REPORT of the INSPECTOR OF MINES *for the Year* 1882.

Inspector of Mines Office,
Launceston, December, 1882.

SIR,

I HAVE the honor to submit my first Report as Inspector of Mines, from the 1st of January to the 31st December, 1882, inclusive.*

The results of "The Regulation of Mines Act, 1881," together with the list of accidents which have occurred in the mines of Tasmania during the period mentioned, and other Returns and Tables, with illustrations, &c., connected both with the administration of the Act and the mining operations in the Colony, are hereby presented for consideration. Appendix A. Appendix B.

The miners and engineers in our mining districts generally, and those who have been employed elsewhere in mines subject to the provisions of similar Acts, have met the Inspector of Mines with an evident desire to facilitate his duties; and the owners and managers have in many instances also co-operated. This is a creditable circumstance, when the great distances separating most of the mining districts are taken into consideration.

At this early stage of the operation of "The Regulation of Mines Act" in Tasmania, when the necessary machinery, departmental or otherwise, for its proper administration is not quite so complete as would be desirable, it is scarcely possible to speak of the accidents that have unfortu-

* The Inspector of Mines was gazetted as appointed on the 19th of January, such appointment to take effect from the 9th January, 1882. In order to render a complete Report, it commences with the first of January, 1882.

nately occurred except as to their immediate causes. The wider application of the provisions of this Act can only be felt when the mining community at large has acquired a greater and better knowledge of how accidents may be prevented, and when the Miners themselves have become aware of the fact that the rules and provisions of same have been framed for the special purpose of ensuring, so far as it may be possible to do so by legal enactment, their safety. The Act will doubtless, and that in a short time, for above and other reasons, be of lasting and increasing benefit to the mining community generally. Carelessness, through every day's familiarity with all kinds of danger on the part of the miners, appears to be *the* great obstacle to the beneficial working of this new law.

As the Clauses are stringent, however, it is to be hoped that Managers, by insisting on the careful observance of the various Sections and Clauses, and further, by discouraging, through immediate dismissal of employés for any kind of carelessness or neglect, the Act may be the means of gradually reducing the number of fatal and non-fatal mining accidents.

There are proofs existent, and attention is now directed, to the reluctant feeling and inaction on the part of both owners and managers in not giving the stipulated lawful notice of accidents having occurred, thereby interfering with prompt investigation, whereby the intentions of the Legislature are to a considerable extent defeated. Under these circumstances the Inspector, for want of any other explanation, cannot do otherwise than attribute these lapses of duty on the part of the parties implicated to the effect of the originally proposed Section 3 having been expunged by Parliament, thereby altering the scope and the final issues of the new Act in several very important respects besides those above referred to.

It may be stated that in the Colony of Victoria this particular Section has been found, after the most strenuous opposition by the owners and managers, to form one of the most valuable parts of their Mines Regulation Statute, 1877. The No. 3 Section referred to as having been rejected by our Legislature appears as follows (Section 4 in the Victorian Act) :—"*Any accident occurring in a mine shall be primâ facie evidence that such accident occurred through some negligence on the part of the owner.* The effect of that Clause is simply to throw the onus of disproval of any such neglect, &c. on the owners, and, secondarily, on the managers they employ; both of whom or either one of them will have to take the initiative of proving, on being charged with negligence by an Inspector of Mines, that any such accident or accidents were not owing to any such neglect on his or their part. As the case stands now, the Managers delay or omit altogether to give information of accidents to the Inspector, and the latter is consequently placed in a most difficult position through, in the first place, not being able to reach the scene of accident immediately to examine same, or to provide means, with the sanction of the Hon. Minister of Lands and Works, for causing such an examination to be made; and, in the second place, hearing only of such occurrences long after, when, of course, the intentions of the Legislature have been frustrated to a very great extent or totally. The restoration of that Section to an amended Act would therefore be of very great usefulness; it is, besides, the only safeguard for the protection of the interests of those that remain to mourn the loss of miners killed through negligence by the management, or those that are maimed from the same cause, and are thus deprived of what may be considered the fruits of their labour.

Mines Regn Act, Sect. 11, Rule (xv.)

Safety appliances, *i.e.* Safety Hooks and Safety Cages, which are required to be used under the provisions of "The Regulation of Mines Act," have been, during the year, introduced to Mines of depth. After a series of tests with Safety Cages in order to ascertain the best, those that are patented in this Colony by J. H. Seymour, Engineer, have obtained the preference, principally on account of the "catches" gripping the "runners" being supplemented by a compound hand-lever, which the miners, travelling up or down the shafts, can effectually use for arresting the cage when falling through the breakage of the ropes or chains, and from over-winding.

Rule (xv.)

Entrances to shafts (working) at the surface, "brace" or underground at various levels, have also been provided with proper and strong gates, doors, and cross-bars, and in some cases with movable "grilles" at the "brace."

Rule (xxi.)

Fifteen steam boilers were found to be able to withstand the hydraulic test applied, *i.e.* injecting cold water through a hydraulic force-pump into such boilers filled with cold water, up to a certain pressure; viz.—

	Boilers.
At Lefroy :—	
The New Native Youth Gold Mining Company	2
The East New Chum ditto	1
The New Native Youth Crushing Plant	2
The Crosby and Curran ditto	1

At Beaconsfield:—

The Florence Nightingale Crushing Plant	2
The Nil Desperandum ditto	1
The Tasmania Gold Mining Company (Golden Gate)	1
The Tasmania Crushing Plant	3
The Leviathan Gold Mining Company	1
Ellis and party	1
	15

One Company furnished a Manufacturer's certificate of their then almost new boiler having been submitted by him to a satisfactory test pressure, which was thereupon accepted by the Inspector of Mines for a time, or till the next periodical test was to be taken in hand. And, in four other instances, similar Certificates were to be furnished when obtained from the makers. This would bring the number of reliable boilers on record to twenty of these steam generators in Tasmanian mines.

In testing these boilers, it may be remarked, care was taken in the first instance not to strain or use too high a pressure; double (or over) the ordinary working pressure appears to be quite safe enough as long as that pressure can be maintained in future tests, though meanwhile the boilers may have deteriorated; in some cases allowances had to be made in consequence of the temperature of the water in the boilers not having been sufficiently reduced as was desirable.

Fencing in of abandoned shafts and open cuttings dangerous to the public has been enforced in some instances; but there are still numbers of unprotected shafts in every mining district, and in regard to these minor matters it would be well if the local police—territorial or municipal—would be instructed to look after same.

Several of the more prominent mining companies have found it necessary to frame special rules for the guidance and observance of their employés, and this is a step in the right direction for useful and practical purposes: a copy is submitted with this Report in order that they may be considered and eventually be embodied in "The Mines Regulation Act" when such is being amended by Parliament. From amongst quite a number of reasons favouring such a procedure by the Legislature, the following may be adduced to show how very important a matter the adoption and legalisation of those rules would be to our mining industry; viz.—"The miners would have a *uniform* set of rules to go by all over the colony, facilitating thereby mine management to a very considerable extent: there is, however, one portion of these rules which would prove, if so adopted, of the greatest value, viz., *the introduction of a uniform system of working signals used by engine-drivers working their respective steam engines in Tasmania, or by persons in charge of other machines used in hauling or lowering men and material at the mines.*" If those working signals now referred to were made in future a legal provision, there cannot be any doubt but what the possibility of accidents in connection with winding or pumping from shafts would be considerably lessened, because, at the present time, every steam or other mining plant in this colony is worked by means of *distinctly different* working signals; engine-drivers, bracemen, and others, therefore, on changing their places of employment from one mine to another, have now to acquire continuously a knowledge of new and ever-varying signals with every one of such changes wherever they go to, thus causing, undoubtedly, and as a matter of fact, confusion in their minds promotive of accidents.* Special Rules. Sect. 12. Appendix C.

In several cases where it had been customary for engine-drivers to use a separate and different code of signals from the surface in connection with the underground workings, shafts, and pumping gear, or *vice versâ*, the Inspector of Mines perceiving that another code of signals was used for and by the bracemen, caused one code to answer instead, through having the wires continued from underground to the brace, and thence into the engine-house to the driver. This has been the means of simplifying matters, and consequently the occurrence of mistakes fraught with danger has been rendered almost an impossibility from that cause. Sect. 9.

Telephones appear to be preferred now in most mining countries to the ordinary and ancient "knocker" or "bell" system.

Section 5 provides for the annual production of certified copies of plans and sections of underground workings carried out during the past year and their delivery to an officer appointed by the

* NOTE.—These special Rules as adopted by some companies were submitted to the Inspector of Mines for consideration, and the Hon. Minister of Lands and Works on his recommendation approved of same, so that they have now become legal for these few companies, in accordance with Section 12, "Mines Regulation Act," 45 Vict. No. 8, 1881. If these rules were *legalised* for the whole colony, Tasmania would occupy a position in advance of mining countries elsewhere.

Hon. Minister of Lands and Works.* As these records of the development of our mines will doubtless become more and more valuable for future reference, and as the extent of the various underground workings is of the gravest importance to adjoining mines, when such mines are abandoned and filled with water or deleterious gas, it is suggested that these plans and sections may in future be drawn on the *uniform* scale of "four inches to 100 feet"; the regular collection of the data mentioned in the Circulars are the more necessary because of the ever increasing importance of our mines on the one hand, and of the undoubted right the State possesses of becoming the custodian of all and every information relating to the metalliferous deposits existing in Tasmania, and leased for working to proprietaries.

Explosives.

During the past year, accidents with the above in Tasmania make it appear as if the properties and behaviour of the more modern explosive compounds were not sufficiently understood; the following may therefore prove of some value in extending the knowledge of miners in that direction. It may be stated that, whilst common blasting powder consists on the average of 79 parts of saltpetre, 9 parts of sulphur, and 12 parts of carbon (charcoal), the "explosive oil" used with nitro-glycerine compounds requires 380 parts of glycerine (pure), 1000 parts of fuming nitric acid, and 2000 parts of sulphuric acid in order to produce, through very careful mechanical mixing, and by means of chemical reaction, 760 parts of nitro-glycerine,—the basis of dynamite and other similar explosives. This nitro-glycerine is a clear, oil-like, colourless, and inodorous fluid, heavier than, but insoluble in water. In order to reduce the immense power of this most dangerous substance to such a degree as would make it safer to handle, and which power, as against blasting powder, is as 10,400 to 800 for the latter, this oil is mixed with "infusorial earth" with a view of dividing atomically the oil, and of producing a firmer article to be manufactured into cartridges for the use of the miners, whilst at the same time its enormous inherent power is being reduced. These nitro-glycerine compounds, even with all these and other precautions, are still, as late accidents in Tasmania have unfortunately demonstrated, of an exceedingly dangerous character. The explosive oil congeals at a moderately low temperature (4° Celsius), thereby inducing probably a spontaneous combustion, or, it may be, explosion from the least concussion in its vicinity,—the latter more frequent. Its admixture with the siliceous earth mechanically has, as stated above, tended to remove some of its more risky properties. Another feature has been observed in cold climates, and in most cases fatally so, that the "thawing" of congealed cartridges before or over a slow fire, even if the vessel in which they are placed is immersed in water contained in a larger vessel to prevent their contact with the sides of the vessel, is highly dangerous, and cannot be too strongly condemned. On thawing, that oil is to some extent liberated from its earth, leading to exudation in consequence; now, as both vessels holding the cartridges and the water are heated, this thus liberated oil floats on top and touches the sides of the vessels; the mere "dragging," without even lifting from away of the fire, is apt to cause an explosion. Cartridges in this or any other condition, burning in the open air, can do no further harm than through the evaporation of noxious fumes; but on any exclusion of the air from the burning mass an explosion will follow, the same as if the cartridges were used in a legitimate manner in holes drilled in rock for blasting.

In the deep quartz mines of Victoria, where those kinds of explosives are prepared for working in hard rocks, the Minister of Mines has been supplied with replies to a series of questions which were put to the Miners of Bendigo, through the Secretary of the Bendigo Miners' Accident Society, and the replies thereto, epitomised below, are doubtless of very great importance to the mining community.

"A general feeling exists amongst the miners against the use of these compounds; but it is also felt that because of their efficiency in hard and wet ground, their use cannot now be avoided. They should be confined to wet ground, or if used in dry, ample time should be given for the fumes to clear away. That those compounds manufactured by Nobel are generally preferred to those of any other maker, but that importation should be allowed, subject to strict inspection as to age and quality. That as their use is more injurious in dry than in wet ground, it should be restricted to the latter. That when lithofracteur or dynamite is hard and exudes nitro-glycerine it is unsafe to handle. That it is not possible to ascertain at what age these compounds become unsafe, as it depends much in what place or manner they have been kept."

Storage of Explosives.—With regard to this matter, the storage of explosives at the mines or elsewhere, it has been found expedient to discard substantial buildings as magazines, and in place to substitute more fragile buildings. The latter, used for storing purposes, should likewise not permit to house *more than one kind of explosive;* especial care being taken to effect a separation in different buildings of the nitro-glycerine compounds from those of gun-cotton and of blasting powder, because if stored all under the same roof the least concussion in the neighbourhood would explode the former, the effects of which would be enormously intensified by the consequent ignition of the other explosives in the magazine as well.

*The Hon. Minister of Lands and Works appointed the Inspector of Mines as the person to receive the certified plans and sections; consequently about thirty of the more prominent companies have been notified of such by means of circulars; a copy of this document is added to this Report. (Appendix D.)

Magazines for the storage of nitro-glycerine explosives should be constructed in a hollow of the ground in clayey soil, kept securely locked, under a suitable roof. *The effects of any explosion in this case are in a downward direction.*

Magazines of gun-cotton or blasting powder should be built upon rising ground, at a good distance away from the former, inasmuch as *these explosives have a strong tendency to act in an upward direction after ignition.*

TABLE showing the Number of Miners employed in Tasmania, 1882.*

Auriferous vein or alluvial mining—	
Localities :—Beaconsfield, Lefroy, Minnaw, Gladstone, N.W. and West Coasts...	1500
Stanniferous vein or alluvial mining—	
Localities :—N.E. Counties, Eastern Counties, Mount Bischoff, Ben Lomond, West Coast	2500
TOTAL.....	4000

In this matter of statistical returns there are no means by which the accurate number of miners can be ascertained, and as this appears to be a most important feature, it is suggested that the Mining Registrars should forward quarterly returns to the Mines Department showing the state of population in their respective districts.

Accidents.

Since the beginning of the year 1882 to its close, the total number of miners killed and injured is as follows :—

Fatal Accidents, 1882 *to* 1883.

Date of Accident.	Consecutive No.	Description of Mining.	Locality.	Married.	Single.	Date of Death.	Compensation.	Names.
Jan. 14th.....	1	Gold	Lefroy	...	1	Jan. 14th	Nil.	— Vaughan.
April 20th....	2	Tin	Mt. Bischoff	...	1	June 22nd	Nil.	A. Mackenzie.
June 23rd	3	Tin	L. Thomas's Plains	1‡	...	June 23rd	£10	Geo. Washington Bobinson
Aug. 2nd.....	4	Gold	Campania	1	...	Aug. 2nd	Nil.	Thos. Jarvis.
Sept. 20th	5	Gold	Lisle	...	1	Sept. 20th	Nil.	Wm. Esias.
Oct. 3rd.....	6	Tin	Branxholm	...	1	Oct. 3rd	Nil.	Chung Ah Chay.
Oct. 20.....	7	Tin	Scottsdale	...	2	Oct. 20th	Funeral Expenses	Chas. Redding.
Ditto	8†	Tin	Scottsdale	...	2	Oct. 20th	Funeral Expenses	E. Lane.

Non-Fatal Accidents.

Date.	No.	Description of Mining.	Locality.	Married.	Single.	Date of Accident and Recovery.	Compensation.	Names.
6 January	1	Tin	Mount Bischoff	...	S.	6 January, recovered in a few days	Nil.	Geo. Gibbons & another.
ditto	2	ditto	ditto	...	S.	ditto	ditto	
14 January	3	ditto	ditto	...	S.	Recovered after	ditto	Jno. Rooney.
24 January	4	ditto	ditto	...	S.	ditto	ditto	Chas. Anderson.
24 April	5	Gold	Lefroy	...	S.	ditto	ditto	Geo. Scales.
6 June	6	ditto	ditto	...	S.	In four weeks	ditto	Ah How.
27 August	7	Tin	Mount Bischoff	...	S.	Recovered	ditto	Thos. Stebbings.
15 Sept.	8	Gold	Lefroy	...	S.	ditto	ditto	Lewis M'Manus.
30 Sept.	9	Tin	Mount Bischoff	...	S.	ditto	ditto	Joseph Pascoe.
3 October	10	Gold	Beaconsfield	...	S.	ditto	ditto	Edward Hunter.
11 October	11	Tin	Mount Bischoff	...	S.	ditto	ditto	John Sheen.
4 Nov.	12	ditto	ditto	...	S.	ditto	ditto	Ed. Hartnett.
17 Nov.	13	ditto	ditto	...	S.	ditto	ditto	Geo. M'George.
1 Dec.	14	Gold	Lefroy	...	S.	ditto	ditto	Giden Tretheway.
ditto	15	ditto	Lefroy	...	S.	ditto	ditto	William Hern.
9 Dec.	16	ditto	Beaconsfield	...	S.	ditto	ditto	John Burt, jun.
14 Dec.	17	ditto	ditto	...	S.	ditto	ditto	George Scales.
20 Dec.	18	ditto	ditto	...	S.	ditto	ditto	Jas. Ferguson.

* These Returns are approximate only ; Mr. Bernard Shaw, Commissioner of Gold Fields, furnished the formor, and Mr. E. C. Nowell, Government Statistician, the latter.

† Total number of deaths from fatal accidents amount to eight during the year.

‡ Left wife and seven children.

Total number of accidents by means of which miners were injured are, for the year 1882, reported as amounting to 18.

Total number of all accidents during 1882 *amounts to* 26.

The total number of persons engaged in mining as stated above aggregate to four thousand in this colony, consequently the proportionate number of killed in that number during the year ended 31st December, 1882, are at the rate of two in every thousand so employed. This result, as compared with Victoria, where since 1874, a "Regulation of Mines Statute" has been in force, upon which enactment our "Mines Regulation Act, 1881," has principally been based, shows that but 1·31 per thousand were deprived of life in 1880 in the Victorian mines. Again, as to those injured in mines in this colony, 4·50 were so incapacitated in every thousand, whilst Victoria shows but 2·23 for the same number. This state of affairs can be ascribed as due to causes which are clearly under control, and which "The Regulation of Mines Act, 1881," can doubtless cure without in the least trammeling our mining interests with legislation which interferes with enterprise and progress. It should be the aim of mining capitalists to employ in the first place experienced men as managers, and, secondly, to cause strict enquiry into all cases of accident, and whether the Act is being observed by their employés with attention, and at all times.

In Victoria it has been proved that their "Regulation of Mines Act" or "Statute" has been of very considerable benefit to their mining community, as shown by the Returns; viz.—in 1874 (the year of its initiation), the numbers stood as follows:—1·93 killed and 5·26 injured per thousand, and in 1880, 1·87 killed and 2·81 injured per thousand, though in the latter period an increase in the number of miners had taken place. It will be observed that in Tasmania these numbers have been exceeded in the past year, and that our death-rate is considerably higher than theirs, as well as that relating to those injured in mining avocations.

Fatal accidents from fall of rock.—Of these there were six instances, of which not less than four proved fatal.

Fatal accident from blasting.—After the explosion of a blast a stone propelled with great force struck a miner on the head, from the effects of which he died a few weeks after.

Fatal accidents from ignited lithofracteur, dynamite, &c.—There was one of these, from thawing congealed lithofracteur in a can near the fire.

One miner was killed by a fall down a shaft 130 feet, and another from a similar cause.

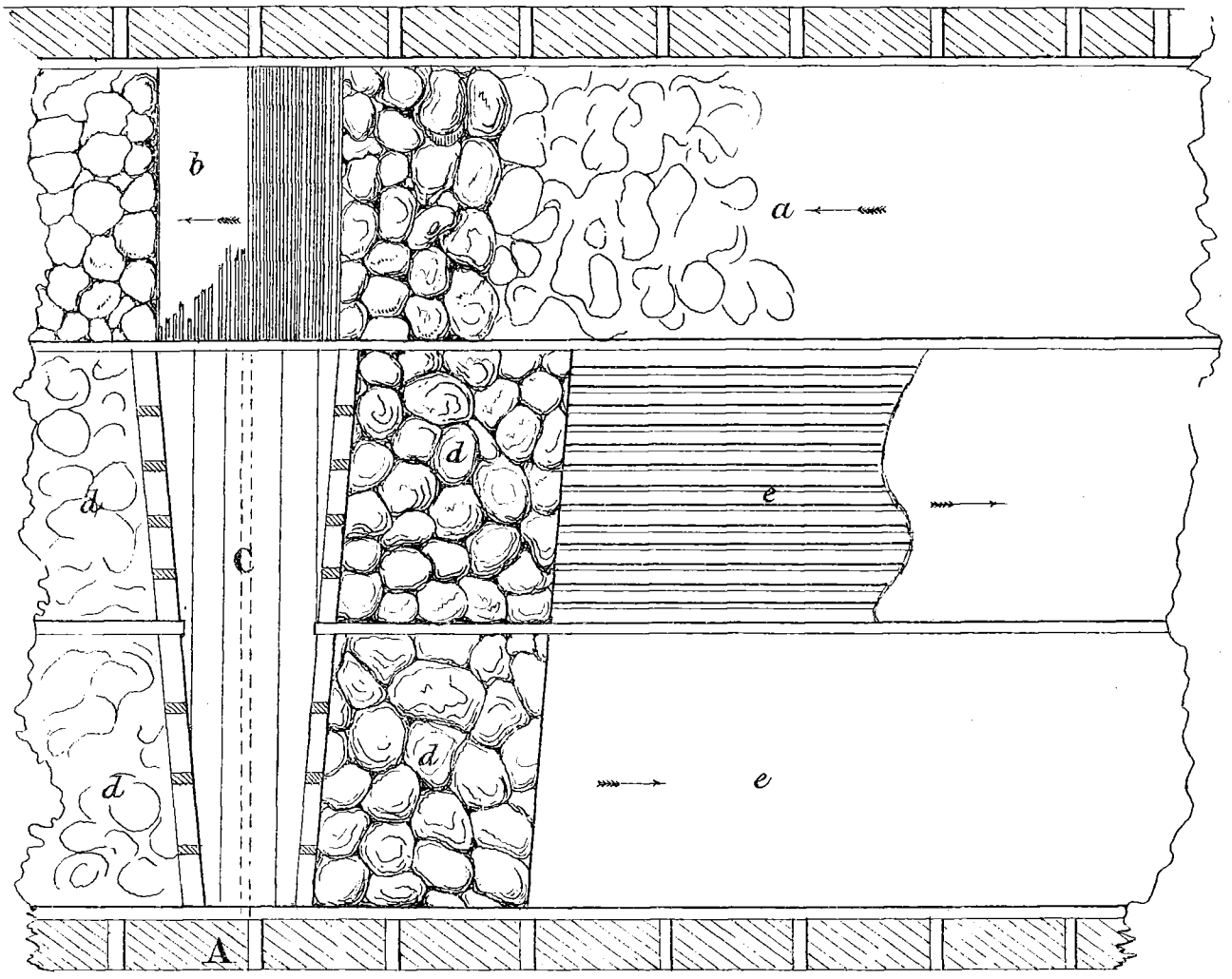
Non-fatal accidents.—Two miners were overwhelmed by a fall of ground in a drive, by which the timbers were displaced.—A Chinaman charged a hole with blasting powder and rammed same with an iron scraper, when ignition ensued.—A miner trying to thaw lithofracteur cartridges in a tin can over a lighted candle was severely burned.—A miner in a weak state of health became very ill in an ill-ventilated winze, and had to be sent to the surface; another fell down some distance from an open cutting or "face."—One miner missed his footing on a ladder and fell 40 feet.—A stone rolling from the top of a "face" injured a miner's leg.—In a winze a miner slipped and fell.—A trucker sitting on loaded trucks running down an incline was hurled 20 feet away, as the trucks were not properly geared with break-power, and he lost control of same.—A small remnant of dynamite in a hole exploded, injuring one of the miners in a tunnel.—An undermined bank fell suddenly upon a miner, breaking his collar-bone and bruising him considerably.—A steel drill was used in drilling out a charge of two inches of compressed blasting powder, burning, after explosion, the hand and face of two miners.—A young miner carried loose blasting powder in his hat from the surface to some underground workings; in a winze his candle went out, and on re-lighting an explosion followed burning his face.—A miner lashed some picks to the rope, and then stepping into the lashing, which broke on his being lowered, causing a fracture of his ancle.

It may be stated that, in the majority of these cases, accidents might have been avoided if only reasonable care had been exercised. As there is doubtless great carelessness so frequently displayed and so severely punished without any appreciable effect, the emendation of the clauses in our "Regulation of Mines Act" as recommended in this Report would appear of very great necessity.

Improvements in Mining Appliances.

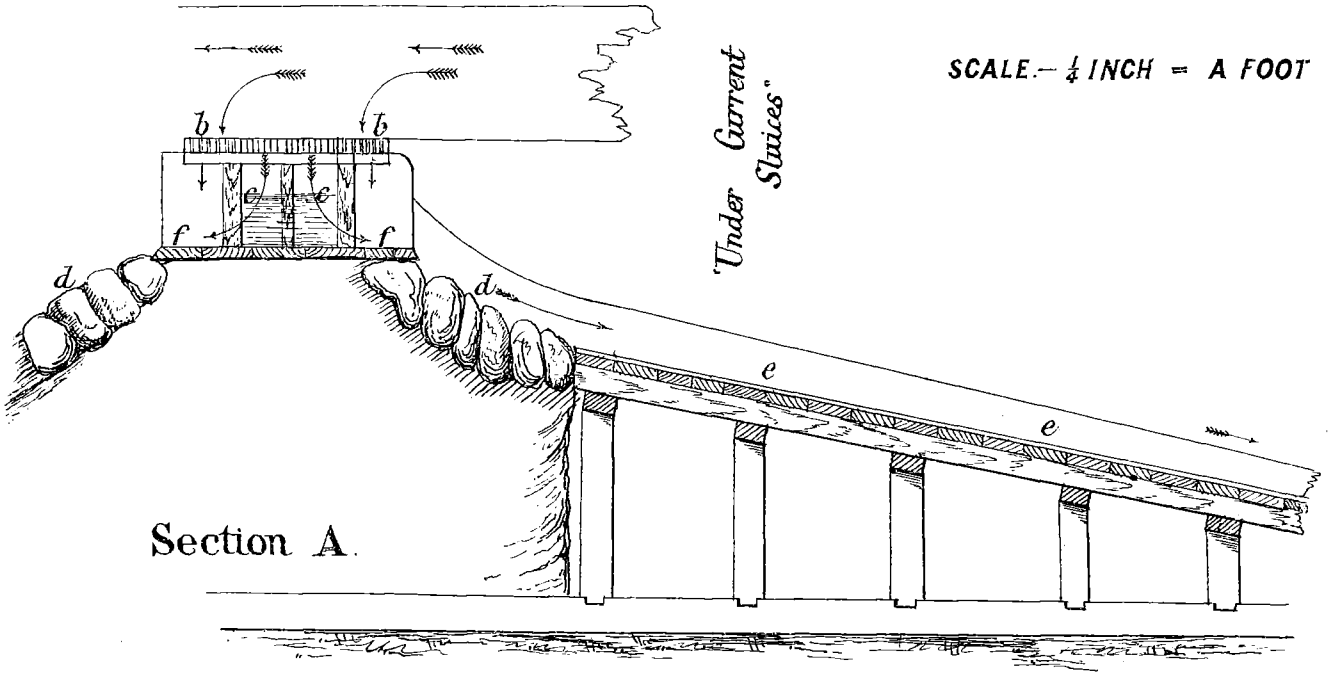
It being considered desirable to draw from time to time attention to the great progress making with appliances which aid the mining industry elsewhere, and as those improved machinery processes, &c. are not always available for the information of our mining engineers, the following are now embodied in this Report. In connection with this it may be stated that, so far as gold mining is concerned, our vein-stuffs give a higher yield on the average than those of the same class in Victoria, but the expenses of our manipulation of the ore appear to form a much heavier charge than what is the practice in that colony, thereby reducing the profits. The reduction of these costs

PLAN



"Under Current Sluices"

SCALE.— 1/4 INCH = A FOOT



Section A.

depends entirely on the greater or lesser excellence of the apparatus employed, *i.e.*, apparatus that is nearly self-acting and not too expensive to manufacture. If these latter were worked by a *more skilful class of persons*, the results would justify a departure from the appliances now in use.

Pumping Machinery.—It has been proved that cast iron "lifts" of the larger sizes especially are not only expensive, but, on account of their weight, difficult to place into or to move about shafts; they are cast of thick metal, and require strong flange joints every nine feet. Such a length for 15-inch pipes in diameter, and only one inch metal, for instance, weighs over 1600 lbs.; the iron is generally more or less porous, and therefore liable to rapid corrosion by the action of mine waters charged with saline matter.

The introduction of "lifts" made of wrought iron plates (boiler iron) riveted together to the required sizes, have the following advantages:—Though the latter also need cast iron flanges riveted on at the joints, these flanges are required every twenty feet only. They are much lighter, require not so much or so strong timber for resting on in the shafts, nor are they so difficult to move about. From the much denser quality of wrought iron they can stand a much higher water pressure per square inch, and they also withstand the corrosive action of mine waters much longer.

In Victoria (Ballarat) a new description of deep-mining pumps has been introduced by the inventor, which are highly recommended by those who have had them in practical use. They are said to require less steam power to work them, and a saving of fuel is thereby effected. The solid "column" (delivery) can be extended to a depth of 600 feet before permanent "workings" are required. With an upcast delivery lift of that depth, five inches in diameter only, and with eight inch workings, not less than from 16,000 to 17,000 gallons per hour has been raised. For that depth about three ordinary "workings" would be required if our ordinary "plungers" were employed, necessitating, of course, a corresponding number of plunger-chambers and of cisterns. As the rods work outside the column of lifts, thereby delivering an uninterrupted stream of water, besides the other advantages referred to, this invention should be of considerable value for deep-mining purposes.

Conduit Pipes.—In conveying water in pipes for "hydraulicking" or similar purposes, wrought iron has of late come into use here the same as it has been years ago in California. For the Ringarooma and adjacent districts, large numbers of such pipes have been imported from Melbourne, riveted together, and forming lifts 20 feet in length. The joints are made of cast iron flanges riveted on, thus presenting not only a weak line for fracture, but also an imperfect joint if the rugged bed is considered on which these pipes are to be placed. In California, these pipes are also 20 feet in length each, but they are simply "telescoped" at the joints, *i.e.* one end is passed into the other end for a depth of from 3 to 4 inches, and the pressure of the water makes not only a tight but a flexible joint, which adapts itself to the bed it rests on, and permits their expansion and contraction in a varying temperature.

Sluicing Concentrators.—Under-Currents.

A considerable per-centage of fine tin ore, and most all the gold which occurs in our stanniferous gravels, is lost during the sluicing operations, which entail a great rush of water, rendering perfect concentration difficult, and resulting in a loss of both valuable ore and metal. Any kind of self-acting and economic process which enables the collection of the above would add to our production. It is therefore, that attention to the Under-Currents is called, as supplying the above so obvious a want. (Plate I.) On Plan at *a b* the tail-race is shown, lined with hard boulders of rock at the bottom, the water running in the direction of the arrows; at *b*, a series of iron bars $\frac{3}{4}$ in. by 4 in. are set on edge with about from $\frac{1}{3}$ to $\frac{1}{2}$ in. interstices between on top of channel c. The rushing water, well charged with coarse and fine gravels, tin ores and gold of a finer grain, pass over this iron grating, and the more valuable and weighty portions fall through the interstices or openings between the bars into the bottom of channel c, without, however, interrupting the course of the stream in the tail-race proper. From c these sands and ores pass out at *f* over the bed of boulders *d*. Here the gold in the sands is mostly caught by means of quicksilver, which is from time to time distributed in and amongst the irregular "ripples" formed by these boulders. The remainder passes on to tables *e e*, which are roughly put together,—the joints of the boards being across the stream, and lined with bands of hoop-iron. The action of the sandy water forms scoops in the soft wood between the strips of hoop-iron, and these are the receptacles of the finest floured ores or metals, and which are regularly removed from the "Under-Currents" by means of coarse brooms.

*The Frue Concentrator.**

This machine combines the action, with good effect, of the "buddle," "jigger," "tye," and other separators; its peculiar construction makes it one of the most compact appliances known to

* The Inspector of Mines had occasion, on applications being made to him in that respect, to recommend this Concentrator to the West Coast Mining Managers. The Cornwall Company there have ordered and lately received a complete machine, which will be in working order soon for the inspection of all interested.

ore-dressers, doing a large amount of work in a satisfactory manner, and at the expense ot very limited steam or other motive power. This concentrator can be worked without any great attention being required as to the size of grain in the ores about to be manipulated, though thorough concentration cannot always succeed without classification of the ores as to sizes. In this case, ores that pass through screens or gratings having 120 holes to the square inch, down to the impalpable slimes, are successfully treated. In the case of coarser grained metalliferous sands, as already specified, it would be advisable to employ a second machine to re-work the "tailings" of the first one. Of course, as with all other kinds of machines, great care and considerable intelligence have to be exercised in order to achieve the highest results obtainable by skilled attendants, and if this is done, from 6 to 10 tons can be separated from the stamped ores by each machine in every twenty-four hours. Regularity in speed, regularity in feeding the concentrators with material to be cleaned, and regularity in the supply of water (clear), are of the greatest importance when working these machines. The motive power, of whatever description such may be, is estimated at one-sixth and one-fourth of a horse power for each machine, and one man, or a sharp lad, can attend up to nearly six of such machines. As regards the ores which these appliances can work with greater success than perhaps a great many others, the only point of importance is, that there be a fair difference between the specific gravity of the ore to be saved and that of the matrix turned into waste by the same. The following ores have been operated upon with good average results; viz.—iron and copper pyrites, arsenical ditto, zinc blende, galena, tinstone, cinnabar, native silver, native copper, and titaniferous iron sand containing a little scaly gold. This sand, it may be observed, is being thrown up periodically by the sea in several places—New Zealand and on the Californian Coast; average assays have given about £1 14*s*. worth of gold per ton of raw sand, but owing to its great specific gravity, due to the great per-centage of titaniferous iron it contains, it could not be profitably worked, or the gold separated from it. After passing through the Frue Concentrator, however, but a faint trace of gold could be detected in the tailings, whereas the residues intercepted and held by this machine assayed at the rate of over £300 per ton in gold. Many Companies there have discarded their ordinary, though in many cases very ingeniously constructed, appliances for concentration as not so effective as the Frue Concentrator, and are satisfied with the change.

When it is considered that the specific gravity of titanic iron varies from 4·5 to 5, tinstone (cassiterite) from 6·4 to 7·1, cinnabar from 8·5 to 9, and zinc blende (sphalerite) from 3·9 to 4·2, it will be admitted that the cited results promise to simplify, if these concentrators are introduced generally, our ore-dressing or cleansing processes; and as they can be most effectively used as attached directly to the splash-boards of batteries, or the delivery exits from other kinds of pulverisers, other and kindred apparatus can be thrown aside, thereby curtailing expenses for attendance and motive power.

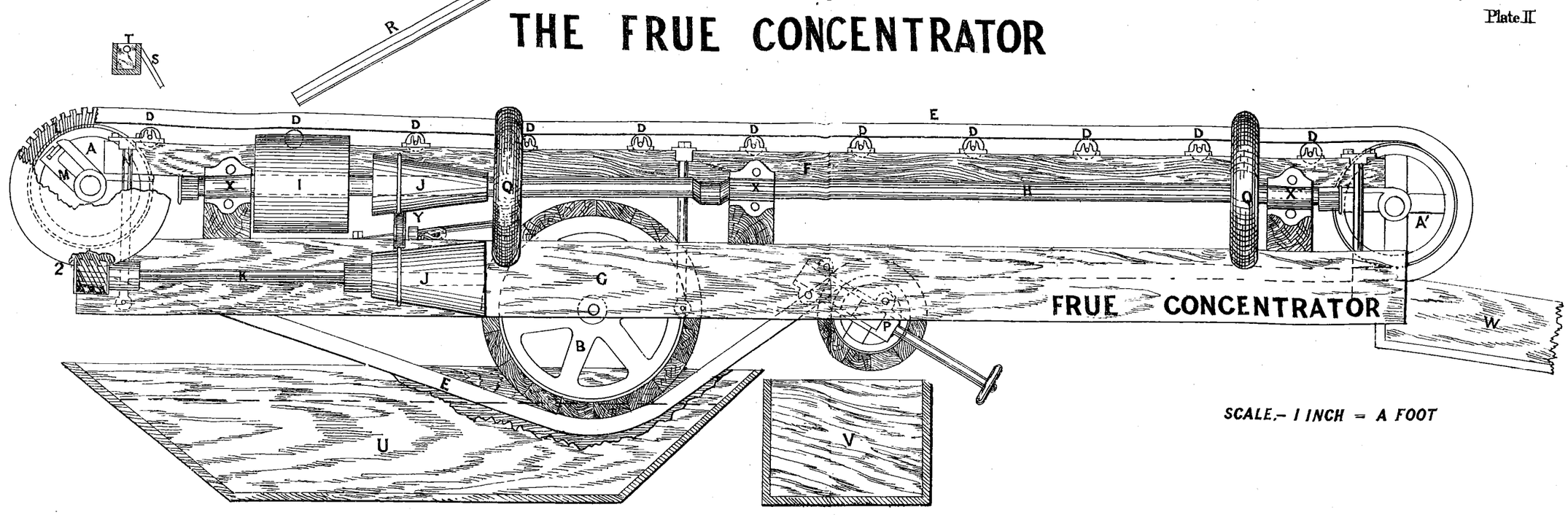
Description.—(Vide Plan and Long Section, Plate II.)

It will be perceived that the principle of this machine is that of an *endless* belt running over the top of two end pulleys, A A′, and beneath or under a pulley B, which latter causes the immersion of the belt E E. A & A′ are the main rollers which carry the belt, and form the ends of the table or concentrator. Each roller is 51 inches long and 13 inches in diameter; such a roller if made of cast-iron would weigh 200 lbs.; if made of wood it would shrink or swell unevenly owing to its being at times dry or wet. In order to secure a light yet strong roller, the plan has been adopted of making these rollers of No. 12 sheet iron, riveted lengthways, and "crowned" in the centre about quarter-inch. The whole is galvanised when finished, so that even the rivets are protected from rust. These rollers are strong, can carry a good weight, and weigh only about 70 lbs. B is a large roller 24 inches in diameter, beneath which the belt passes through water in a tank, and there the cleaned ore on the belt is deposited for collection. D D D are a number of small rollers supporting the belt E, and causing the latter to form an evenly inclined plane table; the whole is fixed within a strong oaken frame F, bolted together at A A′ at the ends. C is a "tightening" roller keeping the belt taut and regulating it to run evenly; it is of wood on a cast-iron frame. The frame F is braced with cross-pieces and bolts; these latter hold the frame together parallel with A A′ and D D, to which flat springs O are bolted—one to each underneath the frame. The principal belt is made of vulcanised canvas (4 ply), 4 feet wide, and 27½ feet in entire length, having raised sides or edges, thus forming a broad channel or plane. G G is the stationary frame, secured with cross-braces, supporting the whole machine, and the "*grade*" or "*incline*" is given to the belt by elevating or depressing G G at its lower end by means of wedges. The whole machine rests on two heavy bed-logs. F is constructed with a view of keeping the main belt travelling in a certain direction or groove. The cross-timbers of G G are longer at one side, in order to carry the bearings of the main crank-shaft H; at these bearings, X X X, the cranks are, however, half-inch out of centre, thus giving 1 inch throw. I is the driving pulley to which the motive power for the machines are supplied. The coned pulleys, J J, kept in place by a grooved pulley Y with its handle and strap, which regulates the working of the main belt as required, either diminishing or increasing the speed.

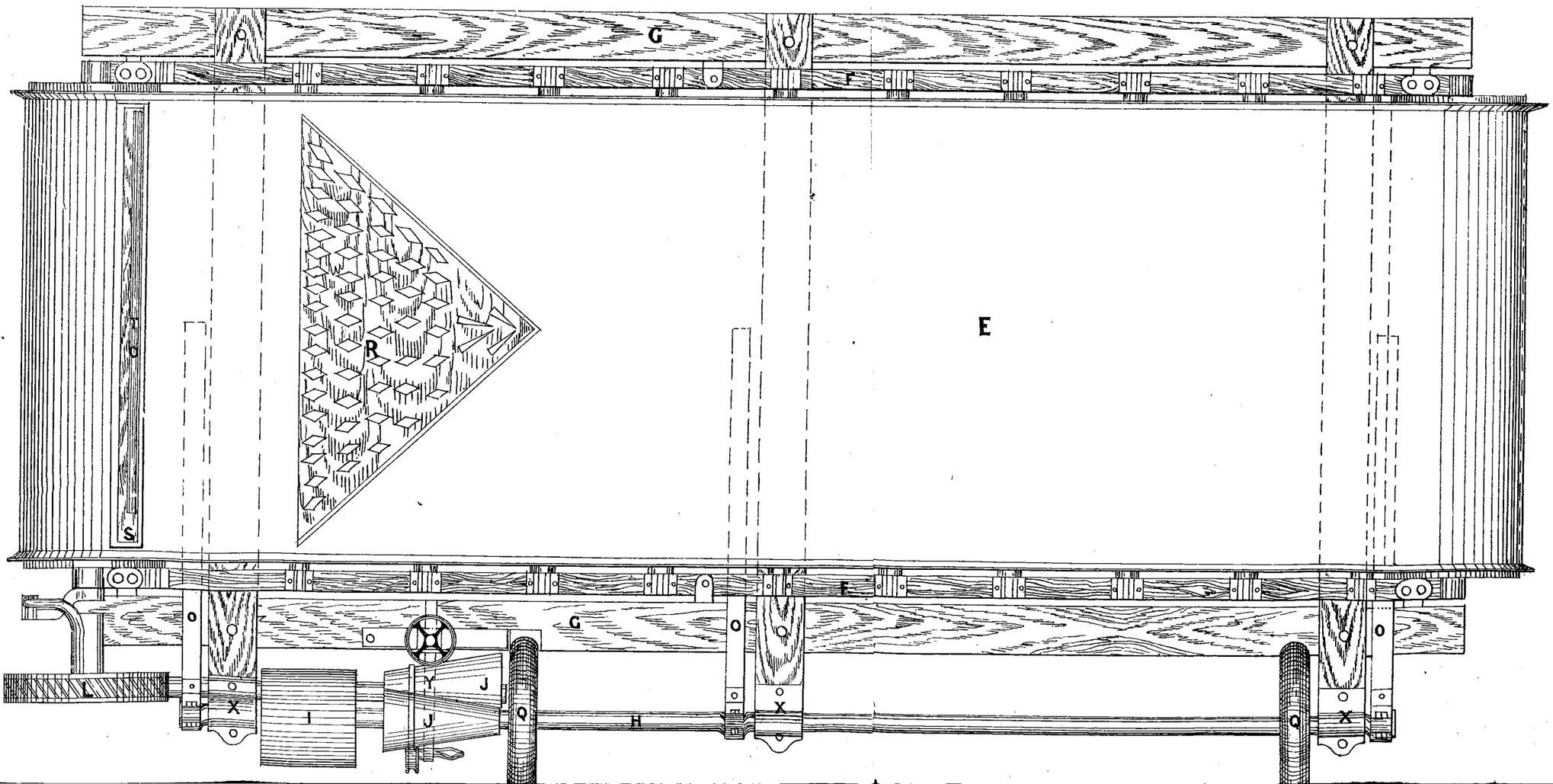
The springs O O give a quick lateral motion or side shake to the travelling belt as it travels over A from A′.

Method of Working.—The ore is fed with water on to the belt E at about D. R is the feed-board, which is regulated by the diamond-shaped blocks of wood screwed to same so as to spread the

THE FRUE CONCENTRATOR



SCALE.- 1 INCH = A FOOT



ore regularly all over the belt. S is the water-trough, and a depth of not less than half-inch of water and sand should always be kept on the belt. The up-hill motion of the latter varies from 5 to 12 feet per minute, and the incline is from 4 to 12 inches in 12 feet, in accordance with the character of the ore fed on to the belt.

The machine must be set out square and level, the belt travelling "up hill" according to the speed necessary for quick and good separation of the purer ore from its matrices. With stampers an excess of water must be avoided by means of a box from which the sands and water are made to overflow on to the distributor R.

The surface of the belt lasts at least three months; whenever the canvas begins to show under the vulcanised rubber a fresh coat of the latter should be given, and it would be advisable always to keep a spare belt at hand.

In concluding the description of this valuable machine, it should be borne in mind that the process by it is simple but very effective; it takes up but little room, and it would be an acquisition to companies who cannot go to a heavy outlay for more complicated systems of concentration.

Calcining or Roasting Furnace.

An application for permission to erect such a furnace was made by Messrs. Curran and Crosby, at Lefroy, and was reported on at the request of the Hon. Minister of Lands and Works in order to allay the fears of some of the inhabitants, who informed the Hon. Minister of the dire results that would follow the exhalation of noxious fumes from the works contemplated. Under certain conditions having in view the public comfort and health of the people residing in the neighbourhood, the Inspector of Mines reported in favour of the application, and since then the works have been completed and are working continuously. The fumes arising from the calcination of pyritous sands or tailings are now condensed by means of water chambers and sprays of water, in accordance with the directions of the Inspector of Mines, and no further objections have since been made, though the works have been twice inspected during the year.

I have the honor to be,
Sir,
Your most obedient Servant,
G. THUREAU, *F.G.S., Inspector of Mines.*

To the Hon. N. J. BROWN, *Minister of Lands and Works, Hobart.*

APPENDIX A.

LIST of Accidents in the Mines of the Colony of Tasmania during the Year ended 31st December, 1882.

Gold District.	*Mineral District.*	*Mine-owner.*	*Date of Accident.*	*No. of Accident.*	*Cause of Accident.*	*Killed.*	*Injured.*	REMARKS.
—	Mount Bischoff	Mount Bischoff Silver-Lead Mining Company, Registered	6 Jan.	1 & 2	Fall of rock	...	2	This miner was working with another in this Company's tunnel, which required close timbering. The back laths had been driven with the last set of timber over the cap, when the soft ground suddenly settled on the point of the laths, causing the last two sets of timber to capsize, burying the miner in the *débris*, and injuring his comrade; both recovered.—(Police.*)
—	Ditto	Mount Bischoff Tin Mining Company, Registered	14 Jan.	3	Stone falling in on open cutting	...	1	This miner was working at the base of the "Red Face," when a stone detached itself from near its top and fell on his head, causing an open cut; he recovered in a few days. (Police.)
Lefroy	...	New Native Youth Gold Mining Company, Registered	14 Jan.	4	Fell down the main shaft for a distance of 130 feet	1	...	The deceased was engaged as a trucker at the 320 feet level, the plat of which was in a state of alteration, not however so as to interfere with sending away quartz. He had sent the last truck to the surface at 5 A.M., and his body was found at 6 A.M. after, on the well-boards of the 450 feet level. On the 1st February, all the provisions of "The Regulation of Mines Act," Sect. 11, General Rule (XXV.) were complied with. Verdict by jury: "Accidental Death."—(Police.)
—	Ditto	East Bischoff Tin Mining Company, Registered	24 Jan.	5	Explosion of lithofracteur	...	1	This man was "thawing" several cartridges of lithofracteur in a tin can with water; the vessel was hung over a lighted candle; after a while the vessel was placed two feet nearer the candle and the man went to sleep, and an explosion woke him. He was injured in the arms and thighs by the flying fragments of his tin can. He recovered.—(Police.)
—	Ditto	Mount Bischoff Tin Mining Company, Registered	20 April	6	Whilst blasting a tunnel	1	..	In a tunnel driven by this proprietary a place for refuge had been provided by the Mining Manager, but this miner did not avail himself of same, and on the explosion of a blast a stone came flying along, hitting him on the head and breaking his skull. He died on the 22nd June, in the hospital.—(M. Manager.)
Lefroy	...	West New Chum Gold Mining Company, Registered	24 April	7	Depraved air, acting on a weak constitution	...	1	As a miner was sinking a winze 47 feet below the No. 3 level, the air became very light and caused him to faint, requiring his removal home, where he ultimately recovered.—(Manager.)
Ditto	...	New Native Youth Gold Mining Company, Registered	6 June	8	Using an iron scraper to ram a charge of blasting powder	...	1	A Chinaman working by himself at the 320 feet level, after drilling a hole to the depth of 18 inches, placed about 4 inches blasting powder in same. He stated that the wooden rammer was, in his opinion, too light, and he used an iron scraper instead, causing an explosion. Both eyes were injured and his face burned considerably. He recovered in the Launceston Hospital, and returned to work.—(Manager.)
—	Little Thomas' Plains, Gould's Country	Cambria Tin Mining Company, Registered	23 June	9	Thawing congealed dynamite cartridges	1	...	The deceased, who was the Mining Manager of the Company's claim, it is surmised, in the absence of witnesses, was engaged in thawing in water congealed cartridges placed near the blacksmith's fire at the forge. An explosion took place, killing the man immediately. Verdict: "Accidental Death."—(Police.)

* This indicates by whom the information of accidents was communicated to the Inspector of Mines.

Campania	...	Campania Gold Mining Company, Registered	2 August	10	Fall of rock	1	...	Two miners were "blocking" auriferous (?) rock near the corner of the main tunnel and the first cross-drive, which were well secured with strong timber. The "face" they had opened was five feet in width, and the rock had been undermined two feet; this latter came away suddenly, and by mishap a block weighing one ton and a half fell upon the deceased crushing his loins and abdomen, breaking his legs, &c. He died on the train while being taken to the Hobart Hospital. Verdict of Jury: "Accidental Death."—(Manager.)
—	Mount Bischoff	Mount Bischoff Tin Mining Company, Registered	27 August	11	Fall from a working face	...	1	Not seriously injured, but it was found necessary to take him to the Hospital.—(M. Manager.)
Lisle	...	Private Miners' Claim	20 Sept.	12	Fall of ground in alluvial workings at Cradle Creek	1	...	This miner and his partner were working an alluvial claim; their shaft was ten feet deep, and on the night of the accident the deceased was alone underground finishing some work. A while after 8 P.M. his mate discovered that a fall of ground had taken place, completely burying the miner. About three tons of earth fell upon the deceased, fearfully injuring him and causing his immediate death. Verdict of Jury: "Killed accidentally, casually, and by misfortune, by a fall of earth."—(Police.)
Lefroy	...	New Chum Gold Mining Company, Registered	15 Sept.	13	Missing his footing oft a ladder, and falling 40 feet	...	1	This miner fell down the New Chum Gold Mining Company's shaft a distance of 40 feet, by slipping off an iron stay on a ladder through his own carelessness. He was not much hurt, and recovered soon after.—(Police.)
—	Mount Bischoff	North Bischoff Valley Tin Mining Company, Registered	30 Sept.	14	A stone rolling down the face and crushing the miner's leg.	...	1	He and five other miners were working in the stopes known as Wheal Bischoff; the men were getting timber ready to secure the workings, and this miner had just prepared for its reception and fixture, and whilst on his knees a large stone and some earth fell, holding him fast. Two men moved the stone eventually, and set him free. He avers the accident canaot be laid at any one's door to blame. He had to retire to bed, and is now recovered (?)—(Police.)
Beaconsfield	...	New Providence Gold Mining Company, Limited	3 Oct.	15	Slipping in a winze	...	1	Slipping off the lowest set of timber in a winze, he fell on to the end of a projecting lath in the bottom; he was not much injured.—(M. Manager.)
—	Branxholm	Golden Age Tin Mining Company (Private), R. Walmsley in charge of mine	3 Oct.	16	Preparing ground for sluicing	1	...	The deceased and another Chinaman were employed at Ruby's Flat in grubbing trees preparatory to sluicing the ground beneath the same. One of these trees fell unexpectedly and caught the deceased against the opposite gravel bank. He was extricated, but died the same night.—(Police.)
—	Mount Bischoff	Mount Bischoff Tin Mining Company, Registered	11 Oct.	17	"Trucking" ore without a proper brake	...	1	This man was "trucking" tin ore from the face, and his truck was not furnished with the requisite brake, but nevertheless he was riding on the load in the truck. This extra weight doubtless gave an increased impetus to the speed down an incline, at the end of which he was thrown down 20 feet and considerably bruised. Recovered.—(Police.)
—	Scottsdale	Great Consols Tin Mining Company, Registered	20 Oct.	18 & 19	Repairing a tail-race	2	...	These two young men were employed by the Mining Manager to repair a tail-race; the lower parts at the sides had been undermined by the action of the water charged with coarsish gravel, and they had to take down the worst parts of the overhanging sides, when the latter suddenly collapsed, and killed them through an enormous fall of earth, almost instantaneously. The Mining Manager was fined £1, and costs 9*s.* 6*d.*, for neglecting to observe Section 4 of "The Regulation of Mines Act, 1881." *First Conviction:* Police Court, 24th Nov., 1882.—(Police.)
—	Mount Bischoff	Mount Bischoff Tin Mining Company, Registered	4 Nov.	20	Ignition of a small remnant of dynamite not exploded in a blast	...	1	In this case, from the evidence at hand it appears that whilst drilling a hole an explosion took place; and, as the miner was stooping over the place, his eyes were somewhat injured.—(M. Manager.)

Gold District.	*Mineral District.*	*Mine-owner.*	*Date of Accident.*	*No. of Accident.*	*Cause of Accident.*	*Killed.*	*Injured.*	REMARKS.
—	Mount Bischoff	North Bischoff Valley Tin Mining Company, Registered	17 Nov.	21	Fall of earth after undermining same in the bank	...	1	This man was engaged at a face nine feet in height, which had been undermined, and suddenly gave way without warning, covering him all but the head. He was taken out of the *débris* as quickly as possible, when the doctor found that his collar-bone was broken, besides sustaining a severe shaking.—(M. Manager.)
Lefroy	...	West New Chum Gold Mining Company, Registered	1 Dec.	22 & 23	Drilling out part of an unexploded charge of blasting powder by means of a steel drill	...	2	Two miners were working in a "rise" 18 feet above the 348 feet level. At 11·30 A.M. they had drilled a flat hole and charged same in the ordinary manner with powder, and afterwards tamping. This hole missed, and half an hour after they used a copper-headed "pricker" for removing the tamping down to the powder, which was quite hard and compressed. A "collar" of clay was then made at the opening of the hole to retain the water they used for saturating the explosive until 3 P.M., when they returned and removed the wet powder until about two inches of compressed powder remained. They then used a steel drill for boring out what was left, whereupon an explosion followed, causing one man's hand and face to be burned after the drill was forced through his hands. The other man escaped nearly all injury. *Cautioned.*—(M. Manager.)
Beaconsfield	...	Tasmania Gold Mining Company, Registered	9 Dec.	25	Explosion of loose blasting powder	...	1	This young man was carrying, without being ordered to do so by the Captain of the shift, or the Mining Manager, a charge of loose blasting powder in his hat from the surface into another working. In so doing he had to descend a "pass," where his candle went out; whilst relighting same the explosion took place, burning his face considerably, though not injuring his eyesight. *Cautioned.*—(M. Manager.)
Ditto	...	Ditto	14 Dec.	24	Fall of rock	...	1	Two miners were working in a stope between the Nos. 1 and 2 levels, and were preparing to place timber in the end of such workings, when suddenly a portion of the "hanging wall" of the lode fell and pushed one of these miners against the footwall about 4 feet from the opposite wall. The place where this occurred measured 6 feet high by 4 feet wide, and underneath the stope was securely and properly filled in with "addle." No bones were broken, and injuries but inconsiderable, though bruised somewhat.—(M. Manager.)
Ditto	...	Moonlight Gold Mining Company, Registered	20 Dec.	26	Breaking of "lashing"	...	1	Some picks were securely lashed to the rope at the windlass, by means of which they were sent down a winze; instead of trusting to the rope, this miner stepped into the "lashings," which gave way, precipitating the man for a distance of 31 feet. It was discovered by the doctor, after the swelling had gone down, that one of his ancles was fractured.—(M. Manager.)
				26		8	18	

NOTE.—From the above Appendix it will be seen that, for every thousand miners engaged in connection with mining, a proportion of two were killed in every thousand, and, similarly, that 4·50 were injured in every thousand, during the year now closed. Also, that fifteen informations were conveyed to the Inspector of Mines by the Mine Managers, and eleven by the Police Department.

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

Launceston, 31*st December*, 1882.

APPENDIX B.

LIST of Mines inspected in the Colony of Tasmania during the Year ended 31*st December*, 1882.

Date.	*Gold.*	*Mineral.*	*Mine-owner.*	*Observance of Regulation of Mines Act*, 1881.	*Special Rules or Exemptions granted or refused.*	*No. of Steam Boilers tested; Amount of Pressure.*	*Diamond Drills: No. of Bores, and Depth.*	*Remarks.*
January	Lefroy	...	Queen's Birthday Co.	Open shafts, unfenced; owners not known	...	...	...	The workings on this line of reef were abandoned, and left in a dangerous state; the Road Board should see to this.
Ditto	Ditto	...	Golden Point	Complied with	...	...	...	Not working.
Ditto	Ditto	...	Shamrock	Ditto	...	...	...	Ditto.
February	Ditto	...	New Native Youth G. M. Co., Registered	Ordered rails round bob-pit; directed M. Manager to continue all signals from below by way of the brace into the engine-house or *vice versd.*	Special rules submitted for report, and approved of by the Hon. Minister of Lands and Works	Two; winding and pumping engines; working pressure* 30 lbs. to the square inch; test pressure, 74 lbs. ditto. Crushing engines: working pressure, 30 to 35 lbs. square inch; test pressure, 70 lbs. ditto	...	This Company holds several leases, of which that of the New Native Youth Co. is alone in work. Their main shaft is 600 feet deep, with levels at 200, 260, 320, and 450 feet. There are two 8½ inch plungers working at the 320 and 450 feet levels; and the machinery is in good working order. Safety cages have been ordered. The crushing plant consists of three boilers, a pair of 18-inch coupled engines, driving 40 revolving heads of stamps of 900 lbs. each, gratings from 196 to 225 holes per square inch; and outside the boxes there are copper-plates, ripples, blankets, and tyes for the interception of the gold and the concentration of the valuable pyrites disseminated throughout the reefs. There are 1 manager, 1 underground ditto, 2 engine-drivers, 34 miners, and 8 boys at the mine, and 1 engineer, 1 crushing manager, and a number of boys employed at the crushing works. The surface buildings are substantially constructed, and on the whole the under-ground workings secured with strong timber.
Ditto	Ditto	...	New Chum G. M. Co., Registered	Safety cages ordered	...	Two; winding and pumping, W.P., 25 lbs. p. sq. in.; T.P., as per engineer's certificate, 85 lbs. p. sq. in.	...	This Company is located on the New Chum line of reef. They were erecting a pumping engine; and tenders had been called for the construction of a crushing plant. Their quartz had to be sent *viâ* tramway ¾ of a mile away to the N. Native Youth batteries to be crushed. One M. Manager, 14 men at surface, and 60 men below are employed. The mine is opened from their main shaft at the 120, 180, and 240 feet levels. This New Chum lode is regular as to mode of occurrence and average yields of gold.
Ditto	Ditto	...	West New Chum G. M. Co., Registered	Safety cages ordered	...	Certificate (3)	...	This Company adjoins the above in the west on the same line of reef. They employ winding, pumping, and crushing machinery, with the usual appliances for gold saving and concentration of sulphurets. From the main shaft levels have been opened at the 112, 172, 236, and 270 feet. They employ one M. Manager, one engineer, one underground manager, and about fifty men underground and at the surface. This mine is deeper on the line of reef than any other, and it is well timbered and systematically worked.

* Read abbreviations as follows :—Working Pressure—W.P.; per square inch—p. sq. in.; Test Pressure—T.P.; winding or pumping engines—w. *or* p. engines as the case may be.

Date.	*Gold.*	*Mineral.*	*Mine-owner.*	*Observance of Regulation of Mines Act*, 1881.	*Special Rules or Exemptions granted or refused.*	*No. of Steam Boilers tested; Amount of Pressure.*	*Diamond Drills: No. of Bores, and Depth.*	*Remarks.*
January	Lefroy	...	East New Chum G. M. Co., Registered	Safety cage ordered; signals to be continued into engine-house	...	One multitubular for portable engine, W.P., 25 to 30 lbs. p. sq. in.; T.P., 72 lbs. ditto	...	This Company adjoins the above on the east, and they have but one level opened from their main shaft, at the 240 feet from the surface, or 40 feet deeper than the New Chum Co.
Ditto	Ditto	...	Crosby, Curran, and Kennan's Co., Pyrites works.	Complied with	...	One multitubular for portable engine, W.P., 30 to 35 lbs. p. sq. in.	...	Some objections having been made by parties residing near the proposed new roasting furnace to Mr. B. Shaw, Commissioner of Gold Fields, the matter was referred to the Inspector of Mines, who recommended the adoption of certain means for condensing the more injurious ingredients of the noxious fumes which would be exhaled by the furnace and stack during the process. These preventatives having since been carried into effect, the fumes have not, on enquiry, given rise to further complaints, and these works are now returning profits to the owners.
Ditto	Ditto	...	West New Chum Extended G. M. Co., Registered	Complied with	...	...	...	This Company had suspended operations pending the delivery and erection of new steam machinery partly on the ground. The depth of their main shaft was 189 feet.
Ditto	Ditto	..	South West Chum G. M. Co., Registered	Ditto	...	...	...	Depth of shaft 200 feet.
Ditto	Ditto	...	Great Extended West New Chum Co., Registered	Ditto	...	Horse whim	...	There are two shafts: one 260 feet deep, and opened out at 250 feet from the surface; the whim shaft was being sunk from beneath the 140 feet level.
Ditto	Ditto	...	United Chum G.M. Co., Registered	Ditto	...	Certificate by boiler-maker; T.P., 100 lbs. p. sq. inch	...	Erecting steam winding, pumping, and crushing machinery, constructing a capacious reservoir, and 190 feet of a tunnel to connect with the new machinery. New main shaft (10ft. × 3ft. 6in.) 80 feet deep, whim shaft 226 feet. Fine gold was intersected in the shaft at the 225 feet level, where it was being exploited by levels driven on the course of lode.
Ditto	Ditto	...	Ryhope G. M. Co., Registered	Ditto	...	Whip	...	Sinking a main shaft from beneath the 180 feet level.
Ditto	Ditto	...	Band of Hope G.M. Co., Registered	Ditto	...	...	...	Sinking a main shaft from beneath the 150 feet level.
March	Ditto	...	United Chum Extended G.M. Co., Registered	Ditto	...	Whim	...	Sinking beneath the 118 feet level.
Ditto	Ditto	...	Consolidated Chum G. M. Co., Registered	Ditto	...	Ditto	...	Sinking beneath the 140 feet level.
Ditto	Ditto	...	Land o' Cakes G.M. Co., Registered	Ditto	...	Ditto	...	Main shaft one hundred feet deep; driving along the Caledonian reef, which promises to be profitable to work.
Ditto	Ditto	...	Waverley G. M. Co., Registered	Ditto	...	Windlass	...	Not working; shaft 109 feet in depth; in cross-cutting, the Caledonian reef was intersected in favourable country.

Ditto	Ditto	...	Caledonian G. M. Co., Registered	Ditto	...	Ditto	...	There are two shafts, one 180 feet deep, and opened out at 80 and 171 feet respectively. The lode has been met with in both levels, but proved very patchy at that limited depth.
Ditto	Ditto	...	Shamrock G. M. Co., Registered	Ditto	...	Tunnel	...	This is located on a parallel line of reefs with the Birthday, and it had been abandoned for some time. Very probably this and the Birthday and Caledonian reefs belong to one and the same belt here traversing the district.
Ditto	Ditto	...	Golden Era G. M. Co., Registered	Ditto	Applied for and had granted an exemption of Sect. 14, Regulation of Mines Act, 1881, on certain conditions formulated by the Inspector of Mines	Whim	...	This proprietary was originally formed to work for quartz reefs; in extending their operations at the 170 feet level in a north-easterly direction, a black diluvial gravel deposit was met with at a distance of 340 feet from the shaft. This proved to be an auriferous deposit of considerable promise, and to dip over 15 feet beneath the main level; further prospecting fully warrants an expenditure for testing, by means of steam pumping and winding machinery, this "ancient river deposit."
Ditto	Ditto	...	Rock Shaft Alluvial G.M. Co., Registered	Ditto	...	Windlass	...	This Company has sunk a small timbered shaft to a depth of 102 feet through principally a dense black basalt; taking into consideration the close vicinity of the deep ground in the Era Co., the trend of that channel is clearly indicated by the depths attained. Further down the valley these basalts appear to be submerged beneath recent tertiary gravels and mottled indurated clays. The indications are favourable for sub-basaltic pliocene auriferous gravel deposits, probably joining the Back Creek ancient river system or "gutters" in a north-easterly direction. This region deserves every attention of miners and capitalists on account of the very promising prospects of the deep ground disclosed. (*Vide* Geological Report No. 118.)
Ditto	Ditto	...	Pinafore G.M. Co., Registered	Ditto	...	Whim	...	Searching for a quartz reef by means of a tunnel and shaft, as some rich alluvial gold has been found in close vicinity.
Ditto	Ditto	...	Hacket G. M. Co., (Private)	Ditto	...	...	...	A number of prospecting shafts have disclosed a promising auriferous quartz vein, which may ultimately be traced to a reef at a greater depth than 60 feet.
Ditto	Back Creek	...	John Franklin G. M. Co., Registered	Ditto	...	Portable engine, not tested, as necessary parts were wanting	...	Quartz of gold-bearing qualities has been intersected by means of shafts and of tunnels, but they were much disordered, and a heavy influx of water became too strong for present appliances to follow indications.
Ditto	Ditto	...	Australasian Slate Co., Limited	Ditto	...	...	...	These slates were wrought at one time both from open cuttings and tunnels, producing an excellent article at times; for some reason or other they have not been in operation for some years.
Ditto	Ditto	...	Deep Lead G. M. Co., Registered	Ditto	...	Portable engine, not in working order	...	Shallow alluvial gold deposits having been traced up to the basalt, this proprietary started to sink through that rock. Though the indications in the basalt were favourable for deep ground, the machinery proved powerless almost to cope with the heavy water therein encountered. Not working.
Ditto	Lisle	...	Anvil Co-operative G.M. Co.	Ditto	...	Windlass	...	A series of blocks of quartz formed against a wall of "Beresite" have been proved auriferous, but requires more prospecting to ascertain value.

Date.	*Gold.*	*Mineral.*	*Mine-owner.*	*Observance of Regulation of Mines Act, 1881.*	*Special Rules or Exemptions granted or refused.*	*No. of Steam Boilers tested; Amount of Pressure.*	*Diamond Drills: No. of Bores, and Depth.*	*Remarks.*
March	Lisle	...	Defiance Tunnelling Co.	Complied with	...	Tunnel	...	Several irregular quartz leaders, reported as gold-bearing, were intersected in this tunnel; their coming into contact with the metamorphic schists to the east may lead to promising deposits.
Ditto	Ditto	...	Bessell's Tunnelling Co.	Ditto	...	Ditto	...	Have been prospecting western joint between granites and schists.
Ditto	Ditto	...	Lisle Tunnelling Co.	Ditto	...	Ditto	...	This has intersected a tributary of Bessell's Lead, with poor results so far.
Ditto	Ditto	...	Titmus Co., Upper Tunnel	Ditto	...	Ditto	...	Prospecting an auriferous quartzose and feldspathic vein occurring in metamorphic rock; appearances are favourable to better prospects obtainable when in contact with granites.
Ditto	Deu	...	Den Co-operative Prospecting Co.	Ditto	...	Windlass	...	Sinking a shaft for the intersection of, at a lower level, a gold-bearing reef; very heavy influx of water.
Ditto	Beaconstield	...	Beaconsfield G.M. Co., Registered	Ditto	...	Tunnel	...	In driving a tunnel into the Cabbage-tree Range a diluvial gold-bearing gravelly deposit was intersected; also, black-coloured quartz, slightly auriferous.
Ditto	...	Mt. Bischoff	Bischoff Extended T.M. Co., Registered	Infringement of General Rules 20 and 22, Section 11	...	...	...	The solicitors of the Mount Bischoff T. M. Co., Registered, informed the Inspector of Mines of the fences of that Company (which enclosed their railway in order to protect the general public from injury) were being successively broken down or injured by this Company. Proper notice was served on them by the Inspector of Mines, through the post, on the Mine Manager, asking him to refrain in future from such a practice, or else prosecution would follow.
May	...	...	...	...	...	...	Two Diamond Drills were landed at Launceston wharf	These perforators, &c. were packed in 72 boxes, and required considerable time and trouble to get ready for work after checking invoices and effecting some repairs. They were placed in the Ordnance Stores pending the arrival of skilful foremen to take charge from Victoria.
								RECEIVED instructions to proceed to the West Coast to report on the mineral prospects and the permanency of the tin deposits at Mount Heemskirk and its vicinity; also, to observe how the provisions of "The Regulation of Mines Act" were being observed generally.
June 17	...	Mt. Heemskirk District (Tin)	Montagu T.M. Co., Registered	Complied with	...	No steam machinery yet in use here	...	These mines were examined in accordance with special instructions received from the Hon. Minister of Lands and Works, with a view of ascertaining their stability and the probable permanency of the tin deposits in that district, whether lode or vein at deeper levels, and which proved not only satisfactory but very encouraging. The total amount of capital expended by these principal Companies was estimated at £16,000 sterling.
Ditto	...	Ditto	Cumberland T.M. Co., ditto	Ditto				
Ditto	...	Ditto	West Cumberland, Co., ditto	Ditto				
Ditto	...	Ditto	Prince George Co., ditto	Ditto				
Ditto	...	Ditto	Cornwall Co.	Ditto				
Ditto	...	Ditto	Empress Victoria, Registered	Ditto				

			Orient Co., ditto Cliff Co., ditto Montagu Extended ditto	Ditto Ditto Ditto				
July	Campania	...	Campania G. M. Co., Registered	Ditto	...	...	...	This Company is working an almost horizontally-bedded layer of indurated sandstone by means of a tunnel; "blocking" had been commenced in order to supply a battery.
September	...	...	...	...	...	...	Last load of No. 1 Diamond Drill delivered at Back Creek and commenced first bore with this modern perforator in Tasmania, on the 25th September. At end of September 157 feet were drilled.	
Ditto	Beaconsfield	...	Florence Nightingale G. M. Co., Registered	Ditto	...	Two; P. Engine, W. P. 50 lbs. per sq. in., T. P. *(a)* 75 lbs., and *(b)* 84 lbs. per sq. inch. Winding Engine Certificate	...	*(a)* Boiler 23 ft. × 6 ft. 6 in.; *(b)* Boiler 24 ft. × 6 ft. 6 in.
October	Ditto	...	Tasmania G. M. Co., Registered	Ditto	...	Golden Gate P. W. Engine, one boiler: W. P. 45 lbs., T. P. 88 lbs. per sq. in. Crushing Plant: Nos. 1 & 2 boilers, W. P. 40 lbs., T. P. 86 lbs., & No. 3 boiler, W. P. 40 lbs. & T. P. 88 lbs. per sq. in.	No. 1 bore 218 ft. 4 inches; not bottomed, on account of heavy wash of a loose character being forced into drill-hole by water pressure. Prepared for No. 2 bore.	
September	Ditto	...	Eldorado G. M. Co., Registered					
November	Ditto	...	Leviathan G. M. Co., Registered	...	...	One portable engine, W. P. 40 lbs., T. P. 80 lbs.	...	This Company working alluvial and quartz, and crushing same for gold.
Ditto	Ditto	...	Ellis's party	...	...	Ditto	...	Ditto.
Ditto	Ditto	...	Phœnix G. M. Co., Registered	Rails for steps, brace covering bob-pit to be constructed, and doors at surface of shaft	...	Portable Engine; Certificate by maker.	...	Prospecting for a quartz reef at a lower level than where worked before.

Date.	*Gold.*	*Mineral.*	*Mine-owner.*	*Observance of Regulation of Mines Act*, 1881.	*Special Rules* or *Exemptions granted* or *refused.*	*No. of Steam Boilers tested; Amount of Pressure.*	*Diamond Drills: No. of Bores, and Depth.*	*Remarks.*
							Nov. 11, No. 2 or Under-ground Diamond Drill landed at Beaconsfield	
November	Beaconsfield	...	Leviathan, Dundee, Garfield G. M. Cos., and Ellis's party	Notices served to provide books recording weekly examinations of mines by M. Managers of Mines and Machinery—General Rule (xxrv.), Sect. 11 Regulation of Mines Act, 1881	...	...	...	In all these cases a first and only warning was given to the Mine Managers in regard to this important portion of "The Regulation of Mines Act, 1881."
Ditto	Ditto	...	Nil Desperandum G. M. Co.	...	...	P. Engine, W.P. 40 lbs., T.P., 49 lbs.	...	Crushing alluvial gravels for gold.
December	Saxon's Creek	...	Saxon's Creek Copper M. Co.	...	...	Tunnel.	...	Prospecting a promising cupriferous formation in quartz.
							19th December, Started to drill with No. 2 Drill at Leviathan Company's Mine, Beaconsfield.	
Ditto	Ditto	...	Asbestos M. Co.	...	...	...	...	Prospecting for Asbestos deposits in Serpentine.
Ditto	Ditto	...	Port Lempriere Iron Co.	...	...	...	...	Mining Limonite and Hematite *cum* Chromium; this is a very valuable deposit, deserving every notice.
Ditto	Beaconsfield	...	Port Phillip G. C.	...	...	Waterwheel, (25 h. p.)	...	Crushing alluvial auriferous gravel.
							Total depth bored—Diamond Drill No. 1—879 ft. 6 in., ditto No. 2, 20 feet.	

NOTE.—About Sixty Mines and Machines have been dealt with in this Appendix.

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

APPENDIX C.

To all persons, whether Contractors or not, employed by "The Gold Mining Company, Registered."

ALL persons employed by the above Company are engaged subject to the following Rules and Conditions :—

1. All persons employed, except Contractors, shall be deemed to be engaged by the Shift only.

2. All persons employed, whether Contractors or otherwise, shall be subject in their work to the control of the Company's officers for the time being.

3. The Company will not be responsible to individual members of contracting parties for moneys due on account of work and labour done other than to the person or persons whose name or names may appear in the Company's accounts as the recognised heads of contracting parties.

4. In accepting employment, you consent to be searched at whatever time the Directors or Manager of the Company may think proper, and if any unmanufactured gold or other ore is found upon your person, it shall be deemed the property of the Company ; and the Company shall be at liberty to take proceedings against you in any Court of Justice.

5. If any property belonging to the Company shall be destroyed through your carelessness, you shall be liable for the value of the property so destroyed, or to the full amount of wages that may be due to you.

The following working signals to be used :—

For WINDING—

1	shall signify	**Heave up**
1	,, (when the cage is in motion)	**Stop**
2	,,	**Lower**
3	,,	**Speak**
3 & 1	,,	**Men coming up**

For PUMPING—

4	,,	**Work**
4	,, (when pumps are working)	**Stop**
5	,,	**Slower**
6	,,	**Faster**

For CHANGING LEVELS—

4 & 1	,,	**No. 1 Level**
4 & 2	,,	**No. 2 Level**
4 & 3	,,	**No. 3 Level**

To Engineers or Drivers.

6. Before taking charge for the Shift, you shall examine well all machinery and boilers committed to your care ; and should you observe any defect you shall report the same to the Manager immediately, so that the defect may be remedied at once if necessary ; and the engine-man, before being relieved, shall communicate to the one taking charge anything he may have noticed necessary to be known.

7. The safety-valves and water-guages are to be particularly attended to during your Shift ; and, without the authority of the Manager or the Engineer, you shall not allow any person to interfere with the engines, or any machinery connected therewith.

8. The braceman shall daily inspect the ropes, chains, and shackles used for hauling ; and if found faulty in any respect you are to report the same to the Manager immediately, and prevent any one from using that rope until the requisite repairs are made.

9. You shall pay due attention to the shaft signals, and if they should not be rung distinctly you shall neither raise nor lower the cage until they are rung so as to be clearly understood.

10. You shall, on no pretext, leave the brake of the engine while the cage is in motion, neither shall you wind up or lower fast while men are on the cage. No conversation allowed while the cage is in motion.

11. Should the signal "stop pumping" be given, you shall not again start the engine until the pumps are either disconnected or the signal "start the pumps" is rung.

12. No person is allowed to descend the mine without permission from the proper authority ; and it is the duty of the braceman or engine-driver, in the absence of Manager or other person in charge, to see that this rule is attended to ; and that no one is allowed to go down, or be employed in any way about the Company's works, while in a state of intoxication.

To Miners and others.

13. While working three Shifts of eight hours, you shall not leave your place of work until relieved; you shall then report the condition of the face to those relieving you, pointing out any source of danger; and if there are missed holes, those who may have charged them shall give notice of the same to the relieving Shift.

14. You shall ring the signals distinctly, so that the engine-driver may clearly understand them.

15. When ascending or descending the mine, you shall keep yourself straight and well within the cage, and on no account shall you lean over the winding shaft from the levels, or attempt to get on or off the cage while it is in motion.

16. The number of persons allowed to ascend or descend the shaft in one cage shall not exceed four (4), and any one transgressing this or any of these rules shall be liable to be immediately discharged.

17. All tools are to be securely placed in a truck while passing up or down the shaft, and you shall not ascend or descend the shaft in the same cage as the tools.

18. All persons employed in the works are enjoined to use every precaution against accident or unnecessary risk; and in all cases where any doubt or unusual difficulty arises in any part of the work, the Mining Manager or Captain of the Shift in charge for the time being must be immediately informed thereof.

19. Every miner shall be held responsible for the safety of that part of the mine in which he is employed, and shall be careful to run no unnecessary risk from baulked or dangerous ground, or from want of timber.

20. Two sets of iron dogs shall be used in each drive for supporting the timbers next the face, and should you neglect to use the same you will be discharged without notice.

21. Under no circumstances will any one be allowed to draw out any timber without the consent of the Mining Manager.

22. Should any accident, loss, or casualty occur through your neglect or carelessness, you will be discharged, and disqualified from further employment.

23. It will be the duty of the bracemen and platmen to give all the signals required in the working of the shaft, and in no case whatever will any one be allowed to give the signals unless authorised to do so by the Engine-driver for the time being.

24. No intoxicating drink shall be taken down into the mine without the permission of the Manager or person in charge, who will only give such permission in case of necessity; and no person will be allowed to descend the mine, or remain on the works, in a state of intoxication; and the braceman for the time being will be held responsible for allowing any man to descend the mine in such state.

25. Every person employed will be required to sign the Roll-book of the Company, binding himself to abide by the foregoing Rules and Regulations.

By order of the Board of Directors,

Manager.

APPENDIX D.

CIRCULAR.

Inspector of Mines Office, Launceston, January, 188 .

SIR,

I HAVE the honor to inform you that the undersigned has been appointed by the Hon. Minister of Lands and Works, under the Regulation of Mines Act, 45 Vict. No. 8, 1881, Section 5, to receive certified copies of plans and sections of your mine wherein operations have been carried on during the year 188 .

The uniform scale of 4 inches to 100 feet has been adopted for these plans and sections.

These drawings, it is requested, shall indicate by means of arrows the direction, as nearly as possible, in which the richer deposits are trending, and have been subjected to exploration.

These exhibits shall comprise the following:—plan, longitudinal and cross sections; and they are due at this office during the present month.

I have the honor to be,
Sir,
Your obedient Servant,
G. THUREAU, *F.G.S., Inspector of Mines.*

WILLIAM THOMAS STRUTT,
GOVERNMENT PRINTER, TASMANIA.