 35 per cent. yields good profits, and it is there much used for the manufacture of steel rails and chlorine gas, so that a market for it should not be very difficult to find.

*Copper* occurs chiefly as sulphurets, a little of carbonates, and small particles of native metal. At Saxon's Creek, near Beaconsfield, an extensive deposit of copper sulphurets has been found only nine miles from the nearest port. Nothing has been done as yet beyond driving an adit and opening several branch workings. Near the Wilmot River and Penguin small nests of pure prismatical native copper occur in the porphyrites and felsites.

*Nickel.*—This ore I first discovered in the main adit of the late Mount Victoria Gold Mining Company, Salisbury, near Beaconsfield; the assay gave nearly 10 per cent., which elsewhere yields a profit; the mines are now abandoned.

*Antimony* occurs as a strong band with a gold-bearing quartz reef near Lefroy; at the present price of this ore it would be remunerative to work this lode.

* See Report No. 45, page 4, and Report on the Lefroy Goldfield, page 9.

*Slate* of from medium to good quality has been wrought near Back Creek, on a large scale; a new deposit near Turner's Marsh is being opened by means of powerful mining and dressing machinery; skilled slate miners are imported from Wales, and the speculation is likely to turn out a success.

*Lime and Marble.*—The former occurs in many places, from the fossiliferous beds in the coal measures to the pure carbonates in the Silurian strata; the latter has been found near Beaconsfield, of very good quality and durability.

*Infusorial Earth.*—Thick beds of this rare mineral have been found at the Piper River. When the Launceston to Scottsdale railway is completed, the manufacturers of nitro-glycerine explosives will probably use it, as it is very pure and easily procurable.

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From the above it will be perceived that in this Colony there is no lack of extensive mineral and metalliferous deposits; most of these have been only looked at, or the preliminary workings have but impinged on those deposits, the actual amount of work being very limited. The great desideratum undoubtedly is the introduction of *foreign capital*, together with *skilled labour*, in order to successfully develop these valuable resources. If that were done it would put a stop to the present spasmodic methods of carrying on mining operations, because with ample capital at the disposal of mining companies, any temporary cessation of yields or discontinuance of lodes, &c. would be tided over, and the whole operations would be carried on energetically, systematically, and without intermission. The Directors of mining companies would likewise find it of utility to make themselves *personally* acquainted, on frequent occasions, with the character of the lodes, &c. and the general requirements of the concerns in their care; at present the mining managers have either too little or too much control or power.

Now that most of the outside leases have been forfeited, and the remaining companies are really in possession of lodes, &c., very little, if any, attention should be, it is hoped, given to what may be termed "*Paper Mining*," which has, on several occasions, produced so disastrous results, to the great injury of our mining industry.

I have the honor to be,
Sir,
Your obedient Servant,

G. THUREAU, *F.G.S.*, *Inspector of Mines.*

*The Secretary of Mines, Hobart.*

# APPENDIX A.

*LIST of Accidents in the Mines of the Colony of Tasmania during the Year ended 31st December*, 1884.

| *Gold District.* | *Mineral District.* | *Mine Owner.* | *Date of Accident.* | *Connective No.* | *Cause of Accident.* | *Killed.* | *Injured.* | REMARKS. *Name of Person injured.* — *Mine Manager.* |
|---|---|---|---|---|---|---|---|---|
| Beaconsfield | ... | Tasmania G. M. Co., Registered | 10 January | 1 | Falling of a truck | ... | 1 | William Hills, M. — Joseph Davies. In jumping on a passing truck, he failed to secure his seat in time, and thus one of his legs got severely jammed against a shoot from which the trucks were filled at the side of the tramway line, worked by horses in No. 2 tunnel. The upper portion of the thigh is badly bruised, but the doctor does not anticipate any serious consequences. |
| ... | Tarleton Coal Mines | William Riley | 5 February | 2 | Slipping off the brace into the shaft | ... | 1 | John Wardly. — William Riley. This miner in landing a box filled with rock, which he had raised from a shaft by means of a windlass, from a depth of 12 feet, slipped and fell down the shaft head foremost. The doctor found his collar bone broken, and slight internal injuries. He was recovering by later accounts. |
| Beaconsfield | ... | Florence Nightingale G. M. Co., Registered | 13 February | 3 and 4 | Injured whilst fitting lifts | ... | 2 | William Bennett and William Flanagan. — George Webb. These two miners were assisting the pitman, who had added two lengths to the drawing lifts. They were steadying those 15-inch draw lifts, and keeping same in position whilst the former was screwing on the collar launder. By some means, however, the lifts were allowed to slip, and in order to save themselves from falling they each got their hands cut somewhat severely. |
| ... | Gould's Country | Anchor T. M. Co., Registered | 20 February | 5 | Fall of rock | ... | 1 | John Read. — John Symons. A stone which fell in some parts of the workings broke in two whilst rolling down, and unfortunately Read in trying to escape was caught by one-half unexpectedly. Besides having both of his legs broken, no other injuries were inflicted. After a little while he was taken to the Campbell Town Hospital. |
| Beaconsfield | ... | Tasmania G. M. Co., Registered | 11 March | 6 | Falling down pass | ... | 1 | Robert Foster (18.) — Joseph Davies. Whilst lowering some timber from No. 2 to No. 3 levels through a pass, by means of a rope fastened by himself, it slipped, and the jerk precipitated Foster to the bottom, a depth of 50 feet. The examination by the doctor disclosed that he had sustained, besides a flesh wound on the head, a severe injury to one of his ancles. |
| Ditto | ... | Florence Nightingale G. M. Co., Registered | 1 April | 7 | Fall of timber down a shaft | ... | 1 | Edward Rosewarren. — George Webb. The man at the windlass erected at No. 3 level for the purpose of sinking the main shaft deeper, did not, in lashing a piece of timber, use sufficient care, so the timber slipped oat of the rope and fell upon Rosewarren at the bottom. His head was cut open, and his shoulder bruised. |
| ... | Frome River | Go By T. M. Co. | 22 April | 8 | Fall of a branch of a tree | ... | 1 | George Pratt. — James Oliver. In removing a tree by grubbing out of the trench of the workings it fell, and a branch rebounded to the ground to a considerable distance, where it struck Pratt, who was considerably injured, but apparently not dangerously so. |
| ... | Gould's Country | Anchor T. M. Co., Registered | 26 April | 9 | Falling off a truck | ... | 1 | David Medwin. — John Symons. This man rode on a truck down an incline to the mine, a practice which the Mine Manager had specially and strictly forbidden. Medwin fell off the truck, and broke his leg. Although this could scarcely be termed a "mining" accident, still as it occurred at or upon a mining tramway, it may be enumerated here. |

| *Gold District.* | *Mineral District.* | *Mine Owner.* | *Date of Accident.* | *Connective No.* | *Cause of Accident.* | *Killed.* | *Injured.* | REMARKS. *Name of Person injured.* — *Name of Manager.* |
|---|---|---|---|---|---|---|---|---|
| Beaconsfield | ... | Florence Nightingale G. M. Co., Registered | 26 April | 10 | Falling down in the stopes | ... | 1 | This was not a very severe accident, but having been reported, it is placed now on record. |
| — | Thomas's Plains | Main Creek Co., (private) | 30 April | 11 | Explosion of dynamite | 1 | ... | Ah Fun. R. B. Ingles. In the course of clearing the ground for mining operations, Ah Fun was blasting a log with dynamite ; he did not allow sufficient time, and the charge exploded before he could get out of the way. A piece of flying timber struck him on the head, causing a very severe injury. He lingered unconsciously until his death the next morning. |
| — | Gladstone | Esk T. M. Co., Registered | 5 May | 12 | Falling tree struck him | ... | 1 | James Duffy. Fredk. M'Gregor. A tree was being grubbed so as to remove it out of the way of the workings. It fell, and injured Duffy considerably. |
| Beaconsfield | ... | Tasmania G. M. Co., Registered | 7 May | 13 | Knocked down by the arms of a capstan | ... | 1 | Stephen Foster (56.) Joseph Davies. S. F. was with four others employed to lower the "windbore" of the pumps to the bottom of the shaft ; a jerk or slip took place, causing the hold these four men had of the arms of the capstan to be released, causing it to revolve rapidly, and thereby S. Foster was caught and knocked down. His head was cut in several places, but there were no bones broken. |
| Lefroy | ... | New Chum G. M. Co., Registered | 21 May | 14 | Pricking out an unexploded charge of blasting powder | ... | 1 | John Barker (21, m. n. j.) Hy. Barker. John Barker, a contractor, went to the unexploded hole charged with blasting powder, after waiting about half an hour, and then he pricked out a charge by means of a copper pricker, when about 1½ inches of blasting powder exploded, injuring his hand. |
| — | Thomas's Plains | Onyx T. M. Co., Mr. Gill's (private) | 22 May | 15 | Fall of earth | 1 | ... | Ah Chang. G. W. Thomson. This miner, along with some other Chinamen, worked at this mine for over seven years, and was held to be quite an experienced miner. In picking down a face of gravel only 6 feet deep, about 3 tons of it came away without the slightest warning, and buried him completely. It took nearly half an hour before he could be extricated by his mates, when he was found to have been suffocated. The Mine Manager ascribes the accident to have been caused by the very heavy rains having been followed by a severe frost cracking the faces, and rendering the same very treacherous. As those workings are but 12 feet deep, and the ground is worked by benches 6 feet high only, the man being killed as described on the upper terrace, blame does not appear to have been attached to the Mine Manager or the miner himself. |
| Beaconsfield | ... | Tasmania G. M. Co., Registered | 27 May | 16 | Fall of a piece of quartz | ... | 1 | Elisha Martin (16.) Joseph Davies. This boy was working at the No. 4 level, filling trucks from a "shoot;" whilst he had the door open a piece of quartz fell down the shoot, passed through the door, and cut his face open, necessitating the doctor's stitching the wound. |
| — | Ben Lomond | Tasmania T. M. Co., Registered | 12 June | 17 | Falling down a shaft | ... | 1 | William Dodd. John Dennis. Three men were sinking the main shaft from below the 50 feet level. W. Dodd was on the brace, and he allowed somehow the bucket to slip into the shaft ; he himself caught hold of the rope, and fell with it, keeping hold of it, to the bottom. The new windlass stood the shock admirably, and Dodd was also not much hurt, nor were either of the other two men in the shaft much hurt. Dodd wanted to go to work again, but he was not permitted, as, in all such cases, he felt not incapacitated from doing so. Next morning he was very sore about the hip and thighs. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| — | Mt. Heemskirk, West Coast | Montagu T. M. Co., N. L. | 23 June | 18 | Injured by a falling plumb-bob | ... | 1 | Miohael Meara (u.) Alex. Ingleton.<br>This man was engaged in dividing ne main shaft into three compartments, and in so doing a plumb-bob fell and cut his head open; but no ill effects were apprehended, as he brought up his tools and got his injuries attended to. |
| — | Mt. Bischoff | Mount Bischoff T.M. Co., Registered | 18 July | 19 | Whilst emptying trucks he injured his hand | ... | 1 | William Dickinson. Ferd. Kayser.<br>In emptying a truck Dickinson got his fingers so very severely crushed as would incapacitate him, in the doctor's opinion, from working for about six weeks from date. |
| Beaconsfield | ... | Little Wonder G. M. Co., Registered | 21 July | 20 | Fall of rock | ... | 1 | Andrew Campbell (22, m.) Per J. Slade.<br>As one of a party of tributers, he and mates were preparing to put in some timber at the bottom of a "rise," when suddenly a mass of rock detached itself from the side and struck A. Campbell on the back and shoulders; he was badly bruised, but no bones were found to be broken. |
| — | Moorina (Main Creek) | Mutual T. M. Co., Registered | 24 July | 21 | Fall of a stone | ... | 1 | Thomas Brooks. James Auton.<br>Whilst working in one of the faces, a stone fell upon Brooks' head, cutting it open, inducing him to seek medical advice in Launceston. |
| — | Branxholm (Ruby Flat) | Hope T. M. Co., (private) | 29 July | 22 | Fall of clay | ... | 1 | Hip Con (Chinese, 47, u.) S. Hawke.<br>The alluvial (stanniferous deposits) at the Ruby Flat, and especially those at the Hope Co., are worked by water gravitating upon the benches, the whole depth being about 20 feet; 9 feet of the top are thus run off for a width of from 15 to 20 feet for the bench. The accident occurred on this top bench by a fall of clay which, owing to the surface soil being covered by roots, &c., gave no indication of weakness. The Mine Manager was absent at the time; and after careful examination of the ground he attributed the accident to carelessness. The injuries were chiefly internal, caused by pressure of gravel falling upon the man. |
| Mt. Victoria (Alberton) | ... | Mercury G. M. Co., Registered | 29 July | 23 | Fall of quartz whilst repairing a hopper | ... | 1 | Timothy M'Donald (28, s.) Edward Hardy.<br>This appears to have been a case of gross carelessness. It appears T. M'Donald was instructed to screw a bolt-nut inside of the hopper, into which the trucks were emptied in order to furnish the battery with crushing dirt. Whilst so engaged, the trucker on the top line of tramway came along, and, without looking down into the hopper or calling out, tipped a truck full of quartz upon the man below. M'Donald was severely cut about the head, and four of his teeth were knocked out. |
| — | Cascade River (Branxholm) | Clyde T. M. Co., (E. J. Tracy tributer) | 4 August | 24 | Fall of earth | 1 | ... | Gee Jim. Superintendent of Police.<br>Gee Jim was killed by a fall of earth at this mine, and an inquest was to be held on the 31st July. |
| — | Branxholm | Payne & Pogson, T. M. Co., (Private) | 4 August | 25 | Cut from an axe | ... | 1 | William Talbot (25, u.) James Grant<br>Whilst engaged in cutting a floor race for carrying away the accumulating tailings at the workings, his foot slipped, causing the axe he was using for cutting away a root to injure his other foot. He was employed as a labourer at the mine. |
| — | Thomas's Plains | Morning Star T.M.Co. | Dec. 1883. Died on 6th Aug. 1884. | 26 | Fall of earth | 1 | ... | Kee Wee. Superintendent of Police.<br>This Chinaman received severe injuries by a fall of earth at this mine in December last year, and the case was never reported by the Manager. He has been ill ever since; and a Chinese doctor has been in attendance on him, he having lost the use of his limbs. He died on the 6th August. The Mining Manager's name is Lee Cock, and the witnesses of the accident were Ah Fam, Ah Fue, Ah How, Ah Loung.<br>The fact of the mine being altogether in the hands of Chinamen, who did not probably know of the law affecting accidents, together with the time elapsed since the accident took place, eventually resulting fatally, were not considered worthy of proceedings at this date. |

| *Gold District.* | *Mineral District.* | *Mine Owner.* | *Date of Accident.* | *Connective No.* | *Cause of Accident.* | *Killed.* | *Injured.* | REMARKS. *Name of Person injured.* / *Name of Manager.* |
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| — | Mt. Bischoff | Mt. Bischoff T. M. Co., Registered | 8 August | 27 | Fall of a bag full of tin ore | ... | 1 | Henry Williams. C. H. Hall<br>While employed in the lower dressing sheds in bagging tin ore, near the elevator, it appears that one of the bags hoisted upon the latter, to nearly 40 feet in height, fell out of the machine upon H. Williams, causing one of his legs to be fractured. He was attended to by the Doctor at the local Hospital. |
| Mt. Victoria | ... | Mercury G. M. Co., Registered | 9 August | 28 | Falling against a truck, off the line of tramway | ... | ... | John Williams (62). Edward Hardy.<br>J. Williams was taking two trucks full of quartz down the line to the battery. Two wheels of one of the trucks came off the line, through the tail end of it coming open, causing a severe and sudden stoppage and concussion. The man fell against the truck, causing partial unconsciousness, from want of breath; but he eventually recovered, though he appears to have been internally injured to an extent not yet ascertained. |
| — | Gladstone | Mt. Cameron T. M. Co., Registered | 25 August | 29 | Fall of earth | 1 | ... | Ah Ho (46, u.) Percy Dickinson.<br>After this accident had been reported by the Agent, the Inspector inspected the scene, and found that these Chinamen had worked an alluvial deposit by cutting under the bank of gravel, which was about 12 to 14 feet high, to a depth of from 3 to 5 feet, leaving small "pillars" at equidistant intervals. The gravel being pretty compact, no danger was apprehended; but in cutting out the "pillars" on this occasion, it happened that at the back of the face, about 7 to 8 feet away, an old prospecting shaft had been sunk some time ago, containing some water, which, through percolation, had loosened the gravel; so, when those last supports were knocked away, that part of the face suddenly, and without warning, fell over and buried this miner, who had some years' experience in working that and similar ground in the Gladstone District. Under the circumstances, a little more foresight might have prevented this fatality; but Chinamen, as a rule, work without much consideration of what may be ahead of themselves in this or other mining ground. |
| — | Mt. Cameron, South | John Simpson | 25 August | 30 | Fall of earth | ... | 1 | ———. John Simpson.<br>A Chinaman was working in a face of tin-bearing gravel when a slip took place, by means of which his legs were bruised. |
| Beaconsfield | ... | Florence Nightingale G. M. Co., Registered | 26 August | 31 | Fall of a bucket | ... | 1 | John Hancock. R. H. Price.<br>At their No. 3 level a windlass is being employed for raising stuff from an under-hand stope; and, on the bucket being lowered, it became by some means detached from the hook and fell upon the miner beneath, cutting his head through the scalp. |
| — | Main Creek, Ringarooma | Mutual Tin M. Co. | 27 August | 32 | Fall of a tree | ... | 1 | George Marcell (23, s.) James Auton.<br>A tree standing near the workings suddenly fell into the workings, injuring this miner. |
| — | Waratah | Stanhope Tin M. Co., Limited | 1 September | 33 | Whilst blasting | ... | 1 | John Evans. Richard Bailey.<br>It appears that J. Evans and his mate were driving a tunnel, and had each charged a hole with powder. It was desirable that the former (Evans) should light his fuse first, which he did; but, on attempting to set fire to the other fuse, it was found to be difficult, owing to the fact that Evans, having cut his finger previously, the blood oozing from the wound prevented same from being done; so he left, as he thought, only one fuse burning. It was by him intended to run back and light it, which he did within ten minutes of the first shot going off. When he got to the "end," however, the blast went off, as it still must have been ignited in the first instance,—the sand and |

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| | | | | | | | | stones being thrown about him by the explosion. One small stone entered his eye, and was extracted by the Hospital Doctor. As the miner left the charged hole, to his thinking, unexploded, or, rather, that the fuse had not ignited, there is no provision in the Act to prevent him going back ten minutes after the first explosion, and therefore the whole occurrence may be classed as unavoidable. Had the fuse ignited and the shot missed, then would a breach of the law have taken place, which does not allow any such unexploded charge to be approached at less than thirty minutes after igniting the fuse. |
| Beaconsfield | ... | Florence Nightingale G. M. Co., Registered | 10 Sept. | 34 | Bursting of a steam pipe | ... | 1 | Frank Tregaskis (Engineer). George Webb. After making an expansion steam joint of the pipe connecting No. 1 boiler with the pumping engine, the steam was very carefully and slowly turned on, as is usual, and then one of the joints began to blow considerably. They stopped to renew the joint insertion, when suddenly the S piece burst with a report equal to a cannon. The Engineer was working close by caulking a joint, and he had a narrow escape from being killed; but, beyond a great fright, occasioning partial unconsciousness for a few minutes, he was not otherwise hurt. |
| Beaconsfield | ... | Florence Nightingale G. M. Co., Registered | 6 October | 35 | Whilst descending in a cage | ... | 1 | Will. Williamson. Geo. Webb, M.M. Whilst being lowered down the shaft, in order to ascertain the height of water in the shaft, it appears the cage got jammed, and on his reaching out for the lever which is connected with the safety clutches, his hands got caught and were severely squeezed and grazed on the back although no bones were broken. |
| ... | Moorina | Chance T. M. Co., Registered | 10 October | 36 | Fall of rock | ... | 1 | Michael Egan (40, s.) John Branley. M. E. was working in the tail-race, and a miner working in the "face" inadvertently let a stone fall into the race, which caught Egan, and injured him both over the eye and nose, which were cut open. |
| Alberton | ... | Mt. Victoria G.M.Co., Registered. | 14 October | 37 | Fall of rock | ... | 1 | Daniel Stephens, (30, s.) H. Hays. Whilst engaged underground in filling the stopes with mullock, a large piece rolled down and caught D. S.'s hand, severely injuring two of his fingers. |
| ... | Waratah | Mt. Bischoff T.M.Co., Registered | 16 October | 38 | Missing his footing | ... | 1 | Peter Broadie, (23, s.) H. W. F. Kayser. This appears to be a somewhat unaccountable accident; he was working in the "white face," and from some cause or another his right foot twisted under him, breaking the leg at the ancle, whereupon he was conveyed to the local hospital. |
| Beaconsfield | ... | Tasmania G. M. Co., Registered | 30 October | 39 | Crushed by roller of pump sweep-roller | ... | 1 | Henry Rigby (15½, s.) Joseph Davies. Whilst repairing the pump sweep-rod, on the surface, the wooden roller of same rolled over R.'s foot; the doctor could not then ascertain whether any bones were broken or not, but the crushing was severe. |
| Ditto | ... | Ditto | 9 November | 40 | Fall of quartz | ... | 1 | Edwd. Rowbottom (27, m.) Joseph Davies. Whilst stoping above the No. 4 level, a piece of quartz in the roof became detached, and fell from a height of 4 feet on R.'s head, inflicting a cut which the doctor deemed not very serious at that time. |
| Ditto | ... | Ditto | 26 November | 41 | Injured whilst lowering pumps | ... | 1 | John Sullock, (62, m.) Joseph Davies, M.M. Whilst engaged, with others, in lowering the pumps from the No. 4 to the No. 5 level, S. was using a slab to lever the pumps past the timber in the shaft; in doing so, he missed hold, and the lath struck him on the body. He continued working for two or three days, but had eventually to desist, when the examination by the Mine Doctor proved one of his ribs to have been fractured. |

# APPENDIX B.

*PARTICULARS as to the Observance of the Regulation of Mines Act, 45 Vict. No. 8, 1881, by the Mining Proprietaries.*

Sections 8 and 9, General Rule XIX.

1884. *January.—The Waverley G. M. Co.* were complained against for using a defective winding rope unsafe for mining purposes, and for their employing young and inexperienced persons both as engine-drivers and as bracemen. Immediate notice was given directing them to repair the rope and to work the engine and brace by reliable and capable drivers and bracemen. The company, soon after that notice had been given, ceased operations at their mine, as the yield of gold from the quartz proved unremunerative.

Sections 8 and 9.

*February.—The North Brothers' Home T. M. Company, Limited.*—In the latter part of last year, owing to the dangerous methods adopted in working a face over 100 feet vertical by means of hydraulic sluicing with nozzles, &c., this company was enjoined, on complaints reaching the Inspector, to adopt a different and more safe mode of working. They applied to be permitted to modify that method, and, under certain conditions, their application was granted.

*The Specimen Reef G. M. Company, Registered,* were granted permission, under Section 12, to adopt special rules for working their mines. On the recommendation of the Inspector, the Hon. Minister of Lands and Works signed these rules, and they became law under the provisions of the Act.

At *Mr. Riley's Tarleton Coal Mine*, near Latrobe, an accident took place, and the mine was thereupon inspected; in doing so it was noticed that numerous coal-pits were located everywhere about there, and several in close contiguity to main roads and tracks. As many of these pits had been sunk years ago, and from their number it was quite impossible to get them filled up, &c. under General Rule VI., as owners were absent or could not be found, *notices* were served on present owners to cause *printed notices* to be displayed on trees and posts warning people to be careful, and to avoid such excavations in that locality.

At New Town a young man was, after some time, found dead at the bottom of an abandoned coal-pit belonging to Mr. T. Meredith. The examination of the old shaft in question showed that it was securely and substantially fenced, but that, in bird-nesting, the deceased had crawled beneath the fence and losing his balance had been precipitated to the bottom. As there were quite a number of old coal-pits totally unprotected by fences, &c. on that and the adjoining properties, *notices* under General Rule VI. were served by post on the following mine-owners; viz.—Messrs. Timothy Meredith, James Baker, Ebenezer Sims, and Henry Stops, all of New Town.

*The Stanhope T. M. Co., Limited,* at Waratah, were found to infringe General Rule XVI., and the men employed in sinking their engine shaft close to the Mount Bischoff Company's boundary descended and ascended on the buckets in use. Notice was served by post on the manager to provide, for the use of those miners using the buckets as stated, proper straps or other fastenings, rendering accidents impossible.

*The Florence Nightingale G. M. Company, Registered,* at Beaconsfield, were served, under the following circumstances, with a notice directing them to alter a portion of their outlook from the engine-house to the brace. It was noticed that the windows at the roof of the engine-house were too low, and admitted only about a couple of feet of the cage to be seen by the driver; as this limited view would lead to dangerous occurrences in cases of overwinding or breaking of ropes, &c., the above action was very necessary.

*The Lefroy G. M. Company, (Drainage Union,)* at Beaconsfield. This proprietary, in sinking a very large main shaft, utilised one of the three compartments as a ladderway, but having ignored Section 6, and having constructed vertical ladders to a depth exceeding 180 feet without any platforms, "since" the passing of this Act, were clearly liable to pay a penalty if proceedings were taken. After a consideration of all the circumstances, one month's notice was given to construct the necessary platforms, without which the miners would in ascending or descending these vertical ladders without rests incur great danger.

*The New Native Youth G. M. Company, Registered,* at Lefroy, were informed against for leaving their workings in such a state, in close vicinity of a large reservoir filled with water, as to threaten a collapse of their main shaft, levels, &c., underground, and of their extensive crushing plant on the surface. The Inspector reported the case to the Hon. Minister of Land and Works.

*The North Brothers' Home T. M. Company, Limited,* at Ringarooma. This mine was inspected in September, in order to ascertain, amongst other matters connected with a large water scheme, whether the notice served on the Company in the early part of this year had been complied with or otherwise. Though not quite strictly in accordance, the workings at the main and eastern "face" were found not nearly in so dangerous a condition as when inspected previously, and it was found that certain precautionary measures were observed which greatly reduced the danger to the employees.

*The Triangle T. M. Company, Registered,* adjoining, were found to have abandoned the workings at the "face" which were found to be in a dangerous condition, and that they had opened at a higher level whereby the operations were being carried on much more safely.

G. THUREAU, *F.G.S., Inspector of Mines.*

WILLIAM THOMAS STRUTT,
GOVERNMENT PRINTER, TASMANIA.