

1884.  
NEW ZEALAND.

## CONTROL AND INSPECTION OF MINES

(REPORT ON).

*Presented to both Houses of the General Assembly by Command of His Excellency.*

To the Honourable WILLIAM ROLLESTON, Minister of Mines.

SIR,— Mines Department, Wellington, 20th June, 1884.

I have the honour to forward you the general and detailed reports on the inspection of mines, under "The Regulation of Mines Act, 1874," for the year ending the 31st December, 1883.

I have, &c.,

JAMES MCKERROW,  
Secretary for Mines.

The Hon. the Minister of Mines.

### REPORT.

#### COAL MINES.

THE rapid and progressive development of the coal-mining industry in the colony demands continual watchfulness on the part of the department to see that the workings of the various mines are conducted with due regard to a proper system of ventilation and other precautions in the interests of the safety of those daily engaged in them.

As by far the most valuable and extensive coal fields belong to the Crown, it behoves the Government to see that they are worked on a systematic principle, so that there may be no waste, and that the mines may be opened out so that the largest percentage of coal may be taken from the seams that it is possible to obtain.

As the mines get developed by an extension of their workings their ventilation becomes more intricate, and requires minute inspection to guard against the accumulation of noxious gases and spontaneous combustion. The efforts of the Mines Department in this direction have so far been successful, and it is both satisfactory and gratifying to state that proprietors and those intrusted with the management of mines show their ready acquiescence by co-operating with the Inspectors whenever necessity requires them to do so.

All the principal mines in the colony have been periodically inspected, and those that have demanded particular attention have been attended to by Mr. J. McLaren in the North Island, in conjunction with his other duties as Mining Inspector under "The Gold-Mining Districts Act, 1873;" and Mr. G. J. Binns and Mr. S. H. Cox have inspected those in the Middle Island. The latter gentleman fulfilled these duties satisfactorily in conjunction with those of Assistant-Geologist of the Colony, but he has recently resigned both appointments owing to his departure to occupy an official position in New South Wales.

The only mine in the North Island requiring special attention during the year was the Taupiri Mine, near Huntly, which was partially flooded, owing to the ground having given way at the end of one of the bords that had been driven a little too far under the edge of a swamp; but this accident fortunately produced no serious results to the workmen, nor permanent damage to the mine.

In the Middle Island Mr. Binns has devoted a great deal of time and attention to the workings in the Shag Point Mine, near Palmerston, which, unfortunately, had to be closed in February last, owing to the large influx of water that percolated through the covering of the coal in the sub-marine workings. Inspectors have, in the case of those mines subject to inundation, fire, emissions of gas, or other causes endangering life, a difficult task to perform: on the one hand, they are naturally anxious to see the coal mines developed; but, on the other hand, they incur a great responsibility if they allow mines to be worked when there is imminent danger.

The Kaitangata Mine, near Balclutha, has likewise received a deal of attention from Mr. Binns, on account of its fiery nature, and being liable to spontaneous combustion, which requires careful and minute inspection to see that there is a constant supply of fresh air passing through every portion of the workings, and that the vitiated air may be conducted to a proper upcast. One of those spontaneous outbursts has recently occurred, but, fortunately, no lives have been endangered by it, and it is to be hoped that the steps taken to subdue the flames will be successful.

Much attention has been directed to the ventilation and working of fiery mines in Great Britain by able and scientific men, who have done a great deal towards improving the conditions of safe working. It will be of interest to quote the remarks of Mr. Wardell, one of Her Majesty's Inspectors of Mines for the United Kingdom, on ventilation, as taken from his report published in the *Colliery Guardian* on 3rd August last:—

In all previous reports I have more or less offered observations and suggestions on the subject of ventilation, and other kindred topics so important to the safe working of mines. Those opinions are still held good, and the various recommendations from time to time brought forward apply with equal force now. For instance, an abundant sectional area, allowing the air every possible facility in transit, with a minimum of friction, has been always advocated, and, as a general principle, is not only admitted, but is being acted up to, with, I think, marked improvement year by year. Other aids and auxiliaries must be, as such, carefully attended to; but such aids, on the one hand, and capacious courses, on the other, unless accompanied by one or the other, are worthless and worse than vain. I think this fact is becoming more and more widely understood by the workmen themselves, as well as by those in charge, and there can be little doubt but that advantage and increased safety will accrue from this extended knowledge. Incautious methods of lighting mines and blasting no doubt still are practised in many cases, and I must again, as formerly, express my disapproval of such systems as admit of the use of naked lights in seams giving off gas, or of the promiscuous mixing of candles and safety-lamps, and yet further the simultaneous use of safety-lamps with gunpowder. The adequate ventilation of a mine is of the highest importance, but this is not to be obtained to the exclusion of equally important measures. An explosion is not necessarily the effect of a defective ventilation. Many accidental circumstances arise in the shape of unexpected outbursts and "blowers" of gas, which in a moment fill the workings. The suddenness of these discharges, with the enormous pressure at which the gas is evolved, render the best ventilation for the time being powerless, and it is at such times when an open light or a defective lamp may furnish the cause perhaps hastily ascribed to lack of adequate ventilation. Here, in this district, several instances have occurred during last year, as in, I think, nearly every other year reported on, where, but for the most perfect state of the safety-lamps in use, and the rigorous discipline maintained, the death-roll I have to record in this report would have presented a very different aspect. The fact that these "outbursts" have passed off without causing loss of life may be fairly looked upon as an encouraging sign, from which may be deduced the belief that not only do those in authority more fully appreciate the necessity for enforcing a constant vigilance and strict attention to rules, but also that those who are employed as workmen themselves more completely realize with a growing intelligence that, in co-operating to maintain such caution and observance of rules, they are in the surest possible way promoting their own safety. A safety-lamp of the most perfect known description is, under such conditions as those mentioned above, amongst others an absolute necessity for the preservation of life. No one is able to foretell these outbursts, but the fact of their having occurred over and over again without leaving behind a record of death is the best and most convincing proof that loss of life need not necessarily follow in their train. There are certain precautions which ought to be, and in these cases were, taken, which at any rate reduce to a minimum the risk attending sudden issues of gas. I am as far from saying or believing that all or even the larger proportion of explosions occur from an ignition of gas produced by an outburst as I am from holding an opinion that ventilation is a matter of no material consequence. I wish to be clearly understood that in instancing explosions of the above class I do not in any way detract from the necessity of ventilation any more than I advocate the use of safety-lamps without concurrent precautions. I believe both to be

essentially necessary in all fiery collieries, and if employed together, being coupled with a reasonable and vigilant care, they diminish considerably the chances of explosion. Most truly it may be affirmed that to effect this diminution the aid of nearly every contrivance or scientific invention devised has been brought to bear, and is, where practicable, in operation. Gas, where known to exist, and where it is met with almost daily exuding from floor, or roof, or sides, can be dealt with, except in the extraordinary cases of outburst, by providing sufficient air to mix with it and render it harmless; for light carburetted hydrogen will, if combined with a certain proportion only of oxygen, reach a point at which contact with flame would produce an explosion: the aim therefore must be to have such a quantity of air as to have no narrow margin beyond such proportion, and to let it be too much in volume rather than too little. All working-places should, and must, be, according to the rules, examined before their occupants commence work. This examination is made at each colliery by a staff of deputies, and should be of a very searching description. Moreover, it should be made in each case within as short a time as is reasonably practicable of the commencement of operations by the miner. In every case, both in fiery and non-fiery mines, this precursory inspection is to be made with safety-lamps. The men to whom is intrusted this duty are supposed to be selected from their fellow-workmen as steady, careful, and experienced; and indeed this is necessary, for upon their competency and attention depends, perhaps more than upon anything else, the safe working of the mine. The mark left in every man's working-place by the deputy is his voucher of examination, and the workman's authority to begin his work. This voucher refers of course to the time at which such examination was made, and can be no guarantee that the safety then existing will continue. Many circumstances not under control, or the workman's own neglect and carelessness, might and probably would convert a position of comparative safety into one of peril. A faithful and strictly accurate report of what he has found in the course of his inspection constitutes a very important item in the deputy's duties, and this is to be recorded daily in a book. I impress on this class that, so far as gas is concerned, their report must contain mention of all and any which they find, no matter how small in quantity, and no matter whether removed at the time or not. The rules require any gas found to be reported, hence it is a mistaken idea, as I have had occasion to point out to some deputies, to suppose that if they find a very little gas, which, by putting up a sheet at the time or by some other easily effected means, is removed before they leave, then no entry concerning the same need be made. It must be remembered that to a great extent those who have the control and guidance of mines must depend upon the reports of subordinate officials, who, in consequence of their number, are able to visit all districts of a mine, and so steps can be taken to insure, so far as may be, the workings being carried on with safety. Objections have been raised by some people to the employment of any deputy who cannot read or write. It is quite true there are many such, but I should be very sorry for the most part to debar them. They are, generally speaking, otherwise better qualified for their position than many who can do both, being practical men of great and varied experience in all the duties incumbent on their office. The reports in such cases should be dictated by themselves personally, then read over to them, and then they should affix their mark in the presence of a witness. As education spreads, however, this class of deputy will die out, the proportion even now being nothing like so large as formerly of those who are unable to write their own reports. Air-courses should be attended to, all brattice or air-pipes, or boxes and sheets, carefully watched, as well as stoppings and doors, the latter of which should be hung so as to fall to of themselves. Air should sweep round every place. No holes or hiding-places must be allowed to remain, where the insidious gas can lurk. The main roads only are not to be supplied with air, to the neglect of other places. Air will naturally travel by the shortest and most direct route available, and therefore it is necessary to conduct it by artificial means through the ramifications of a colliery, in order that a pure and sufficient current be taken to all persons at work, and noxious gases diluted and removed. Where furnaces exist as means of ventilation, let them in every case be fed with fresh air, and on no account should the return air be allowed to pass directly over the flames. For many reasons I prefer fans in fiery collieries, and I am thankful that such mechanical appliances are yearly increasing in number, so that in mines where safety-lamps exclusively, under the strictest supervision, are allowed, the anomaly of a large open light, even upon the very best principle of construction, is less frequently met with. In addition to the careful examination of the workings before men go to work which I have alluded to, the deputies and others in charge must maintain a strict supervision during the working-hours in all air-ways, working-places, and travelling roads, and over all things relating to the safety of the workmen. It is yet left for me to remind the workmen that attention to all the above matters on the part of those in authority will be of no avail whatever unless they themselves, on their part, do all that in them lies to co-operate for the common safety by obedience to rules and a proper exercise of ordinary care and judgment. I do not believe myself that the use of safety-lamps engenders inadequate ventilation: at least my experience does not teach me so. If safety-lamps are rejected where they ought to be used, those who act with such recklessness would equally disregard ventilation, and if any person detects fire-damp in his working-place he is obliged by the rules to cease working. The use of the safety-lamps and adequate ventilation, it must be repeated, produce in combination what either alone cannot. The best ventilation possible may be upset and utterly disarranged in a moment in the simplest way: a sudden outburst, the leaving open of a door, disarrangement of a brattice-sheet, or temporary neglect of the ventilating power may each and all effect this, and a naked light might then produce an explosion. The term 'adequate ventilation' is somewhat vague, and bears different interpretations by different managers, but sufficient should be provided to dilute gases and render them innocuous.

It will be seen from the above that Mr. Wardell prefers a fan for ventilating fiery mines, and impresses strongly the necessity of not allowing the vitiated air to come in contact with the flames where furnaces are used. He likewise considers

blasting with powder very unsafe in a fiery mine. In last year's report Mr. Cox referred to compressed-lime cartridges, manufactured by Messrs. Sebastian Smith and Moore, as an agent to bring down coal in lieu of explosives. This new agent has been tried at Shipley Collieries, and Mr. Bell, one of Her Majesty's Inspectors of Mines for Great Britain, in an extract from his report published in the *Colliery Guardian* in August last, says,—

The use of compressed-lime cartridges, the invention of Messrs. Smith and Moore, of Shipley Collieries, for the purpose of bringing down coal, in place of gunpowder, has been extensively tried during the past year, and bids fair to become a success. All experiments that I have witnessed have given entire satisfaction, and several of the owners of our fiery mines have laid out their works for its exclusive use. The only difference hitherto experienced is the want of a constant supply of cartridges. The patentees, I believe, have not yet got machinery sufficient at work to supply the demand. There does not appear to be any more labour in preparing the coal for blowing down for the lime process than is necessary for the use of gunpowder; besides, the lime produces from 10 to 15 per cent. more merchantable round coal, which of itself ought to be an inducement for its general adoption. Then we have the all-important fact that there is no flame given off, and it can be used next to goaves where there is gas without the least danger of explosion.

From the account given of this material, and the percentage of round coal it gives above blasting in the ordinary manner with powder, ought in itself to recommend it, especially in some of the mines where there is a large percentage of soft coal.

It will be seen from Mr. Binns's report on the workings of the Coalpit-Heath and Wallsend Mines at Brunner-ton that a deal of gas exists, and that safety-lamps have to be used in the dip-workings of the former mine. This no doubt will add to the cost of getting coal with naked lights, but, under the circumstance that a slight explosion occurred in this mine recently and that a man was slightly burned, the proprietors will no doubt see the necessity of complying with the Inspector's request, until they get their workings better ventilated by artificial means.

#### QUARTZ MINES.

Quartz-mining is becoming every year of more importance, not only with regard to the number of new mines that are opened up, but the workings are gradually becoming deeper and more intricate, requiring a well-defined method of ventilation, and considerable experience in timbering and filling up the ground as the quartz lodes get worked out. Noxious gases are not so common in quartz workings as they are in the coal measures, yet in some places where the ground is thickly impregnated with iron pyrites their decomposition causes the emission of large quantities of gas from the fissures in the strata; but the system of timbering that is required in main levels, passes, and stopes in order to work the lodes with perfect safety require a considerable amount of skill and careful supervision to see that the work is executed in such a manner as will best secure the safety of the workman and prevent the ground from breaking down.

The large quantities of dynamite and lithofracteur used in these mines, and the careless manner in which these explosives are handled by some of the workmen and mine managers, renders it necessary for the provisions of the Regulation of Mines Act to be strictly enforced. The quartz mines in Westport District are the only mines that have been brought under the Act, and some of the companies felt at first disinclined to comply with the whole of its provisions, inasmuch that it required certain works to be done that they hitherto had not been accustomed to do, and it limited the quantity of explosives that they had been in the habit of taking into the mine. They likewise felt aggrieved that the Act was brought into force in their district only, and this prevented them from readily acquiescing in its introduction. They are, however, now satisfied that the precautions taken are necessary to insure the safe working of the mines and to guard against accidents occurring to any of the workmen. The inspection of these mines has been attended to by Mr. H. A. Gordon, in conjunction with his other duties as Inspecting Engineer of Works on Gold Fields.

#### STATISTICS.

It is satisfactory to find that the coal-mining industry is making rapid and steady progress year by year, and will no doubt continue to do so as the mines get developed, until the production reaches at least the consumption within the

colony. The amount of imports during 1883 has been 6,042 tons less than the previous year, while the production of coal from the mines of the colony during the same period has increased 43,492 tons. Taking the total imports for 1883, which have been 123,540 tons, and the total output from the mines in the colony for the same period, viz., 421,764 tons, it makes a total of 545,304 tons; of this amount, 7,172 tons have been exported, which leaves the consumption of coal within the colony during 1883 to be 538,132 tons, against 503,609 tons during the previous year: thus showing the increase over the consumption of 1882 to be 34,523 tons. The following table shows the progressive increase in the output, and the corresponding decrease in the amount imported into the colony, during the last six years:—

Year.	Coal raised in the Colony.		Coal Imported.		
	—	Yearly Increase.	—	Plus or Minus.	Increase or Decrease.
	Tons.	Tons.	Tons.		Tons.
1878 ... ..	162,218	...	174,148	...	...
1879 ... ..	231,218	69,000	158,076	—	16,072
1880 ... ..	299,923	68,705	123,298	—	34,778
1881 ... ..	337,262	37,339	129,962	+	6,664
1882 ... ..	378,272	41,010	129,582	—	380
1883 ... ..	421,764	43,492	123,540	—	6,042

The number of mines at work in 1882 was 96, and the number now standing on the list is 99, or 3 more than the previous year. The following table shows the number of mines, the number of men employed, and the output of coal during 1883:—

Number of Mines.	Number of Men employed in each Mine.	Total Number of Men employed.	Output of Coal in Tons.	Output in Tons per Man.
64 mines ... ..	1 to 4 men each ...	126	25,627	206
6 mines ... ..	5 to 10 men each ...	48	19,825	413
7 mines ... ..	11 to 20 men each ...	84	24,897	295
20 mines ... ..	21 men and upwards ...	991	351,415	354
2 mines ... ..	No men employed.			
99 mines ... ..		1,249	421,767	

By analyzing the above table it will be seen that there are 64 mines, in which 126 men are employed, producing 206 tons of coal per man per annum; while the total number of men employed in all the mines have produced 338 tons per man per annum. It should be explained that a considerable number of the 64 mines are merely lignite quarries, from which coal is dug out at certain seasons of the year for local consumption only. If these are deducted the average output per man amounts to 353 tons.

In some of the mines there is a large number of men employed at dead-work, as in the case of the Wallsend Mine, at Greymouth, where there are 50 men engaged at erecting machinery and sinking a shaft, and have produced no coal during the year. Yet, nevertheless the mines in their present state of development compare in their output not unfavourably with those in the United Kingdom, whose output per man during 1883 amounted to 346 tons, or only 8 tons per man more than the output from the mines of the colony.

The total average number of men employed in the coal mines in 1882 was 1,043 and 1,249 in 1883, being an increase of 206 men over the number employed in 1882. The Return No. 1, following the Appendix, shows in detail the number of men employed, and the output of coal from the various mines, together with other information; and Return No. 3 contains a statement by the Secretary of Customs of coal imports and exports during the year 1883. The following is a summary of the output of coal from the several mining districts, showing the comparative increase and decrease for the years 1882 and 1883, together with the total approximate amount of coal produced since the mines were opened:—

Name of District.	Output of Coal.		Plus + or Minus —	Increase or Decrease 1883.	Approximate Total Output of Coal up to 31st December, 1883.
	1882.	1883.			
	Tons.	Tons.		Tons.	Tons.
Kawakawa ... ..	41,484	29,271	—	12,213	517,181
Whangarei (Kamo and Whauwhau) ...	26,062	25,198	—	864	95,140
Waikato ... ..	28,605	38,293	+	9,688	182,300
Pelorus ... ..	11	100	+	89	236
West Wanganui ... ..	1,180	2,900	+	1,720	11,132
Westport (proper) ... ..	48,544	39,297	—	9,247	123,127*
Reefton ... ..	2,827	2,533	—	294	21,577
Greymouth (proper) ... ..	63,053	86,074	+	23,021	401,286
Malvern ... ..	27,036	32,780	+	5,744	151,035
Timaru ... ..	140	292	+	152	432
Otago ... ..	129,476	149,296	+	19,820	986,523.
Southland ... ..	9,854	15,730	+	5,876	34,320
Total ... ..	378,272	421,764	+	43,492	2,524,289

The total quantity of coal produced from the North Island mines during 1883 was 92,762 tons, against 96,152 tons during the previous year. The falling-off in the yield is from the Bay of Islands (Kawakawa) and Kamo Collieries: from the former the decrease in the yield amounts to 12,213 tons, and from the latter, 2,807 tons; but the increase from the remaining collieries amounts to 11,630 tons, which makes the total decrease from the mines in the North Island to be 3,390 tons.

In the Middle Island there has been a great falling-off in the yield of the Banbury Mine at Westport, being 13,351 tons less than the previous year. This may be accounted for by the erection of machinery and endless-chain haulage and different works that the company have constructed during last year to work their mine on a more extensive scale. When they have their tramways and other works completed to the main seam known as Coalbrook Dale, the output will no doubt be greatly and permanently increased. The principal increase during the last year has been—From the Brunner Mine, Greymouth, 23,845 tons; the Kaitangata Mine, Balclutha, 15,027; the Fairfax Mine, Southland, 11,634 tons; and from the Homebush Mine, Malvern, 7,562 tons. The other principal mines have come up to the output of 1882, and a number of them show a slight increase. The output of the different descriptions of coal that have been raised in the colony are as follow:—

Name of Coal.	Output in 1883.	Approximate Total Output up to 31st December, 1883.
	Tons.	Tons.
Bituminous ... ..	156,542	1,052,726
Pitch ... ..	90,029	427,734
Brown... ..	161,058	985,268
Lignite ... ..	14,135	58,561
Totals ... ..	421,764	2,524,289

The Springfield Coal Company, referred to in last year's report as having ordered a diamond rock-drill from Australia with the view of prospecting for coal of a better quality, has now got it at work. The Manager (Mr. O. G. Parker) states that the drill works very satisfactorily, and that they have bored two holes with it, the first one being 300ft., and the latter 664ft., and have found two workable seams of coal. The Government granted this company a subsidy towards the purchase of this drill, for the purpose of encouraging prospecting in that part of the colony; and it is now gratifying to know that it has so far been very successful.

## ACCIDENTS.

The number of accidents in coal mines during the year 1883 has been double that which occurred in 1882, the numbers being respectively seventeen and eight; but out of these seventeen accidents three of them were of a trivial nature, and only two of them terminated fatally: one at Shag Point Mine, when a man named Peter McAnally lost his life by a fall of dirt on the 17th of March, 1883, and was alluded to by Mr. Cox in his last year's report; and the other case was that of G. McIvor, who lost his life in the Brunner Mine by a fall of coal on the 27th November last. At the Coroner's inquest on the latter case the jury returned a verdict of accidental death, and desired it to be recorded that no blame could be attached to the management of the mine. A list of the accidents is published in Return No. 2 following the Appendix hereto.

In addition to the number of fatal accidents included in Return No. 2 there was one during the past year which, although not occurring in or about a mine, was nevertheless connected with the surface workings of one. The case referred to occurred on the Westport Colliery Company's incline, where a boy named Daniel Wouldes met his death, but in what manner no one has been able to ascertain. The last time he was seen alive was getting into a wagon about to ascend the incline.

The number of accidents occurring in or about the mines has been 1 for every 73 men employed, or 1 for every 24,809 tons of coal produced; and the number terminating fatally has been 1 for every 623 men employed, or 1 for every 210,882 tons of coal raised. This compares favourably with the casualties in the mines in the United Kingdom, where during 1883 there was 1 life lost for every 559 men employed, or 1 life for every 169,605 tons of mineral produced.

## CONCLUSION.

In opening out the mines of the colony those engaged in that work have the proven experience of older countries to draw upon in developing them on safe and systematic modes of working, as, although in each country there are slight differences in the circumstances, yet in the main there is much in common, such as ventilation, the use of explosives, the different systems of haulage, the various plans adopted in sinking deep shafts where drifts and large bodies of water have to be encountered: so that in any difficulty arising from these causes there are good precedents to follow.

The nature of under-ground workings is fraught with danger more or less to those engaged in them. Every practicable safeguard, therefore, should be taken, in the interest of life and health. No one can be identified with this department without feeling the great responsibility that rests on its officers in seeing that the provisions of the Regulation of Mines Act, and special rules made thereunder, are rigidly enforced: any faultiness in method or negligence in complying with regulations may lead at any time to a great disaster, such as unfortunately have been but too common in Great Britain, but from which happily the colony, with the exception of one unfortunate case, has hitherto had a complete immunity.

Notwithstanding the official precaution and care that is taken to see that every effort is made to secure the safety of the miners, it is astonishing to find at times the gross carelessness of some of themselves, especially in quartz mines, where, as is referred to in Mr. Gordon's report, large quantities of dynamite and dynamite caps were found in the main tunnels and passes in the mines, where workmen were constantly passing to and fro. These caps contain the most dangerous of all compounds, namely, the fulminate of mercury, requiring to be handled with the utmost care, as the slightest friction causes them to explode. It behoves the whole of those engaged in these pursuits to not only use every means of precaution themselves, but to render every assistance and information to the Inspectors of Mines that they are able to give, in order that nothing may be left undone to improve the conditions of safety.

J. MCKERROW.

## APPENDIX.

## No. 1.

## ANNUAL REPORT UPON INSPECTION OF COAL MINES, NORTH ISLAND DISTRICTS.

Mr. Inspector McLAREN to the UNDER-SECRETARY for MINES.

SIR,—

Inspector of Mines' Office, Thames, 3rd June, 1884.

I have the honour to forward statistics for the coal mines within my districts, for the year ending the 31st December, 1883. As I recently visited these mines, I bring my report up to date.

Since my last yearly report I have only one accident to record. It occurred to a miner named John Wilson on the 8th February last, at the Kamo Mine. It appears he was working in the old or No. 1 dip, where the roof has generally been very bad: the manager, therefore, had it close-timbered up to the face, so close that the man could hardly use his pick; but this close-timbering, which was done to prevent accident, was in this case the cause. A small piece came from the roof and face on to his shoulder; he jumped back to clear it, but, the prop behind preventing this, he fell sideways and broke his leg above the ankle. It was not the small piece that came away, but the awkward position in which he fell, that snapped the bone.

The total output of coal from all the mines is slightly less than the previous year, being 92,761 tons 10cwt., against 96,151 tons 10cwt. in 1882.

1. *Taupiri Colliery, Huntly*.—I visited this mine on the 17th of May, and found the ventilation much improved, through the manager, Mr. Collins, having sunk a fresh air-shaft. The workings were generally in good order, and every care appears to be taken for the safety of men, the company having now wisely granted Mr. Collins an underviewer, which was a very necessary thing to do where so many men are employed. The timber dams that were constructed in the three bords off the west leading to keep out the drift from under the swamp, which had broken in in November last, I found were acting well, and there is no appearance of further danger from that quarter: the hole made from the surface, where the ground had caved in, has been filled in with clay, rendering it still more safe. There is no intention at present to try and win coal from under the swamp towards the river. The machinery is in good order: the hauling-engine is a new one of 12 horse-power nominal working up to 18 horse-power; the pumping-engine has been put in good repair, new valves and seatings having been fitted in. The output from this mine continues to steadily increase: in 1882 it was 25,381 tons; last year, 33,289 tons 10cwt.

2. *Waikato Colliery, near Huntly*.—I visited this mine on the 16th May and found the workings in good order; the ventilation was also good. A well-finished plan of the mine and old workings has just been completed from a fresh survey, which appears to have been carefully and accurately made. An improvement has been made in the mode of filling the barges on the river. Instead of throwing the coal through a shoot from a height into them, a steam crane has been erected, which lifts the mine trucks off the wheel frame into the barges, which are conveyed to Mercer to be tipped into the railway boxes for conveyance to Auckland. This saves handling and, as far as possible, prevents the coal from being broken small, which is very necessary with coal of such a friable nature.

3. *Whauwhau Colliery, near Whangarei*.—The output of this mine has increased from 4,800 tons in 1882 to 6,743 tons in 1883. With the view of having a still larger output a self-acting incline is being constructed in the mine, extending from near the end of the main tunnel through the fault to the rise. The length of this incline is 320ft., and will greatly facilitate and cheapen the output. At the date of my visit (22nd May) the air in this new portion of the mine was far from being good, but I expect this will be remedied when the arrangements in progress are completed. The workings in the older portions are in good order, and the ventilation fairly good.

4. *Kamo Colliery, near Whangarei*.—The new shaft has been completed, and the chambers cut and timbered, but little has as yet been done towards driving the levels. Until the siding from the railway is constructed it will not be profitable to place coal in the market from this shaft. The depth of this shaft, which only goes down to the top seam, is 221ft.; its size, 15ft. x 6ft., divided into three compartments, two for hauling or raising coal, and one for pumping: it is strongly timbered throughout. The poppet-heads are 57ft. in height, which will give ample room for hoppers, screens, &c. Steam is obtained from two Cornish boilers, each 25ft. 6in. x 6ft. 6in. The pumping-gear is driven by a 12-in. cylinder engine, having a 2ft. 6in. stroke: the pump stroke can be varied from 3ft. to 7ft.; the pumping barrel is 10in. in diameter; the winding engine is 18in. in diameter, having a 3ft. stroke; the ropes are flat hemp, passing over 6ft. pulleys at the poppet-heads; the cages are hooded, and work in the shaft with three guides. At the date of my visit (21st May) all the output was from the new or No. 2 dip: the workings there were safe, but the ventilation was far from being good; the tangye pump was, however, not working at the time, and the manager assures me that when working the air is quite different, which, from the steam pipes leading to it being placed down the upcast-shaft, is sure to be the case.

5. *Kawakawa Colliery, Bay of Islands*.—I visited this mine on the 28th and 29th May. There is nothing special or new to report in regard to it. A little coal is being won from the dip, but the principal output is from that part of the mine lying towards what is known by the name of "Moody's outcrop:" towards this, from No. 2 level, a self-acting incline tramway has been constructed, 300ft. in length. On account of the great distance of this part of the mine from the



furnace upcast, great difficulty was found in ventilating it, the air being generally very bad. To cure this Mr. Moody (the manager) sunk an air-shaft 120ft. deep on to the coal, with good effect, the air now being nearly all that could be desired; in one or two places, however, it required a little guiding toward the faces where the men were working. The roof is very bad in several places in this part of the mine, being broken and jointy, but every care is being taken to prevent accident by close-timbering. All other working parts of the mine are in good order.

Since last year there have been no new mines opened up, but coal has been found and prospecting operations are now being carried on in several places.

It was reported that operations were about to be resumed at the Miranda Mine (late Foot's), but on inquiry I found the statement to be premature. On the private property adjoining that of the Miranda Mine boring operations have been going on for some time, but I have not heard the result. Coal has also been found on private property at Hunua, near Papakura, which is now being prospected. Coal has also been found on, I believe, Native land at Mokau, on the West Coast; also on Government land on the Ohinemuri Gold Field, between Paeroa and Mackaytown, near the foot of the range. This coal was found as far back as 1875, but till now nothing has been done to test it. A number of shafts have recently been sunk and borings made, proving, I understand, there are three seams: two of these are small, but the third is about 5ft. thick. This (brown) coal has been tested by Mr. Pond, analyst, Auckland, who gives the following analysis: Fixed carbon, 45.03; hydrocarbon, 30.57; water, 17.3; ash, 7.1; total, 100. As this sample is taken from the near crop, it may fairly be expected that when driven into the seam will not only improve in thickness but also in quality, as do beds of a similar nature elsewhere.

I have, &c.,

JAMES M. McLAREN,  
Inspector of Mines.

The Under-Secretary for Mines, Wellington.

## No. 2.

EXTRACT FROM MR. BINNS'S ANNUAL REPORT UPON INSPECTION OF COAL MINES, MIDDLE ISLAND DISTRICTS.

Mr. Inspector BINNS, F.G.S., to the UNDER-SECRETARY for MINES.

SIR,—

Dunedin, 9th June, 1884.

I have the honour, in accordance with section 40 of "The Regulation of Mines Act, 1874," to make the following report, for the information of His Excellency the Governor:—

During the year 1883, with the exception of six days of the ordinary Government holidays, and six day's illness in June, the whole of my time has been occupied in carrying out the duties incident to my position as Inspector under the above Act, and under "The Westland and Nelson Coal Fields Administration Act, 1877." Attached to the report are tables of statistics and accidents. With regard to the former, my thanks are due to those managers and owners who have assisted me with particulars of output, &c.; at the same time, I may remark that there is no statutory obligation to send these particulars, and it is often difficult to obtain them—in fact, some output returns are entirely excluded from the table, on account of the failure of managers to send them, even after repeated application.

The following is a *résumé* of the work done in connection with each mine—or, at least, so much as is necessary for a report of this nature. Many of the mines have been more fully reported on during the year, and these reports are among the records of the department.

### PELORUS AND WEST WANGANUI DISTRICTS.

6 to 9. *Picton and Collingwood Mines.*—These have not been visited by me for some considerable time. As they are so near the head-quarters of the department Mr. Cox undertook the work.

### WESTPORT DISTRICT.

10. *Koramui Coal Mine, Westport.*—In 1882 I had to note that this company's prospecting works were in a backward condition, and a similar remark was made last year. I have now to repeat it. On the 24th ultimo, when I visited the mine, the coal generally was crushed and disturbed. That there is good coal on the lease is an accepted fact, though I have not had an opportunity of seeing it: but the company seem a very long time in reaching it. The mine has been visited three times since my last report. On the 15th September, 1883, Mr. Ferguson was in charge, and the Act appeared to be observed: only that, on account of a breakage on the incline, boys were employed after 2 p.m., which was not lawful, as the day was Saturday. Special and general rules were exhibited, and boys registered. On the 11th January, 1884, Mr. Henry Hughes was in charge, with Mr. W. McMurray as mine manager. No Act was observed, but, in view of the change of management, this was to a certain extent to be excused. An air-shaft was being sunk. Last year I ventured to express an opinion that the ordinary endless-rope system would be better than the system then being tried for lowering coal. Mr. Hughes has altered the arrangements now, and has an endless-rope plant at work, in five lifts, the longest of which is 59 chains. The maximum gradient is 1 in  $2\frac{1}{2}$ , and the average one in  $5\frac{1}{4}$ . The inclines, which are all self-acting, work very well, but at present it is necessary to stop each length for every tub that passes the terminus, and this causes great delay. No doubt Mr. Hughes will soon overcome this little difficulty. On the 12th February, 1884, I sent a copy of the Act, and wrote requesting attention to the regulations affecting the employment of children and young persons, and also to the section requiring promulgation of special rules. I was somewhat surprised, therefore, on Saturday, the 24th ultimo, to find boys employed after 2 p.m., and to learn that it was a regular practice; also not to see special rules exhibited. Mr. Hughes arranged to dismiss the boys, of whom there are only three.

The mine has been irregularly worked, and when the good coal is reached this point will require attention. Timbering seems efficiently performed, and the air is good.

11. *Banbury Coal Mine, Westport.*—In last year's report (as, indeed, in previous ones) on this mine the subject of riding in trucks on the incline was referred to, and I wrote, "It is morally certain that, if this continues, somebody will be killed." An account of the fatal accident which occurred in February last from this cause will be found in the after portion of this report. Although not a mining accident—the deceased not having been at any time employed about the mine—I have inserted it, as the practice was prevalent among the employes. The shaft previously mentioned has now been sunk to the coal, and a furnace erected, which makes a great improvement in the ventilation. The mine was last inspected on the 24th May, 1884: the men were off work, and the air seemed good, though the furnace was damped down. No explosive gas has been seen. The headings have now arrived at "Smith's outcrop," where the coal is said to be 18ft. thick, but I was unable to get to the place where it is exposed. About the end of August the company hope to have the endless-chain working to this thick coal. Almost all the seam between the main heading and the cliff has been worked out. The Act appears to be carefully observed, but, during the current year at least, there has been an abnormal number of accidents.

12. *Oriental Coal Mine, Reefton.*—This is an old mine, which had disappeared from the list for some years. It is worked merely for the battery. At my visit two men were employed. Mine well timbered.

13. *Energetic Coal Mine, Reefton.*—Has during the past year been practically at a standstill. On the 21st September, 1883, I was there, but the entrance was boarded up to prevent the intrusion of strangers.

14. *Golden Treasure Coal Mine, Reefton.*—Was examined. There is nothing to report.

15. *Lankey's Gully Coal Mine, Reefton.*—One man employed at the coal, and at the time of my visit the mine was vacant. A new tunnel has been driven, and well timbered.

16. *Inangahua Coal Mine, Reefton.*—This is a new mine on the left-hand branch of the Inangahua River. All the coal has to be "packed." I sent copy of Act, rules, &c.

17. *Newcastle Coal Mine, Reefton.*—Was closed during my visit to the district. There is, however, a prospect of recommencement.

18. *Golden Fleece Coal Mine, Reefton.*—Employs one man, who gets coal for the boiler at the quartz mine.

19 and 20. *Boatman's and Burke's Coal Mines, Reefton.*—Are still at work on a small scale. The workings seem well carried on.

21. *New Durham Coal Mine, Reefton.*—There is no road to this mine, and all the coal is "packed;" consequently the output is very small.

22. *New Durham Coal Mine, No. 2, Reefton.*—This is a new mine on the Reefton side of the line, and has been carried in about 400ft. on a thin seam.

23. *Dudley Coal Mine, Reefton.*—Has been prospecting for some years, and was not on the list last year. This year, however, it has sprung into prominence on account of a most unfortunate fatal accident which occurred on the 10th May (see "Accidents" report.)

24. *Brunner Coal Mine, Greymouth.*—Since the last report there has been no cause of complaint with regard to this mine. Frequent visits have been made, and, the fan having at length been started, the ventilation is much better. On the 16th July, 1883, it registered, in the farthest bolthole in the dip-workings, 5,775 cubic feet per minute for twenty men. The main return from that district was 9,947 cubic feet per minute, and the total return from the mine, 23,406 cubic feet per minute. The old stone drive which was driven in the fault slip some years ago was being cleaned out, and, though no gas showed, lamps were used. The rise workings, which had formerly given cause of complaint, were well aired. A man named McIvor complained that he had sent for timber, and could not get it, to keep up a piece of stone, which, it seemed to me, would have been better down: he was told not to work till the timber was procured. The main level in the rise was clear of gas: reports kept, and boys registered. On the 10th August, 1883, I received a letter from Mr. Bishop, stating that the air-current was up to face of level in rise, and that he would consider candles safe; at the same time, would use lamps, if desired. I replied that, if gas did not accumulate when the air was shut off, there could be no objection to naked lights. On the 28th and 29th September, 1883, I examined the mine, which appeared in good order. Refuge-holes had been constructed in the main incline. On the 27th November, 1883, a miner was killed in the rise-workings (for particulars see "Accidents" report). I was in Southland at the time, and arrived at Greymouth on the 3rd December, and attended the adjourned inquest on the 4th. On the 17th and 19th January another examination of the mine was made. An attempt had been made to clean out the old fault drive, and the air was brought back in pipes, but the gas lodged in the roof for about a chain back; so, at my suggestion, the current was reversed, and the pipes made the intake; but on the 19th this failed to clear the drive, so Mr. Bishop withdrew the men until the upper drive could be cleaned out and a proper return established. This was being done at the time of my last visit, on the 22nd ultimo, at which time no gas was to be seen in either heading. My last inspections were on the 22nd and 23rd ultimo. The men said gas lodged in a small natural fissure in the rise workings near the level, so, although we could find none, I requested that the place might be worked with lamps. The dip was well aired. During the year work has been carried on in the dip and rise districts; the latter is about 20 chains past the line of fault but the coal is thin, and of very variable quality. A section of pillars has been taken out, with my concurrence; the roof breaks well, and a good proportion of the coal is extracted. In the dip the same band of coal which in the Coalpit-Heath Mine indicates the proximity of the fault has appeared, and several of the bords have been stopped. The coal away from this band is very thick. In the heading which was driven through the fault slip Mr. Bishop put down a bore, without success, as the rods gave out. Six chains from the place where the rise level crosses the fault-line a prospecting heading has been driven, and coal of fair quality reached: this required ventilation. A proposal has been made to work the dip pil-

lars, and the question is, where should a road be left for the purpose of bringing out coal, in the event of the fault being proved. The output of coal from the mine during the year 1883 was 68,000 tons, against 44,000 tons in 1882; an increase of 24,000 tons, or more than half the total increase for this Island.

25. *Coalpit-Heath Colliery, Greymouth.*—I regret my inability to report so favourably on this mine as in former years. On the 27th September, 1883, the far dip, in which twelve men were employed, was insufficiently ventilated, a great deal of air being lost at the top; neither was there any proper provision for airing the new dip. On the 28th I found a little gas in the old workings, though I had written on the 12th June requesting that screens might be put up to clear them. The main return was only 7,315 cubic feet per minute, having been usually about 12,000. On the 12th October I again wrote, pointing out that the suggested precautions had not been taken, and requiring plan to be made up. The latter was at once done, and a copy sent. On the 4th December, 1883, a boy aged thirteen was employed over hours, and there was no register: the weekly report was late. In my notes was entered, "In the underviewer's report I find that one or two bords in the new dip are gassy, generally about twelve inches. These places ought to be worked with lamps: told manager." On the 16th January, 1884, the air in the new dip was not guided, and there was a little gas in the lowest bord. The cloths were not properly fixed, and the stopping at the top of the far dip was very bad; there was also gas in one place: nearly all the air appeared to be lost. Spoke to the manager about it, and on the 26th January wrote that on several occasions I had been obliged to take exception to the way in which the mine was ventilated, concluding: "The volume of air is, in the first place, insufficient, the stoppings are some of them practically useless, and the dip-workings are giving off a considerable volume of fire-damp. In spite of this, you are not working with lamps (safety); and, unless the condition of things is so altered that gas is not to be found when next I visit your mine, I shall require the bords and headings to be worked exclusively with safety-lamps." On the 4th February I received an answer saying that the stoppings had been overhauled, and the air was better; also that my letter had been laid before the directors, and authority requested for the erection of an 18-inch fan; also stating that working with lamps would entail an extra cost of 6d. per ton on the coal. On the 11th of the same month a miner named Johns was slightly burned by an explosion of gas, and particulars of the accident are given in the proper place. As this accident occurred through direct disregard of repeated warnings, I prosecuted the manager and underviewer, and give, under the heading of "Prosecution," a report of the case. On the 22nd ultimo the places appeared much better ventilated, and the air-ways and stoppings improved. Still there was a little gas in some of the places, and, in default of this being cleared out, I required them to be worked with safety-lamps. Work during the year has been confined entirely to the dip, one incline, as mentioned previously, being driven half-dip, and the other on the full angle. In the former district the bords have been very badly driven, being in places 25ft. 8in., 23ft. 8in., 26ft. 3in., and 31ft. 6in. in width, instead of 18ft.; and the pillars 9ft., 7ft. 6in., 6ft., and 13ft., instead of a proper thickness. The bords, too, were very tortuous. On the 16th January they were in better order; but on receipt of Mr. Gordon's check survey the system was shown to be very faulty, and on the 14th March I wrote to Mr. Nancarrow, the secretary. Since that date they have been somewhat better. I cannot, however, say, as Inspector under the lease, that the mine is worked to my satisfaction.

#### GREYMOUTH DISTRICT.

26. *Wallsend Colliery, Greymouth.*—In last year's report mention was made of the probability that the gas imprisoned at enormous pressure in the rise workings would, when the pressure was lessened by a decrease in the column of water, burst out and explode at the surface. This actually occurred on the 26th July, 1883 (two months after the report was written), and was a somewhat severe explosion: fortunately, work was suspended at the time, and no one was injured. The new shaft has been carried down to a depth of 140ft., and at that point operations were stopped. The old shaft was successfully cleaned out, and on the 18th January, 1884, I descended. Up to within a day or two before the shaft had been ventilated by means of three canvas pipes, having an area of 4·8ft.; but at this date there was only one pipe of 1·6ft. area, and this reaching only to the bottom of the shaft. Notwithstanding this I was able to penetrate to the end of the east level, about four chains, and up a rise heading, where, however, the presence of gas prevented my carrying a lamp on the level; the lamps could not be lifted far from the floor. On the west level we penetrated three chains. This mine has always been regarded as extraordinarily fiery, so much so, indeed, as to be almost unworkable. But I do not think that, when it is opened out for a few acres, and the coal "bled," there will be any difficulty in carrying on operations, possibly with naked lights. Open lights and first-class ventilation—that is, where it is possible to clear the mine, and no sudden outburst is to be expected—are much safer than slipshod ventilation, permitted because safety-lamps, as they are called, are used and therefore "it must be safe." A 30ft. Guibal fan is on the ground, and a really splendid plant; if the remainder is erected in the substantial and efficient manner which has characterized the works hitherto the colliery will be a credit to the colony. The output for 1883 was one ton.

#### MALVERN DISTRICT.

27. *Springfield Colliery, Springfield.*—On the 14th August, 1883, Captain Parker wrote requesting permission to continue the employment of fourteen men for a longer period than was originally granted, viz., till the 4th September, up to which date, as will be remembered, I was authorized to allow the suspension of section 10. As the special circumstances which rendered such suspension advisable had expired, and other mines were in a similar position, I did not think it advisable to entertain the request. On the 11th September, 1883, the ventilation return for the north side was 3,360 cubic feet per minute for four men, and the current at the lowest place on the south side 83½ cubic feet per minute; this was taken in a pipe to the head end from a bolthole

fourteen yards back, imperfectly stopped with a cloth, through which there was some scale. Intake to south side, 1,687 cubic feet per minute, but a good deal lost at a door. On my calling Captain Parker's attention to this, he wrote, on the 10th November, that a regulator and an extra door had been fixed, which saved a good deal of air. On the 22nd April, 1884, the mine was visited; everything was satisfactory, except the omission to register a boy. The mine is carefully managed, and the company deserve better luck than has hitherto attended their efforts. The diamond-drill has been in use till quite lately, but I am unaware with what ultimate result.

28. *Smithfield Colliery, Springfield*.—Was closed on the 9th November, 1883. On the 3rd August the lessee had his leg broken by a piece of coal which flew off and struck him, when he was standing to hole. On the 11th September the air was pretty good, but the Act otherwise neglected. The output is included with Springfield.

29. *Bowick's Wallsend Coal Mine (formerly Kowai Pass)*.—Has been visited three times since last report. On the 11th September, 1883, a new manager, unacquainted with the requirements of the Act, was in charge; so on the 6th November I sent him a copy, with an explanatory letter. On the 23rd January, 1884, the law was carefully observed. On the 22nd April only two men were at work, and the places appeared short of air; no special rules were up: wrote requesting attention to these points.

30. *Canterbury Colliery, Sheffield*.—On the 23rd October, 1883, this mine passed into the possession of a party of working men, who, however, did not keep it long, for on the 19th December Mr. Austin wrote that he had taken it over. These frequent changes are by no means beneficial. Two slight accidents occurred here in 1883, only one of which was of sufficient importance to be included in the list. On the 22nd April, 1884, only four men were employed, and some of the places were very short of air, so on this subject a letter was sent to the owner.

31. *Baron's Coal Mine, Sheffield*.—This was a very old mine, reopened by Mr. Baron; but its life was very short, lasting only from the beginning of October, 1883, to the middle of February, 1884. The owner was, however, supplied with a copy of the Act, rules, &c.

32. *Homebush Colliery, Glentunnel*.—On the 24th October, 1883, the mine was all right, but some men were engaged in taking out a small pillar of coal, to the dip of a very wide place, and, as no timber was used, I was afraid that the weight would be thrown over, so I got Mr. Brown to stop the place. He wrote subsequently, in reply to my query of the 5th November, that the men had ceased working, but that the roof had not fallen. Perhaps if more had been taken it would have done so: the seam has a very heavy dip (1 in 3), which makes pillar-working somewhat risky. On the 23rd April, 1884, I found that this proceeding had brought on a creep, which had barely missed the main level. At this date, the mine having hardly settled, the pillars were still being wrought between the creep and the level, a policy which appeared to me perfectly suicidal. The coal in the end of the main level has split up into three seams, and is consequently unworkable. The report and plans are duly kept, but a boy of eleven, employed above-ground, had not properly attended school. He was not registered, nor were two boys employed below-ground. The creep, mentioned above, having closed what was the only available second outlet from the mine, Mr. Brown proposed driving a new road to grass at the outcrop, and I thought ladders in the upcast shaft would do.

33. *Hart's Colliery, Whitecliffs*.—This mine has developed considerably on the brown-coal seam mentioned by Mr. Cox. On the 25th October, 1883, general rules were not exhibited. Plan kept, and a good report; refuge holes in incline; shaft fenced, and a good but insufficiently guided air-current; timber in places not first-class. On the 24th April, 1884, no rules were up. The lower portion of the coal is close and hard, but the upper part jointy, with fissures, so the roof generally is bad. An incipient creep, causing the use of a great deal of timber, has set in. Air moderate. Mr. Ekberg has sent up a new set of special rules, which are now under consideration.

34. *Brockley Coal Mine, Whitecliffs*.—Has been closed since January, 1883. Want of railway communication is the cause of this really good household coal being excluded from the market.

35. *Whitecliffs Coal Mine, Whitecliffs*.—On the 24th October, 1883, Mr. W. Smart was in charge, and the Act was not observed at all, nor was the drive properly ventilated: so, on the 5th November, I wrote requesting attention. On the 22nd December, however, Mr. Smart wrote that he had disposed of his interest in the mine and was no longer connected with it. On the 24th April there was a new manager—Mr. W. Dearuley—who had kept a report, but done nothing else to observe the Act; no rules were up, and no plan made, neither was the ventilation perfect. On the 2nd ultimo I wrote about these things.

#### OTAGO DISTRICT.

38. *Wharekuri Coal Mine, Wharekuri*.—Visited the 30th August, 1883, when the air was very bad, and symptoms of a gob-fire apparent. No special rules were up, but the men told me that the owner (who was absent) shows them a copy, without, however, presenting it, as he should. Wrote to him subsequently.

39. *Kurow Coal Mine, Kurow*.—Visited the 30th August, 1883. At the end of the main level pillars were being worked, and a body of damp put our lamps out. The owner works alone, and has a copy of special rules, which he does not exhibit; neither does he keep a report.

40. *Prince Alfred (No. 1) Coal Mine, Oamaru*.—On the 29th August, 1883, the air was bad. Report kept. On the 30th January, 1884, the lessee was finishing his last day at the mine, which is worked out. Rules distributed and report kept.

41. *Prince Alfred, (No. 2) Coal Mine, Oamaru*.—Visited twice since last report. Is nearly worked out, and is, like many moribund mines, badly aired. Report kept, and rules (special) exhibited.

42. *St. Andrew's Coal Mine, Oamaru*.—Has been recommenced, but not yet re-visited.

43. *Ngapara Coal Mine, Ngapara*.—Visited the 11th October, 1883. Everything in good order; plan up to the 11th June, and report kept.

44. *Shag Point Coal Mine, Palmerston*.—As this mine has occupied a good deal of time and attention, and been eventually closed, I shall, even at the risk of prolixity, report in detail as to my action during the past twelve months. In last year's report the circumstances relating to the stoppage of the submarine workings were alluded to; but there is now a correction to be made. The soundings and shore-line were taken from the company's plan, but when these came to be checked by a proper survey it was found that the cover overlying the submarine workings, instead of being 99ft. to 160ft., as stated, is 117½ft. to 195ft. The dams were put in, and, in order to allow the water to be kept at some distance below them, a syphon was arranged to carry the drainage water through these dams and down the shaft to the pumps. Pulsometers also were placed in the dip-workings. The submarine area continued to fill very gradually with drainage water. On the 24th December, 1883, I found a ~~creep~~ had set in in the old level (upper seam), which was closing up rapidly. During Mr. Twining's survey, in February, 1883, there was a heavy weight on this portion of the mine, and since then a good deal of surrounding coal had been taken out. On the 1st February the water was rising more rapidly, and some places were lost. On the 8th February Mr. Williams wrote that he wanted to put a hole in the small dam for the purpose of inserting an 18in. pipe, and through it rescuing some pipes, &c., and he would come and see me on the 11th, if wished. I telegraphed on the 9th that it would be preferable for me to go to Shag Point and discuss the matter on the ground. On the same date Mr. Williams replied, "Too late now to open dam: water too high." Arrived at the colliery on the 11th. A number of miners met me and stated that they were afraid to go down the shaft, as salt water was pouring down from the upper seam, and fissures had appeared on the beach, indicating an incursion of the sea. On meeting Messrs. Rich and Williams we had a long consultation as to what should be done. The dams, I found, were not holding. As might have been expected, the woodwork was passing water; but, in addition to this, a considerable stream was coming in between the masonry and the measures. Though the timber would take up, it was obviously impossible for this to do so. After considering the matter in all its bearings, there appeared no course but to close the mine altogether. In this opinion Messrs. Rich and Williams appeared to agree with me perfectly: they had no other course to suggest, and had there been the slightest apparent disposition to continue working I should have at once given notice under section 19 of "The Regulation of Mines Act, 1874." As it was, I wrote the necessary notice at the colliery on the 11th instant and handed it to Mr. Williams. At the present time the mine is full of water to sea level, and Mr. Williams tells me that the ebb and flow of the tide are distinctly perceptible, but to a very small extent. On the 5th March and 4th April I examined—on the latter occasion in company with Professor Ulrich, F.G.S.—the fissures on the beach. These are very interesting, and are evidently occasioned by the subsidence of the submarine strata. The unfortunate termination to this matter has caused me considerable regret. During the time that negotiations were proceeding I spared neither time nor trouble, and my endeavours, on the one hand, not to risk men's lives, and, on the other hand, not to damage property unnecessarily, occasioned me great anxiety. I trust that the happy medium was arrived at. I have to thank Mr. T. Evans, F.G.S., Her Majesty's Chief Inspector of Mines for the Midland District of Great Britain, and Mr. G. Gilpin, A.M., F.G.S., Government Inspector of Mines for Nova Scotia, both of whom have been good enough to supply me with details of submarine mining. To treat now of the general condition of the mine during the year: In last year's report I had to complain of the ventilation, and this year these complaints culminated in a prosecution, the particulars of which are given below. From January, 1881, to the 2nd June, 1883, thirty months, I have records of having written to Mr. Williams four times, spoken to him nine times, and to the underviewer three, about defective ventilation. On seven other occasions it was noted as insufficient, but I have no record of having mentioned it; still, it is practically certain that it was mentioned. This will show that no undue haste was made in laying an information. On the 13th June, 1883, some of the miners told me that "the day previous it had not been fit for a person to be in." The accompanying plan shows the method of working; the notes give particulars of quantities, &c., on the 15th: on that date one man said, "sometimes you cannot breathe." According to the decision given by the Resident Magistrate in the case brought against the company for defective ventilation, any place where the temperature does not exceed 80° Fahr., and the men are not absolutely asphyxiated, is properly ventilated.

45. *Hill's Creek*; 46. *Idaburn*; 47. *Dunsmuir's*, and 48. *Cambrion's*.—Lignite mines. Are all open-work, and have been recently visited.

49. *Kyeburn Colliery, Kyeburn*.—Inspected the 26th March, 1884. This is a new mine. On the south side of the hill, a drive has been made in bad ground, and moderately timbered. Place in good order; but Mr. McCready does not observe the Act.

50. *Perseverance Coal Mine, Kyeburn*.—26th March, 1884. Mine in good order. Act kept; report up to date; rules up, and air good. No fault to be found.

51. *Archer's Coal Mine, Kyeburn*.—26th March, 1884. A new mine, which has not proved anything very good. Act not introduced till my visit. The proprietor keeps an hotel, and I have cautioned him not to pay wages at it.

52. *Alexandra Coal Mine, Alexandra*.—19th March, 1884. Ladders vertical, and no platform in 50ft. The owner was away, and the one man employed had never heard of the Act. Mine in good order. Wrote to owner.

53. *Manuherikia Coal Mine, Alexandra*.—Is closed now.

54. *Excelsior Coal Mine, Cromwell*.—21st March, 1884. A new mine. Seam nearly vertical in the levels are some awkward "passes," which I asked the owner to protect.

55. *Bannockburn Coal Mine, Cromwell*.—21st March, 1884. This is a new mine, worked by an engine plane, and drained by a 15ft. water-wheel. The mine is in good order. Sent Act and rules.

56. *Kiwarau Coal Mine, Cromwell*.—21st March, 1884. Also a new mine. Act not observed. Manager (who worked the old Kawarau Mine, and is also owner here) says he kept the report for eighteen months, but as no one came to see it he gave it up. Air good, and mine in excellent order.

57. *Clyde Coal Mine, Clyde*.—20th March, 1884. Another new mine, the old one having fired shortly after my last visit (I noted at the time, "Slack heating a little . . . warned the man"): only a dip drive into a thick seam. In answer to a letter from me re observance of Act, Mr. Marie answered that he had lost the Act and rules, and wished to know where to obtain copies, as he was "only too anxious to comply with the conditions of the Act."

58. *Clyde Coal Mine, Clyde*.—20th March, 1884. The 1882 report on this mine was anything but satisfactory, and on the above date things were better; but there was still a good deal of room for improvement. Neither shaft was fenced. An incline had been driven on a very steep angle, terminating in a shaft at a point 30ft. from the bottom. This incline is very slippery, and any one losing his foothold would inevitably fall down the shaft. Mr. Hall promised to put a fence up. The workings do not seem in bad order; but the Act is not observed. Wrote to owner.

59. *Earnsclough Coal Mine, Clyde*.—20th March, 1884. The old workings have fallen in, and a new tunnel was in use, which has since been flooded out. Air-shaft not fenced, and air not guided; slack is left in too large quantities; report-book kept, but a little late; rules up; Mr. Buckley seems to pay considerable attention to the provisions of the Act.

60. *Gibbston Coal Mine, Gibbston*.—22nd March, 1884. This is an old mine; visited on the above date for the first time. The seam is said to be 80ft. thick; I saw half that quantity. Sometimes the coal is mined, but it was then being worked opencast—at least, the place had recently been on fire, large slips had occurred, and the mine was in a bad state for purposes of working. Wrote to owner, sending Act, &c.

61. *McPherson's*; 62. *Low and Robertson's*; and 63. *Crossan's*.—Lignite mines. Are all openwork, and were visited in March, 1884.

64. *Fernhill Colliery, Green Island*.—28th April, 1884. Has, since being reopened, been carefully worked. The railway now reaches the mine, and the new furnace arrangements give a splendid ventilation, which measured, on the 19th October, 1883, 98,000 cubic feet per minute.

65. *Green Island Colliery, Green Island*.—10th April, 1884. The workings were taken carefully under the railway, and the bords are now all on the west side, with a new tunnel. On the 15th November, 1883, the plan was behind time. On the 8th February, 1884, the rules had not been moved from their former position in the abandoned workings, consequently they were not properly exhibited. On the 31st March a boy was not registered; the plan was thirteen months old, but was made upon the 10th April; and the report was late.

66. *Saddle Hill Colliery, Green Island*.—10th March, 1884. On the 6th August, 1883, the main return was 8,190 cubic feet per minute for eight men, and was distributed; plan at mine; report kept. On the 8th November, main return was 11,375 cubic feet per minute; no register of boys. On the 10th March, 1884, everything was right, except the register; mine generally carefully worked on a small scale.

67. *Glenochiel Coal Mine, Green Island*.—16th April, 1884. The owners have at length been induced to keep the Act. A second outlet has been made to an old shaft.

68. *Walton Park Colliery, Green Island*.—10th April, 1884. The total return by furnace shaft was 13,538 cubic feet per minute. This mine is in good order, and gives no trouble, except on the above date, when the mine manager wanted to descend the shaft with me in a tub on the cage. This is contrary to Special Rule No. 45. On the 16th ultimo a man had his leg broken at this mine.

69. *Abbotsroyd Colliery, Green Island*.—28th April, 1884. On the 28th May, 1883, I found that boys were being worked illegally on Saturdays: Mr. Freeman promised he would put a stop to it. On the 31st March, 1884, found that a place approaching a body of water was not properly protected by boreholes, though Mr. Cox had given warning about a fortnight before; and on the 28th April the same offence was committed. Also, a boy of fourteen was employed without being put on the register or supplied with the rules. Wrote to owner.

71. *Bruce Coal Mine, Milton*.—29th October, 1883. This mine is well worked and aired, and the Act moderately well observed.

72. *Real Mackay Coal Mine, Milton*.—7th March, 1884. Has changed hands again. Pillars too small, and too much slack. One man; sometimes two. Act not kept. Warned manager.

73. *Cannon's*; and 69. *Bryce's Lignite Mines, Lovell's Flat*.—Are both openwork, and have been visited.

75. *Paskell's Lignite Mine, Glenore*.—An openwork lignite mine, at which the owner was killed in 1882. On the 31st December, 1883, I found a boy, who said he was "going on for ten," working alone, and in a face 10ft. or 11ft. high, with a vertical crack running behind an overhanging piece. He was in a very dangerous position, and I had to talk seriously to his elder brother.

76. *Benhar Coal Mine, Balclutha*.—2nd February, 1884. Visited three times in 1883, and once, so far, in 1884. On the 10th July, 1883, air was slack, and powder smoke not cleared out quickly enough; ventilating arrangements defective; stoppings bad. On the 15th October, 1883, the furnace was out; no rules up. The owner of this mine has not paid as much attention to the Act as he ought.

77 and 78. *Kaitangata Railway and Coal Company's Mine, Kaitangata*.—10th May, 1884. These may be conveniently reported on together. On the 14th June, 1883, found no gas in the old workings; the difficulty about employment of boys was got over by sending them in an hour later; and the register was duly kept. On the 31st October, 1883, the chimney at the upcast shaft had been burnt down—consequently the furnace was put out, and all the men were out of the dip that day; reports kept. The method of ventilation was as follows: The air descended the shaft, and was split, half going up each side. This portion was coursed along the levels, and back through the slits; but it was proposed to shorten the route. Top coal was being got in the dip. On the 19th November, 1883, the following amounts of ventilation were registered: Intake to dip, 10,887 cubic feet per minute; intake to No. 7 flat (south side), 3,744 cubic feet per minute; intake to No. 6 (south side), 4,488 cubic feet per minute; intake to No. 5 (south side), 2,255 cubic feet per minute.



On the 7th April, 1884, examined part of the dip, and on the 8th finished my inspection. The coal in the dip lies at an angle of  $45^{\circ}$ ; the levels are carried next to the roof, and the bords worked about level to the floor: the head coal is then taken down. At this point the problem arises, how to work the pillars. The seam is 30ft. thick (at right angles to the dip), and exceedingly prone to spontaneous combustion. The roof is a conglomerate 70ft. thick. If the pillars were injudiciously worked the weight might be thrown over, and creep induced over the whole district. To avoid this, it would appear advisable to work at the extreme rise and break the roof, thus keeping the weight well back: at any rate, it is a subject requiring much consideration. A new dip is being driven, and for hauling purposes a 30ft. by 6ft. Cornish boiler was placed underground. There appeared to be some doubt as to the feasibility of carrying steam 800ft., so the boiler was placed below, in the old stone drive. This actuated a 28 horse-power hauling engine. The boiler was not judiciously placed, for it would naturally tend to vitiate the main intake, and the engine would increase the damage done to the air. The boiler flue was carried up through the old workings, and crossed the levels in 3ft. wrought-iron pipes, which were, however, not quite tightly fixed, so some smoke escaped. At this date the furnace chimney was again burnt down, and Mr. Samson proposed to sink a new shaft and erect a proper brick chimney. On the 10th May, 1884, at the request of the company, I made an inspection, with a view to forming an opinion on the advisability or otherwise of keeping the boiler below ground. On the 2nd of that month a fire had broken out in a little heading leading from the bottom of the furnace shaft (into which the underground upper hauling-engine exhausts) to the old stable level. It seemed that the exhaust from the engine must have carried some incandescent material into this shaft 20ft. horizontally, and set the coal on fire. The conflagration was soon suppressed. On examining the boiler to the dip I came to the conclusion expressed in the following letter: "Dunedin, 12th May, 1884.—W. P. Watson, Esq., General Manager, Kaitangata Railway and Coal Company (Limited).—Sir,—At the request of Mr. Brydone, chairman of your company, I have the honour to give you my opinion on the safety or otherwise of the arrangements connected with the underground boiler at your mine. It is quite possible that the present state of things might continue for a long time—as, indeed, it has continued—without an ignition of the coal in the flue; but, at the same time, I consider that a constant danger exists of a conflagration so disastrous in its effects that it is extremely inadvisable to prolong the risk. Regretting that pressure of time prevents my entering more fully into the subject, which has, however, been fully discussed between yourself, Mr. Brydone, and myself,—I have, &c., GEORGE J. BINNS, Inspector of Mines." On the 19th ultimo, between 2 and 3 a.m., the flue took fire, and the place has been closed since. I may mention that the flue is 700ft. long, and has a vertical height of 400ft. I have been unable to visit the mine since the fire broke out: I was at Greymouth at the time. [The following has since been telegraphed: I visited this colliery on the 10th instant for the purpose of attending the reopening of the workings. The air, having been excluded for thirteen days, was admitted about 8 a.m., and, as the carbonic acid drained off very well, everything appeared to be going on satisfactorily, till 5 a.m. on the 11th instant, when Mr. Watson told me the flames again broke out in the flue. The outlets are now closed. This is the third unsuccessful attempt to open up, the two former having been made soon after the fire broke out.]

79. *Adams's Lignite Mine, Lovell's Flat.*—An openwork mine; visited the 2nd February, 1884.

80. *Wangaroa Coal Mine, Kaitangata.*—Visited the 20th November, 1883. Mine in good order; only one man employed.

81 to 90.—All openwork; all visited recently, except Chatton.

91. *Pukerau Coal Mine, Pukerau.*—This mine is now worked by a tunnel, and is in good order. Introduced Act.

92. *Pukerau Coal Mine, Pukerau.*—Openwork. Visited.

#### SOUTHLAND DISTRICT.

93, 94, and 95.—All openwork lignite mines, the first two of which have been recently visited.

96. *Nightcaps Coal Mine, Invercargill.*—On the 7th June, 1883, this mine was examined. Roof good, and timber used where required; also brattice on the levels. Furnace well built. Pumps actuated by a 15ft. by 3ft. water-wheel. Mine examined in the morning with a safety-lamp before men enter. Plan at office; only a rough, undated tracing. No special rules established, but since then a very good set has been gazetted.

97 and 98. Openwork lignite mines. The former has been lately visited.

99. *Orepuki Coal and Shale Company's Mine, Orepuki.*—I visited this ground on the 6th June, 1883, and saw some prospecting works which have been carried on in anticipation of the speedy completion of the railway.

#### NEW MINES IN 1884.

There are several new mines at work, which have been commenced during the current year. These will appear on the next list.

#### PROSPECTING.

Prospecting has been carried on in various localities, notably near Hokitika and Kaniere, where a number of known seams have been examined. I was there for a few hours on the 21st January, 1884, and was of opinion that the drive was on a fault. Whether there is a good seam in the immediate vicinity I was unable to say; but, though crushed, the coal analyzes well, and the importance of a good coal field in this district would be very great.

Boring operations have been carried on at Wangaloa, near Kaitangata, on the sea-beach, and it is proposed to open up another mine near the Kaitangata Company's lease.

## ACCIDENTS.

During the year 1883 the accidents in the coal mines of this Island numbered sixteen, or exactly twice as many as during the previous year; but, of these, only two were fatal, and of the remaining fourteen three were very trifling, and one is merely included because the man happened to be on mining premises at the time.

The following necessary particulars are given (the numbers refer to the list given later):—

2. The fatal accident to McAnally was referred to last year, and reported on by Mr. Cox, whose remarks are in the possession of the department.

3. On the 8th May, 1883, William Espie broke his leg in the Kaitangata Mine by falling over a rail; the limb had been previously injured.

4. On the 1st June, 1883, J. R. Jones, owner of the Cambrian's Openwork Lignite Mine, had just fired a shot, when by some means about 10lb. of powder contained in a keg close to him exploded; as the explosion blinded him, he had great difficulty in avoiding the shot, which went off almost immediately. He was blind for a fortnight.

5. On the 9th June, at Kaitangata (No. 1) Mine, Wm. White, banksman, was standing behind a tub of slack, which was being drawn up a short incline on the surface, when the chain broke, causing the tub to run back on him. This accident was due to the want of a drag. Two ribs were fractured.

6. On the 5th July, 1883, at the Brunner Mine, Colin Williamson was so seriously injured by a fall of coal that he was not expected to recover. I therefore went over at once and made inquiry, but could not find that blame was attributable to any one. Williamson is getting better, I am glad to say.

7. On the 16th July, 1883, at the Wallsend (Greymouth) sinking-pit, a man slipped on a piece of frosty wood and broke his leg. It speaks highly for Mr. Harrison's conduct of the very hazardous operations carried on at this mine that no other accident occurred.

9. On the 3rd August, 1883, at the Smithfield Colliery, Henry Ball, lessee, had his leg broken by a piece of coal, which he said flew off; fortunately he was standing at the time, and escaped with slight injuries.

14. On the 27th November, 1883, Andrew McIvor was killed by a fall of coal in the Brunner Mine. The inquest was adjourned for my attendance, and the following are the particulars: The bord was 8ft. 3in. in height, but reduced to 7ft. by a heap of slack, and 18ft. 7½in. in width. The roof exceptionally good, except just above the place whence the coal fell; but this does not seem to have caused the accident. Thomas McIvor, a younger brother, was endeavouring to get a piece of coal down, when deceased—who, though only twenty years of age, was a first-class miner, and usually very careful—said he would get it for him; unfortunately he stood at the low side, and when the coal fell he was unable to get clear, and was crushed against the side. This was one of those lamentable occasions when a moment's injudicious action costs a valuable life. Deceased was unmarried. The verdict was "Accidental death," with the following rider: "The jurors desire to have it recorded that no blame can be attached to the management of the mine for the accident; and, further, that a local inspector of mines should be appointed to act as deputy to the Inspector when it is not convenient for him to attend after accidents." In consequence of this, Mr. Gow was appointed, under section 38.

15. On the 30th November, 1883, at the Picton Colliery, Peter Marbella, having applied a light to a shot, in a heading at a short distance from the pit bottom, commenced to ascend the shaft in a bucket. When about 8ft. from the bottom the bucket capsized, and Marbella was thrown out and slightly injured. Mr. Hutcheson, the manager, described the accident as "trivial;" but, in my opinion, there must have been something very faulty in the bucket or tackle. I was unable to investigate the accident. Mr. Hutcheson wrote subsequently that a ladder was placed in the shaft and men prohibited from riding in the bucket.

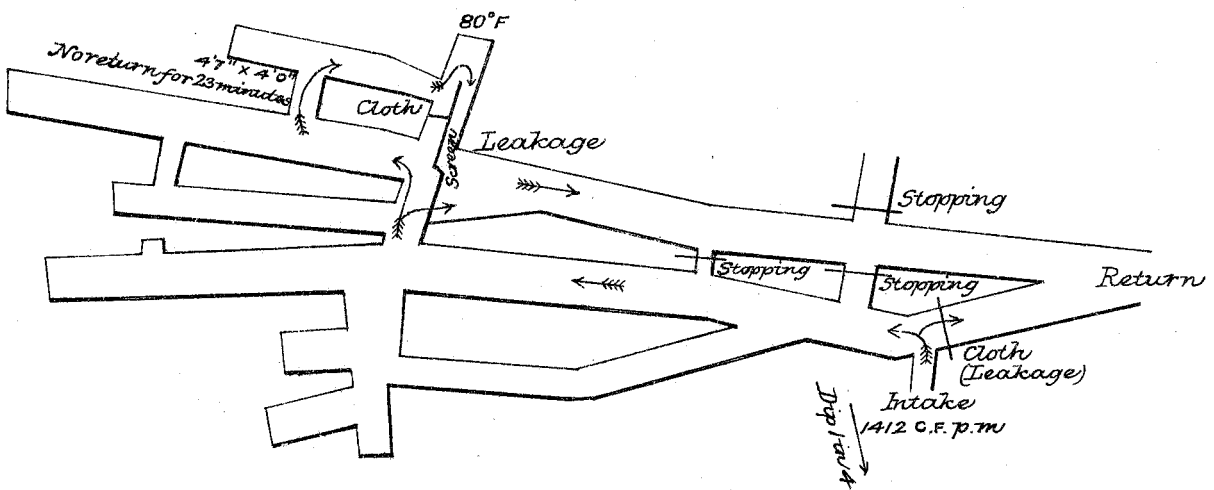
16. On the 19th December, 1883, T. Samuels was injured by a fall of stone at Shag Point. He said it was his own fault. The only injury was a broken jaw.

## CLASSIFICATION OF ACCIDENTS DURING 1883.

Below, 11; above, 4; shaft, 1: total, 16. Falls of roof and sides, 9; miscellaneous in shaft, 1; trucks above, 1; trucks below, 1; powder, 1; miscellaneous above, 2; below, 1: total, 16.

In addition to the ordinary mining accidents, there are generally some occurring about mines which, though not included in the list, or death-rate, are worthy of notice. The following is of this class: "On the 15th August, 1883, a boy named Daniel Wouldes, aged ten, was sent down from the top of the Westport incline by a storekeeper, and (to quote Mr. Elliott's report) came to the bottom of the incline on his way to the top of the hill. The man who is in charge at the bottom told him he must not ride in the wagon. The boy insisted, and got in the empty all right, until the wagon stopped on the long trestlework, a considerable time; . . . from this no one knows or can tell how he got to the next trestlework, but he was found under it, just above McDonald's Hill: this was the last wagon at night. About 6 o'clock the parents of the boy missed him and went in search all along the incline, and could not find him until 12 o'clock at night, under the second trestlework, with one leg cut off, quite dead." It is not a pleasant picture, and I insert it to call attention to the incline-man (T. Sherlock), who stated that a child of ten "insisted" on riding on a wagon, when he was forbidden. It is quite possible that, even if he had not ridden, he would have been killed; as the probability is in favour of his having been overtaken (while walking) by the wagon.





Plan of Portion of Shag Point Coal Mine.

Scale. One Chain = One Inch.

*George J. Dennis*  
 Inspector of Mines



## ACCIDENTS IN 1884.

There have, unfortunately, been already two fatal accidents in 1884, and several of which the consequences were less serious.

The following may be noticed here, and a full list will be given next year: On the 12th February, 1884, a man named Joseph Brown was killed on the Westport Coal Company's surface incline, and another man, named William Harrison, very seriously injured. In order to explain this accident properly it will be necessary to refer back to the action taken with a view to prevent persons from riding on these trucks. On the 11th January, 1884, I had an interview with Mr. Dickson, general manager, and arranged that I would undertake to prosecute somebody if the company would prove the case, there being an obvious difficulty in my doing so. Some doubt arose, however, as to whether the special rule forbidding riding had been gazetted, and on the 12th January I telegraphed an inquiry to the head office, receiving on the same day a negative answer. On the 16th I telegraphed to Mr. Dickson, requesting him to send it up for approval. At the date of the accident this had not been done. After the man was killed I telegraphed to the Coroner stating that I was very anxious to attend, and should like the inquest adjourned, which was done, but unfortunately I was unable to attend the adjourned inquest. The verdict amounted to "Accidental Death;" the jury making two suggestions, one as to the fastening of the truck, and the other urging on the Government the necessity for the construction of a road. On the 10th May, 1884, Mathew Joice, manager of the Dudley Coal Mine, Reefton, was killed by a fall of dirt in the mine. Information reached me at Dunedin late in the evening of the same day, and I attended the adjourned inquest on the 17th. It is unnecessary to give the whole of the evidence. The mine has been worked for five years on a very small scale, the output for that period being only 245 tons. It appeared that on the 8th a young man named James Phillips, who had been alluvial mining for about twelve months, and working for a few days with Joice, refused to go in, as he considered it dangerous. On the other hand, an experienced miner named McKnight, who was one of the first persons to find the body, considered that the place was perfectly safe with ordinary care. This opinion was shared by me, and apparently also by the jury, for some of them, who are practical miners, examined the drive, and the verdict was "Accidental Death." The immediate cause of the accident, appeared to be a slip, running almost parallel with the heading, which loosened a mass of coal and dirt. Deceased was working alone: this is always a dangerous practice, but it is difficult to see how it could be prevented. On the 11th February, 1884, as already mentioned, a man named Johns was injured by an explosion of gas in the Coalpit-Heath Mine. On inquiry the following facts were elicited: On the day in question Jos. Elliott, the underviewer, examined the place at 7 o'clock a.m., found a little gas, which he brushed out (contrary to Special Rule 35), neglected to mark the date, as provided by Special Rule 30, and finally omitted to enter in his report book the fact of gas having been found, as required by Special Rule 30. The day-shift came off at 3, and was followed by the night-shift at 4.30 p.m. Mr. Alexander saw the men, but did not warn them or give them a lamp. The place where the explosion occurred was a rise-heading, nearly through: in this a little gas accumulated while the shift was changing, and when Johns went in with a naked light he fired it and received slight injuries. Both the manager and underviewer were prosecuted. On the 2nd instant a miner named Henderson was hurt in the Banbury Mine by a fall of coal, and died in the Westport Hospital on the 3rd. It was impossible for me to go round to the inquest, so I telegraphed suggesting that Mr. Gow should attend. By your telegram of the 4th I learn that this course is impracticable, and that Sergeant Barrett, of Westport, has been authorized.

## PROSECUTIONS.

Particulars of the prosecution of the Shag Point Colliery manager have already been given, and in the recent case of the Coalpit-Heath manager and underviewer the defendants pleaded guilty, and—as I did not press the case—were fined the mitigated penalty of £2 each and costs; total, £3 14s. It is to be hoped this will act as a warning.

## DEATH-RATE IN SOUTH ISLAND.

The output being 328,002 tons, the number of deaths two, and the number of men employed 1,055, it follows that the death-rate is—164,000 tons of coal raised and 527 men employed per life lost, or 1.89 life for every thousand men.

## NUMBER OF MINES.

The number of mines is ninety-four, or an increase of three on last year. Eight have been struck off and eleven added, of which three are old mines recommenced. With the exception of the Orepuke, none of the new ones will probably be of much importance.

## NUMBER OF MEN EMPLOYED.

During 1883 there was again an increase in the number of men employed, the number being 1,055, as compared with 836 in 1882. The output per man, however, is not quite so large in the latter year, the amounts being respectively 337.4 tons and 311 tons.

## OUTPUT OF COAL.

The output for 1883 is 328,002 tons, or an increase of 45,881 tons on 1882, the principal increase being—Brunner, 23,845 tons; Shag Point, 4,514 tons; Kaitangata, 15,027 tons; Nightcaps, 5,804 tons; Collingwood, 1,720 tons; Whitecliffs, 1,200 tons; and Fernhill, 1,230 tons: while the principal decreases are—Banbury, 13,351 tons; Springfield and Smithfield, 3,521 tons; and Brockley, 2,924.

## METHODS OF WORKING.

Worked by adit—Horse-power used, 7; self-acting inclines, 1; engine-planes, 9; hand-power, 36	...	...	...	...	...	...	53
Openworked	...	...	...	...	...	...	27
Prospecting	...	...	...	...	...	...	2
Worked by shaft—Steam-power used, 6; horse-power, 5...	...	...	...	...	...	...	11
Closed	...	...	...	...	...	...	1
Total	...	...	...	...	...	...	94

This shows that there are five more mines worked by steam-engines than in 1882.

I have, &c.,

GEORGE J. BINNS,

The Under-Secretary for Mines, Wellington.

Inspector of Mines.

## No. 3.

## REPORT UPON INSPECTION OF COAL MINES, SOUTH ISLAND.

Mr. Inspector Cox, F.G.S., to the UNDER-SECRETARY FOR MINES.

SIR,—

Mines Department, Wellington, 31st January, 1884.

I have the honour to inform you that I have visited the more important of the Malvern Hills mines, and herewith submit my report on the same.

*Homebush Colliery.*—I visited this mine on the 11th December, 1883, and found the workings standing well throughout, and the ventilation satisfactory. The fault which I alluded to in my report of last year has now been struck in the main level, and beyond it the seam is much mixed with stone; this disturbance is probably only local, and they will shortly be in good coal again. A number of pillars have been drawn since I last visited the mine, and a considerable area is now worked out, while the work of drawing the pillars still progresses.

*Springfield Colliery.*—This mine was visited on the 12th December, and was found to be generally in good order, Captain Parker being in charge. The workings are now carried on entirely to the dip of the main shaft, and the output is comparatively small, owing to the number of men which can be employed. All the workings were standing well, and timber is well and carefully put in, although I had to call attention in one or two cases to slabs which required renewing. The provisions of the Act are carefully observed, and the ventilation was as good as could be expected, when one shaft is used for pumping, drawing, and ventilating purposes. It is proposed to sink another shaft to the dip shortly, and a bore-hole is now being put down on the flat to prove the existence and character of the coal there.

*Wilson's Colliery (Whitecliffs),* which is still under the management of Mr. W. Smart, is in good order, but the workings are very small. Two seams of coal, about five feet apart, are being worked, and these are connected at places by narrow cross-cuts. The mine is well timbered throughout, and the ventilation was good. A double drive, bratticed, is being put down to work the seams to a greater depth, but this had only just been commenced. No plan of the workings exists as yet, but the requisite report-books are kept.

*Hart's Colliery.*—I visited this mine on the 26th October, and again on the 10th December, and found it in fairly good order, and a fair current of air passing. The coal is very easily got, and timber is used unsparingly, although not always of the best quality, to judge by the incessant repairs which are necessary. In the dip drive the floor is continually swelling, and entails a heavy expense on the mine to keep the road in repair. A cross-drive towards the lower seam of black coal is being driven, and on the day of my visit a thin seam had been struck, which, however, the manager, Mr Ekberg, did not think was the true seam. An accident has happened to a man in this mine from a truck getting away on the incline, which has already been reported on by Mr Binns.

I have, &c.,

S. HERBERT COX,

The Under-Secretary for Mines, Wellington.

Inspector of Mines.

Mr. Inspector Cox, F.G.S., to the UNDER-SECRETARY FOR MINES.

SIR,—

Mines Department, Wellington, 2nd April, 1884.

I have the honour to inform you that I have inspected the more important collieries at Nelson, the West Coast, and Otago, and herewith submit my report on the same.

*Picton Colliery.*—I visited this mine on the 6th February, and found that three shafts had been sunk and drives put in to intersect the country in various directions, all of which, however, end at the same point, viz., the first shaft sunk, from the bottom of which a borehole was put down on coal. There are two seams of coal discovered in the mine up to the present time, neither of which promise to be of any great extent. One of these rests hard against the slate in places, and at others is interstratified with shales; while the upper seam, to which most attention has been paid, is interstratified with shales: both seams are cut in a cross drive from No. 2 shaft. In the main shaft a calcareous conglomerate was struck at the bottom, and a drive was commenced to go through it, but has since been abandoned, and water is now standing at the bottom of the shaft. A drive has been put in from a higher level, which cut the coal. In character the seams are exceedingly patchy, the coal in several cases being seen to pinch out from 4ft. or 5ft. to less than a foot in the width of a drive, while in other cases, although the width of the seam is constant, it will be coal at the top of the drive and nothing but shale at the bottom. There are, however, a few hundred tons of coal available, and works are being undertaken to get this at once. At the time of my visit all the works were standing well, and with the exception of a few details, which are to be amended, the Act

was carefully observed. The ventilation is very good, and the mine is examined before each shift goes to work. The coal will have to be worked by stoping between the different levels, as in a quartz reef, and if carried on in a judicious manner can be worked in perfect safety, and Mr. Renfrew, the manager, appears to understand the system which he intends to pursue. With regard to the accident to Marbella, I find that he has left the mine, as also has the manager who reported it, so that very little information can be obtained. However, the men all go to and from their work by the ladders now, and will continue to do so until the cages, which are on the ground, are fitted.

*Wallsend Colliery, Collingwood.*—I visited this mine on the 18th February, and found the works generally standing well and in good order. The system employed is a variety of long-wall, but, instead of allowing the roof to settle down from the first, it is supported for some distance back from the face, in order to throw the weight on the face and facilitate the workings. I pointed out to both Mr. Rees and Mr. Walker that if this course were followed a time must come at which the roof would break over the coal; but, as this is certain to give warning by crushing the props near the face, I have contented myself with an assurance that, should this ensue, they will either ease the pressure by drawing timber, or abandon the face where the crush has come on.

*Westport Colliery Company (Banbury Mine).*—I visited this mine on the 28th February, and found everything going on satisfactorily. Since my last visit great changes have been effected in the working appliances of the mine. The self-acting incline has been greatly improved on the top lift, the trucks being now completely under control, the speed of transit having at the same time been considerably reduced. The lower incline is still worked under a disadvantage, owing to the inconvenience of the hydraulic brake which is employed; but, even with this, as much as 496 tons of coal has been lowered during an eight-hour shift. The arrangements for haulage on the top of the incline have also been greatly improved, an endless chain having been substituted for the ponies which formerly did the work, with the result, I am informed, of a great economy on the cost of haulage. This endless-chain system it is proposed eventually to continue as far as the thick coal in Coalbrook Dale, and in the course of six weeks from the date of my visit it was hoped that operations would be commenced in the 12ft. seam of coal, which is a continuation of that exposed in Burnett's face. A furnace has now been erected to the rise of the workings, so that a constant ventilation is now insured. The accident which occurred lately on the incline, by which one man lost his life and another suffered severe injuries, appears to have been due to the breaking of a coupling on the railway truck. The men were riding in the truck, in defiance of a rule posted forbidding it; but, at the same time the danger of travelling the incline on foot is considerable, and some provision should be made for access to Denniston without using the incline at all. The question whether the formation of the required track is a duty of the company, or whether it devolves upon the County Council is in dispute, but whoever does it the track is urgently required.

*Brunner Colliery.*—I visited this mine on the 3rd March and examined all the workings, finding that everything was safe and in good order. The most important works are now to the dip, where the coal is thick, and of first-rate quality; but the rise-workings have also been pushed forward during the past year, and a considerable quantity of coal extracted, which is, however, of a more tender character than that from the dip. The system of haulage has been greatly improved since my last visit, and the erection of the fan has given a constant and reliable current of air. A drive has been put through the fault to the rise proving the coal beyond it where the throw is but small, and the work of proving the coal beyond the fault further to the dip is to be continued at once. All the requirements of the Act appear to be observed, and, although a little gas is seen from time to time, no accumulation whatever has as yet occurred, and every care is exercised to prevent accidents. The use of safety-lamps to the rise has been discontinued since the blower mentioned in my last year's report was passed, and at the present time but little gas is given off from it.

*Coalpit-Heath Colliery.*—This mine was visited on the 3rd March, and is in much better order than when I last inspected the workings. The winding machinery has been erected to haul from the dip-workings, and by means of two ropes, one down the main incline and the other down what was formerly the horse-road, the whole of the dip coal is brought to the main level, whence it is drawn by horses to the bottom of the shaft. The present arrangement of the workings allows of a much better system of ventilation than formerly, but still, although there is a strong current of air passing through the mine, the ventilation is not as perfect as it might be at some of the places to the dip. This is probably due to inefficient stoppings at places, and Mr. Alexander has promised to pay particular attention to this. There is still a little gas found in the mine from time to time, but it is soon cleared out when the furnace is in full work, and Mr. Alexander proposes to increase the height of the air-shaft, so as to insure a more perfect current of air and entirely prevent baffling, which should greatly improve the ventilation. I was not aware at the time of my visit that Mr. Binns had several times lately had to find fault with the ventilation, and so took Mr. Alexander's promise to improve it as likely to be carried out. As, however, he appears to have previously neglected the injunctions of the Inspector, it will be necessary, as Mr. Binns suggests, to take steps to enforce compliance with the Act.

*Shag Point Colliery.*—I visited this mine on the 17th March, and found that, in accordance with a notice from Mr. Binns, the whole of the workings had been abandoned and the shaft allowed to fill with water.

*Abbotsroyd Colliery.*—I inspected this mine on the 19th March, finding that the works generally were safe, but, as of late several of the old workings have been reopened and the coal is being got through some of these, the mine does not present the appearance of a well-worked colliery. At the present time a drive is being put in to cut yet another of the old workings, in which a certain amount of standing water is expected to be found. A single borehole was kept ahead in this drive, and I required Mr. Walker to also keep flank boreholes ahead, in compliance with the Act.

*Fernhill Colliery.*—This mine, which I inspected on the 19th March, was generally in good order, and a fair output of coal is being maintained. A large furnace has been erected for ventilating purposes, which should be far more than sufficient to supply good air throughout the mine; but,

notwithstanding this, although there was a fair quantity of air passing, the mine was hot at places. This is accounted for by the manager by the fact that the in-take tunnels are situated in a gully, and the wind on the day of my visit was not favourable for ventilation; but a furnace should be able to overcome difficulties of this sort.

*Green Island Colliery.*—I visited this mine on the 19th March, and found that the works on the south side of the railway had been abandoned, and a new dip-drive put down on the north side, striking a good seam of coal. But little work has as yet been done here, but what works there are are in good order.

*Kaitangata Colliery.*—I paid a visit to this mine on the 20th March and, as usual, found everything in thoroughly good order and every precaution taken to avoid accidents. Since I last visited the mine important works have been undertaken to continue the dip-drive below the level of the shaft. Fresh winding machinery has been erected at what is now the bottom of the incline, and a large boiler has also been erected at the pit bottom. In the meantime the work has been progressing in the upper levels from the incline, and on the south side the tops have been drawn in the bords, and at places the high chambers thus formed have been holed through to the next higher level, so as to secure ventilation. The system which has been employed for drawing this top coal has the recommendation of being as safe as it is possible to make it. All the top coal, as it is broken down, is allowed to remain under foot until the height of the bord has been reached, so that the men are always working in such a position as will enable them to see what they are about and to test the roof. Although, of course, coal standing like this is liable to make a good deal of dross, it is probable that if the coal was drawn as it was broken down the proportion of small coal would be greater, owing to the distance it would have to fall; besides which, high stagings would have to be employed for the men to work on, which would increase the danger of the workings. Notwithstanding the large quantity of coal which has been drawn from this steep area, the stability of the mine does not seem to have been in any way affected, for, the works having been laid out symmetrically, there exist vertical pillars from the base to summit of the workings, and these are strengthened at every level by ribs which have been left in, forming a regular solid network. It is not proposed to in any way interfere with these pillars for the present, but the workings will be continued to the dip on the same system as heretofore. The ventilation is all that can be desired, and, with the exception of the time, a few months ago, when the barometer was so universally low throughout New Zealand, no gas has been seen for a long time. At the time to which I allude a little gas was found, but no accumulation took place, and every care was exercised to be prepared in case of danger.

*Nightcaps Colliery.*—I visited this mine on the 22nd March and found the workings in good order. Over three acres of new sluicing ground has been opened up, in which the stripping is but little over 2ft. in thickness, besides which the lower or 10ft. seam is being opened up by a tunnel, which has struck the coal after driving for a distance of 90ft. through conglomerate. The upper seam is now being opened up on the north side of the dip-drive, sixteen bords being at work; the workings on the south side are abandoned, with the exception of one pillar, which is being drawn. The levels to the north have now been driven for a distance of 250ft. from a depth of 270ft. along the incline, and the seam is only 2ft. 4in. thick. The ventilation is good, and the Act is carefully observed.

*Walton Park Colliery.*—I visited this mine on the 25th March, and found all the workings in good order, the ventilation first rate, and the provisions of the Act observed in every particular.

I have, &c.,

S. HERBERT COX,

Inspector of Mines.

The Under-Secretary for Mines, Wellington.

#### No. 4.

##### REPORT UPON INSPECTION OF QUARTZ MINES, WESTPORT DISTRICT.

Mr. H. A. GORDON, Inspector of Mines, to the UNDER-SECRETARY for MINES.

SIR,—

Mines Department, Wellington, 14th May, 1884.

I have the honour to forward you my annual report on the quartz mines in the Westport District, for the year ending the 31st March, 1884.

1. *Golden Fleece Quartz Mine.*—24th March, 1884. The whole of the workings in this mine are satisfactorily timbered and well ventilated. There is no ladder-way down the main shaft, as it is only formed with two compartments for winding; but there are good ladders going down winzes from the surface to the lowest or 740ft. level. The winze is not continuous all the way; the men go into a tunnel driven in from the face of the hill, about 100ft. below the level of the mouth of the shaft, until they come to the line of reef, and thence down a winze to No. 2 level, thence travelling northwards on No. 2 level they go down a winze to Nos. 3, 4, and 5 levels, thence travelling a few feet northwards they go down a winze to No. 6 level. The ladders in the several winzes are in fair condition, but they are scarcely ever used by the workmen, unless it is to go from one level to another; nevertheless the winzes are kept specially in good repair, with ladders fixed in them, to allow the workmen to go up or down in case of any accident to the shaft or winding machinery. In the No. 6 level there is a winze sunk down to No. 7 level, which is divided into three compartments, viz., two for winding and one in which is placed ladders for the workmen to go up and down to and from their work. On the top of this winze there is a chamber constructed, and an air-winch erected for winding, worked with compressed air from pipes leading down from the air-compressor on the surface. The same pipes supply air to work the rock-borers and underground diamond-drill: the former is used to stope out the quartz, and the latter is fixed in position in the No. 7 level to prospect the country with; this drill, in addition to being compact and easily handled, can bore at any angle for about 600ft. The first borehole that was started failed to go down further than about 135ft., as the rods got bent and twisted in such a manner that they broke in trying to draw them: the reason the mine manager gives for this is, that the accident is not in the least owing to any

faulty construction of the diamond-drill, but more to the men that were working the machine not being accustomed to or properly acquainted with its working. In boring through the various strata some are soft and broken, while others are solid and hard, and if the drill get into a place between these soft and hard substances it is inclined to run or follow the inclination of the side of the hard seam, and requires special manipulation in the working to prevent this, which the workmen did not understand at the time. This company has done a good deal of work during the year in prospecting and in stoping out portions of the reef; but the returns did not remunerate them for their labour: they consequently are prospecting at the present time with a view of again picking up the reef that was worked in former years, but which was cut completely off in the different levels by a slide: There are twenty-one men employed underground and on the surface. Plans of the underground workings were at the mine, but the weekly record was locked up and the key could not be found, so that I had no opportunity of seeing it. This company and its energetic manager, Mr. Trennery, deserve credit for the plucky manner in which they have erected the most complete machinery for underground mining there is in New Zealand, and have set an example to other companies in this district, who are fast following in their footsteps.

2. *Golden Treasure Company's Quartz Mine.*—21st March, 1884. This company has during the year, constructed a chamber at the bottom of their shaft, which is about 300ft. deep, and driven a main level 400ft. long. This level has been driven for the greater part of the distance without timber, but large flakes of the slate-rock have come down from the sides and roof, which necessitates the tunnel being timbered before further work is proceeded with, and the company are at present getting this done. They have struck a small body of quartz at the end of the drive, which they take for the reef that they have been working on at the higher levels, and are beginning to rise up on the lode. They have a very good winding shaft, divided into three compartments, two for winding, and one as a ladder shaft, in which are placed good ladders with iron rungs, and set at a slight inclination from the vertical, having plenty of foot-hold. There is likewise a good landing platform every thirty feet, but there is no fence round the mouth of the shaft, nor sliding-fences to raise and lower as the cages go up and down. The winding machinery also requires to be fenced, in order to comply with the provisions of the Act. On the 15th April last I wrote to the manager requesting him to have the machinery and mouth of shaft properly fenced. An attempt was made to sink a winze in the lower level of the old workings, but the ventilation was not sufficient to get this done, and they are now abandoned for the present. There are seven men employed underground and on the surface.

3. *Energetic Company's Quartz Mine.*—21st March, 1884. This company has done very little else during the year but prospecting. They stoped out a small portion of a block of quartz from the battery level; but when this was crushed it was found not to be remunerative for working, and all hands were discharged, with the exception of the mine manager and one man, who are driving a prospecting tunnel into the hill at right angles with the strata, to see if any new body of stone can be found. At the time of my former visit to this mine I called the attention of the manager to the unsafe state of the timber in the main tunnel: this has been replaced, and the workings on this level are in a perfectly safe condition. There is no weekly record kept, nor plan of the workings kept near the mine; but, as there is so little work doing at present, I did not insist on these rules being strictly adhered to, but if they commence again to work the mine they will be strictly observed.

4. *Wealth of Nations Company's Mine.*—20th March, 1884. This company has abandoned all the upper workings, and is now engaged in driving a tunnel on the same level as the mouth of the Keep-it-Dark Company's shaft. The tunnel is constructed for 150ft.; it is 4ft. 6in. wide at the bottom, 3ft. 6in. wide at the top, and 6ft. 6in. high, all in the clear, inside the timber. The tunnel is timbered with heart of black birch, having legs and caps ten inches square, and placed 4ft. apart from centre to centre, with black birch laths three inches thick placed behind the sets to prevent the ground from flaking away. Air pipes are at present being fixed to secure good ventilation. There are six men employed underground and two on the surface.

5. *Keep-it-Dark Company's Quartz Mine.*—20th March, 1884. This company has a well-regulated mine, both with regard to safe working and good ventilation. They are principally working from No. 4 level, 150ft. below the mouth of the shaft, and are stoping out the quartz between this level and their original workings, and have still about from 40ft. to 60ft. of back to take out. Their shaft is sunk down to the depth of 340ft. A chamber has been constructed, and a tunnel, termed No. 5 level, 522ft. in length, put in at 300ft., and they are now opening out the quartz lode, so that it will be ready to stop out as soon as the No. 4 level is finished. The mine is exceedingly well timbered, the timber in the main levels being from fourteen to sixteen inches in diameter, and, although the stopes in No. 4 level are getting pretty well taken out, there is not the slightest indication of any of the timber showing signs of weakness. The manager of the mine, Mr. Fitzmaurice, deserves credit for the systematic mode in which the mining operations of this company are carried on. The quartz is broken out in stopes with rock-borers worked by compressed air. This plant consists of an air-compressor (two cylinders), receiver, and three rock-drills, and cost, including erection, about £1,800. The air-compressor is driven by an overshot water-wheel, which also works a crushing battery of twenty heads of stamps. The return from this mine for the year ending the 29th December, 1883, was, 9,378 tons of quartz crushed, yielding 5,588oz. 8dw. 18gr. of melted gold, or an average of about 12dw. per ton, and from this return £11,500 was paid in dividends to the shareholders. There are two quartz lodes in this mine, termed the north-and-south reef, which averages about 6ft. wide, and the east-and-west reef, about 4ft. wide. A weekly record is kept, but no plan of the underground workings is at the mine. On the 15th April last I wrote to the manager requesting that a plan be kept at the mine, so that it can be seen when making inspection of the workings. There are likewise no covers on the cages: the manager informed me that he had them on but had to take them off again, as the slack portion of the winding rope used to catch on the covers, and was liable to cause an accident. As the workmen use the ladders in the winze from No. 4 to No. 5 level, I did not insist on the covers being put on at present. In all other respects the provisions of the Act have been complied with. There are twenty-seven men employed underground and five on the surface, exclusive of about six men employed at the crushing battery.

6. *Golden Point Company's Quartz Mine.*—22nd March, 1884. This company has suspended operations. The quartz lode that they were working did not prove remunerative, and after prospecting for some time they could find nothing new, so they ceased working.

7. *Globe Company's Quartz Mine.*—22nd March, 1884. This company is working from two tunnels driven in the face of the hill from a branch of Oriental Creek: they are termed No. 1 and No. 2 tunnels. No. 1 tunnel is driven in until it cuts the reef, and thence follows the course of the reef for about 150ft.: this is a separate lode from what is termed the main reef. It is stoped out for about 60ft. in height, and the lode averages about 8ft. wide for about 70ft. in length; but it then breaks and has about 30ft. of a mullock bar, and thence opens out again to about 5ft. wide; but at the end of the stope it becomes broken up and finally gets into a narrow leader. The main reef in No. 2 tunnel is stoped out for 100ft. high in the north end and 60ft. high in the south end, and about 150ft. along the lode, having an average width of about 10ft. The ladders in the passes leading up to the stopes are badly fixed, and have not sufficient provision made for the workmen getting out of the passes into the stopes, the top of the pass being slabbed over as a receptacle for quartz: when the top of the ladder is reached the only way is to crawl through a division into the quartz pass and scramble up through the mouth of it. There is likewise a considerable amount of carelessness displayed with explosives, as there were dynamite cartridges and detonators lying loosely about the sides of the tunnel on the main level. On the 12th April last I wrote to the manager about this, and requested him to have the ladders properly fixed, and proper cases got for the safe-keeping of dynamite and detonators. There is likewise no plan of the workings at the mine, nor any weekly record kept. There are twenty-two men employed underground and three on the surface. This company during the year has constructed hoppers capable of holding about two hundred tons of quartz, and erected an aerial tramway capable of conveying about five tons of quartz per hour for a distance of ninety-six chains to their crushing battery, which is erected at the side of the Inangahua River, on the opposite side from Crushington; a description of this tramway is given in my report on the gold fields. The crushing battery consists of twenty head of stamps and one berdan, driven by a turbine water-wheel, by water lifted from the Inangahua River and brought down in a water-race a mile and three-quarters in length and capable of carrying about thirty sluice-heads of water.

8. *Oriental Quartz-Mining Company.*—22nd March, 1884. This company had suspended operations at the time of my visit, so that there was no one at the mine or battery. They have a tunnel going through the range from about two miles up Oriental Creek to Devil's Creek, and have stoped out the quartz for about five stopes in height, and crushed about 2,696 tons of stone, which yielded 515oz. of gold, or nearly 4dwts. per ton. The reef averages about 14ft. wide, but the small percentage of gold, with their present crushing plant, will not pay working expenses. They have a new battery of five heads of stamps on the ground ready for erection, but they are afraid that a steam-engine they have for working the battery is not powerful enough to drive more than the ten heads that are erected. They likewise put in a cross-cut from the main drive, and struck another body of stone at a distance of about 50ft. This lode is about 12ft. in width, and shows a little gold, which they intend to test properly as soon as they commence operations again. The main tunnel and workings are securely timbered and well ventilated, and there is a good ladder up a winze to the surface at the end of the tunnel next to Oriental Creek.

9. *Welcome Quartz-Mining Company.*—19th March, 1884. This company has done a great amount of dead-work during the year. The tunnel, or what they term their No. 6 level, goes into the hill from the gully leading down to Boatman's Main Creek, and passes through the leaseholds of the Hopeful and Fiery Cross Extended Companies into the Welcome ground. At the end of this tunnel (about 2,600 feet in length) there is constructed a large chamber, where poppet-heads, over a winding shaft (which is sunk down 150ft., to the No. 7 level) a double cylinder steam-engine, twelve horse-power, with winding gear, and an air-compressor are erected. The steam-boiler and compressed-air receiver were brought in pieces and put together in this chamber. The chamber itself is a work of considerable magnitude: it has vertical walls for about 15ft. in height, and a nicely-curved Gothic-arch roof; the timber-work is nicely dressed, and gives one, were it not for the network of machinery, an idea of being inside a church. From the top of this chamber there is a shaft or winze connected with the surface, which is about 800ft. above this, to serve as a flue for the smoke. The No. 7 level is driven for some distance on the lode known as the "Welcome block." Stopping-out has been commenced from this level, and they are driving on the lode in a southerly direction to strike the antimony reef, but have not succeeded in cutting this yet. The average thickness of the present lode they are working is about 2ft.: it varies in width considerably, sometimes it will widen out to 4ft., and after a few feet will narrow into less than 6in. The stone at the bottom of No. 7 level is not so rich as what it is going up towards No. 6 level, but yet it is of a payable nature. This mine is well timbered and ventilated, with the exception of the chamber where the steam-winding machinery is erected: the ventilation here is very defective and requires to be remedied. The steam from the safety-valve, and the smoke which escapes from the door of the fire-box of the boiler, keep up the temperature from 90° to 100°, or something near that. Although this mine is well-looked after and everything done by the mine manager to render the workings secure, there is carelessness displayed with explosives, which requires to be more strictly watched, as in one of the ladder passes there was a full box of dynamite detonators lying in such a position that the slightest thing would knock it down, or a piece of rock dropping from the roof, or anything falling down the pass, might explode the whole box. These detonators contain the most dangerous explosives, and should be kept in a safe and secure place. On the 12th April last I wrote to the manager and requested that this should be done. The number of men employed underground and on the surface at this mine is fifty-six. The company has added to its crushing plant fifteen berdans, with which they treat the tailings, and have very complete arrangements for lifting them from the pits and feeding the berdans, the whole being done without manual labour. This company has been the most successful one in the Reefton district; they have spent, up to the 31st December last, on machinery and expenses in opening out and working their mine, £89,767,



and have paid £87,000 in dividends to the shareholders; while the capital called up has only amounted to £11,250.

10. *Fiery Cross Extended Quartz-Mining Company*.—18th March, 1884. This company are stoping out from their 450ft. level; the stopes are up for about 100ft. from the level, and the quartz lode is about 2ft. thick, which has been lately averaging about 1½oz. of gold per ton. The mine is securely timbered, but the ladders in the passes are in extremely bad condition: a great many of the rungs are broken, where the ladders are almost vertical. The mine manager, Mr. J. McKenney, seems to consider it impossible to always keep the ladders in good repair, as the workmen have the habit of throwing their tools, &c., down the ladder passes, there being no other provision made for getting them down. However, this will have to be remedied, as the ladders, in places, are absolutely dangerous for the men to travel up and down on. The mine manager is likewise extremely careless about explosives. There was about three-quarters of a case of dynamite (about 37lbs.) lying on the side of the main level, having the wooden lid only partially put on. When speaking to him about this he seemed to think it was quite safe. There was likewise a box of dynamite detonators placed on the edge of a slab on the side of one of the stopes; so that the least thing would knock it down. On the 10th April last I wrote to the manager requesting that explosives be only taken into the mine in properly-made canisters holding small quantities, and that the ladders be repaired. There are thirty-eight men employed in this mine, underground and on the surface, and the output of quartz per week is about from 70 to 80 tons.

11. *Hopeful Extended Company's Quartz Mine*.—19th March, 1884. This company are working from No. 5 level. They have stoped out some of the quartz that was left above the No. 5 level, and are at present sinking down a winze from this level on a small quartz lode, to test its value. There were some time ago ten men employed underground; but at present there are only six men, getting out quartz on tribute. The mine is safely timbered, and provisions of the Act tolerably well complied with.

12. *Eureka Extended Quartz-Mining Company's Incline Tunnel*.—18th March, 1884. This company are driving an incline tunnel, on a gradient of 1 in 3, for the purpose of cutting the quartz reef that the Welcome Company are working. The tunnel is constructed 5ft. wide at the bottom, 4ft. 6in. wide at the top, and 6ft. high in the clear, outside of timber. It is well constructed, securely timbered, and is at the present time 1,050ft. in length. They expect to have to carry it a thousand feet further before it cuts the reef. There are chambers constructed at intervals all along the tunnel for any one to stand in when the truck is in motion. This company have steam-winding and air-compressing machinery, which cost, when erected, about £2,264, and the actual construction of the tunnel up to the present time has cost about £3,500.

13. *Just-in-Time Company's Mine*.—19th March, 1884. This company, in conjunction with the Imperial Company, have sunk a shaft 200ft. in depth, and from which they intend to work their mines. There was too much water in the mine at the time of my visit to enable me to see the workings. They have a good shaft, divided into three compartments, two for winding, and one ladder shaft, with good ladders placed in it. Alongside to the poppet-heads there is a large quartz-hopper erected, divided into several compartments, and capable of holding about 300 tons of quartz. They have good cages, but no covers on the top; nor is the mouth of the shaft fenced, or sliding fences to lift up with the cages as the top of them comes on a level with the brace. On the 12th April last I wrote to the manager and requested that sliding fences be put at the mouth of the shaft on the upper brace, so as to prevent accidents. There are eight men employed, underground and on the surface.

14. *Imperial Company's Quartz Mine*.—19th March, 1884. This company has been doing very little lately, but has now let a contract to sink a winze in their old workings. There is no fence round the winze, which goes down from the surface; but the company only intend to use it until they connect with the workings on the first level from the new shaft that the Just-in-Time Company and they have completed, and then the winze will be covered over.

15. *Caledonian Quartz-Mining Company's Mine (Larry's)*.—17th March, 1884. This company are working in their No. 4 level. They have driven a tunnel southward about 1,000ft. into what is known as the Argyle Lease, then came back in this tunnel about 420ft., and commenced an uprise, which is about 18ft. up; they expect to have to go 40ft. further before they cut the reef. The reason for not rising up at the end of the long tunnel was that the strike of the reef is northwards, and the distance to rise to cut it would have been about 120ft. This is the same lode that a winze was sunk down on for 132ft. in South Larry's (No. 2), and was supposed to be payable. Some very rich stone was taken from this mine a few years ago; but the block of stone that they were working seemed to cut almost entirely out, and they have been doing nothing but prospecting for a long time. There are four men employed, underground and on the surface. To comply strictly with the provisions of the Act comes hard for a company like this, that has now been struggling hard for the last four years to prospect the ground, and have only had a few men employed. So long as the ground is safely timbered, and there are good ladders for the workmen to go up and down, and proper provision made for taking explosives underground, the whole of the rules made under the Regulation of Mines Act might not be rigidly enforced at present. The ladders in the shaft are not in good condition; but the manager undertook to have the repairs and alterations made that I requested to have done, at once. This company have a crushing battery of ten heads of stamps and one berdan, driven with an overshot water-wheel 30ft. in diameter; but this plant has not been used for about four years, and will require to undergo considerable repairs before it can be made use of. The company has spent about £1,045 in prospecting the mine during the past year.

16. *United Alpine Company's Mine, Lyell*.—14th March, 1884. The No. 6 level is now constructed; the tunnel cut the reef 1,466ft. from the mouth, and has been carried on a further distance of 130ft. on the reef; but there has been no stoping-out yet done. The timber in the tunnel is of a substantial character, but the ventilation is rather defective: however, this is to be remedied at once. The Act, on the whole, is fairly complied with. There are six men at work between Nos. 4 and 5 levels, taking out a small block of quartz on tribute; but the lode may be said to be almost

taken out down to No. 5 level, and the ground all filled in. There were at the time of my visit ten men at work underground in No. 6 level, and two men on the surface. Tramways, quartz-hoppers, and shoots were in course of construction, to enable the quartz to be sent to the battery, and when completed and the No. 6 level properly opened out they will be able to keep their crushing battery of twenty heads of stamps going continually. The quartz lode is well defined for about 4ft. in thickness, and alongside the lode there is a conglomerate body of slate and quartz mixed, which, when followed up, may lead on to a larger body of stone.

17. *United Victory Company's Mine, Lyell.*—13th March, 1884. This company has done nothing but prospect the ground since my last visit. They have only two men working by contract, putting in what was supposed to be a cross-cut, but in reality is a tunnel following the strata of the country, with no indication of quartz. There is no mine manager, and, unless there is some new lode found, it is very probable that this company will cease operations entirely, as the lode that was formerly worked was not of a payable nature. The country is extremely hard where they have hitherto been at work; this, together with a small body of stone, will not pay for working, unless the quartz is very rich. The main tunnel leading into the workings is in good repair and safely timbered.

#### NEW MINES:

The following are mines that have no special rules made under the Regulation of Mines Act, and can only be dealt with as far as the general provisions of the Act apply to them; but they will be requested to forward special rules for approval:—

1. *The Phoenix Extended Company's Mine, Reefton.*—21st March, 1884. This mine has been in operation for several years, but, owing to the difficulty of getting the quartz to a crushing battery, and the inaccessible nature of the country—which was without roads, so that machinery could not be got on to the ground—the mine has been prevented from being worked. But this has lately been remedied by the construction of a dray-road up Murray Creek to the mines in this locality. This company, in conjunction with the Inglewood Company, is erecting a crushing battery of ten heads of stamps, and two berdans, driven by a steam-engine of eighteen horse-power; and are constructing tramways, shoots, and quartz-hoppers, to enable the mine to be worked. The quartz lode in this mine is from 2ft. to 3ft. thick. The ground is well timbered, and good ladders are fixed in the passes. There were, at the time of my visit, only two men at work.

2. *Inglewood Company's Quartz Mine.*—21st March, 1884. This company has constructed a tunnel 1,500ft. in length, and driven along the lode for 225ft., which averages about 2ft. 6in. in thickness, and seems to carry a fair amount of gold all through. They have 125ft. of back between the level of the tunnel and their No. 4 level. The ground is securely timbered, and good ladders are fixed in the passes. I cautioned the manager about leaving loose cartridges of dynamite lying about the drives, and he promised to get boxes made to hold them, and place them in a safe position clear of traffic. There were five men at work, underground and on the surface, but this number will be considerably increased as soon as the crushing battery is ready for work.

3. *Inkermann Company's Mine, Reefton.*—20th March, 1884. This company are not working the mine at present, as they are constructing tramways, shoots, and hoppers to convey the quartz to their crushing battery, which is in course of erection at the side of Rainy Creek, about 40 chains from the mine, consisting of thirty heads of stamps and four berdans, driven by a double-cylinder steam-engine of about twenty-five horse-power nominal. They have three levels in their mine, and an immense body of stone: the reef is 22ft. thick, and they have about 230ft. of back between No. 2 and No. 3 levels. The stone is known to be poor, but they anticipate that, from the quantity they will be able to crush, and the small expense of breaking it out and conveying it to the battery, about 4dw. per ton will pay all the working expenses. They have fair timber in their tunnels, but the ladders in the winze will require to be repaired before they commence to work again.

4. *Deep-level Tunnel, Reefton.*—24th March, 1884. This tunnel is constructed for about 15 chains, going in a straight line for the Golden Fleece shaft for about 12 chains, and thence it bears away from this line about 7° to the eastward. There has been no body of quartz struck yet containing gold in payable quantities, and they do not expect to meet with any for a considerable distance further. This tunnel is being constructed by contract. The timbering and ventilation are good.

5. *Low-level Tunnel, Boatman's.*—18th March, 1884. This tunnel is constructed for 800ft.; it is 5ft. wide at the bottom, 4ft. at the top, and 7ft. high in the clear, inside the timber. The sets or frames are made of 8-inch-square legs and 10-inch-square caps, and are placed in the tunnel 4ft. apart from centre to centre, having top and side laths above and behind them 3in. thick. This tunnel is constructed at the joint expense of eight companies in this locality, viz., the Specimen Hill, Homeward Bound, West Welcome, Progress, Comstock, North Cleopatra, and Occidental, with the view of prospecting their ground. They have erected a turbine water-wheel and compressed-air machinery to work the rock-borers, but as soon as this plant was erected some disagreement occurred amongst the companies and the tunnel was stopped.

6. *Specimen Hill Company's Quartz Mine.*—18th March, 1884. This company have just completed the construction of tramways, self-acting incline, shoots, hoppers, &c., necessary to convey the quartz from the mine to their crushing battery, which is erected at the foot of Little Boatman's Creek. The connection between the mine and the battery is as follows: From No. 3 level to first hopper, 33 chains horse-tramway; to the second hopper, 17 chains of self-acting tramway, which is worked by wire ropes and a horizontal pulley having a brake at the upper end; from the second to the third hopper there is a length of 34 chains of horse-tramway; and 120ft. of shoot to the fourth hopper; thence 24 chains of tramway and 220ft. of shoot to the fifth hopper; thence the quartz is conveyed for a distance of about 3 chains in measuring trucks to the battery paddock. All the tramways and inclines are constructed with light iron rails. The battery consists of fifteen heads of stamps and one berdan, driven by an overshot water-wheel 35ft. in diameter. There are three levels in the mine: the upper one is worked out, but there are 70ft. of back to take out between Nos. 1 and 2, and the whole of the reef between Nos. 2 and 3, which is about 84ft. The reef does not run continuous, but has breaks in it here and there, and is intermixed with mullocky slate. The

mine is fairly timbered, and ladders in passes good; but there is great carelessness displayed in the use of explosives: loose cartridges of dynamite, and likewise detonators, were lying here and there along the sides of the drives. On the 12th April last I wrote to the manager requesting that proper canisters be got for taking explosives into the mine. There are twenty-two men at work at the mine and eight men at the battery.

7. *Mokihinui Quartz Mines*.—6th March, 1884. The quartz mines in the Mokihinui district consist of the Red Queen, Comet, Golden Crown, Guiding Star, and Mokihinui. As there was scarcely any work doing in any of these mines I only visited the Red Queen Company's mine; as, from the information supplied me, they are merely prospecting, and nothing can be said about them until they get opened out and their quartz tested. The Red Queen and Mokihinui Companies are conjointly erecting a crushing battery, which will afford facilities to the whole of the companies to test their quartz.

8. *Red Queen Company's Mine*.—6th March, 1884. This company have driven a level following the quartz lode for 250ft., but 170ft. of this is now filled up. The mine manager informed me that the lode was about the same thickness for the whole of the distance driven, viz., from 6in. to 15in. thick, containing good gold. At 80ft. from the mouth of this level or tunnel a winze is being sunk, and some good specimens are got from it. They have likewise driven another level or tunnel 270ft. in length, about 140ft. below the upper level, and have commenced to construct an uprise. There is some fair-looking stone stacked at the mouths of these levels ready for sending to the battery as soon as it and their tramways are completed. It is an extremely hard country, and very little timber will be required to work the ground with safety.

#### SAFETY-CAGES.

A great number of mines, not only in the Westport district, but in every part of the colony, are worked from shafts, some of which are a considerable depth, and therefore careful attention should be given to secure good and efficient winding appliances, and a safe mode of hoisting and lowering the men up and down the shafts. Some of the cages that are at present in use are very defective in their construction: they have not sufficient head-room to admit of a cover being placed on the top to afford protection to persons travelling up and down in case of anything falling down the shaft. It may be truly said that there is not a good description of safety-cage in the colony. This subject is attracting the attention of mine managers and others interested in mines in Victoria, as will be seen from the following description and plans of safety-cages that T. Couchman, Esq., Chief Inspector for Mines for Victoria, has published with his report on the inspection of mines, and which is now republished for the information of those interested in mining and working from deep shafts in this colony:—

“ Mr. Cock, the mining manager of the Victoria Reef Gold-Mining Company, at Sandhurst, has kindly furnished information from which the accompanying plans and description of a safety-cage in use at that mine have been prepared. Mr. Cock says that the advantages claimed for this cage are—(1.) The application of indiarubber springs instead of metal springs, as the latter are so liable to be impaired by rust, and to lose their elasticity and power. [This deterioration of metal springs in quartz mines of considerable depth, where the water is impregnated with minerals, takes place very rapidly; consequently, such springs require constant supervision and frequent testing, otherwise they are not reliable.] The springs are made of the best red rubber,  $3\frac{1}{2}$ in. wide by  $\frac{5}{8}$ in. thick, and are fixed to bear a drawing strain of about 6cwt., the cage being about 8cwt. The springs are four in number, and are placed two on each side of the travelling bar; they are fastened by means of two small bolts at the top and bottom of each pair of springs. These bolts pass through the lower and distant bar for the bottom of the springs, and through the cross tension-bar for the top of the springs, and are tightened by a pair of glands at the top and bottom of each pair of springs, the bolts being beyond the width of the rubber. The rubber springs are said by Mr. Cock to be coming into use in many mines in this district, and he has never heard of a single case of failure, nor does he believe it likely to occur if the cage be well made, the grippers properly set, and if a good tension be on the rubber. (2.) An improvement in the attachment of the connecting-rods to the grippers. These connecting-rods are attached to the tension-bar by eyes slipping over the end of the bar and a pin to keep them in place; but at the other end there is an eye-bolt attached to the grippers: this bolt is passed through the gripper hot, and the head beaten down into a recess made to receive it; it is then loosened so as to move round freely; the eye extends inwards over the side straps of the cage, and the connecting-rod passes through it, with a nut above and below to regulate the pitch of the gripper and to meet the wear of the guides. (3.) The use of an auxiliary safety gripper. These grippers are placed on the slopes of the cage and act upon the face of the runners, but the lateral thrust is not sufficient to push the runners back beyond the action of the main grippers; their length is not sufficient to do so, but they are designed to arrest the progress of the cage sufficiently for the main grippers to come into action. They have been frequently tested in the shaft and have always acted well, not losing half an inch. These grippers are made with  $1\frac{1}{4}$ -in. square iron working in two brackets rivetted on to the slope of the cage, the pinion of the grippers extending beyond the brackets a sufficient length to receive a rod on the end of each pinion; these rods are made with a sweep, as shown in the plan, and are pinned on to the pinion, which is keyed to the grippers; one of these rods on each pinion has an eye turned outwards from the end of the rod, through which the rod on the opposite pinion works, and is of sufficient length to prevent to two forming each pair from coming apart when brought into action. And for the purpose of preventing the grippers coming too readily into action, as they would be liable to do on the rebound of the cage from the bumpers when in rapid work, there is a small strip of  $\frac{1}{2}$ in.-square rubber fastened from the top of the cage to one of the sweep-rods, with just sufficient tension to keep the grippers steady. The auxiliary grippers are brought into action by a man in the cage putting his hand on any part of the sweep-rods and pulling them down: a strain of about 2lb. is sufficient to do so. The sweep-rods are placed on each side, to enable a man on either side of the cage to have command of them without reaching across. The

cage is also provided with two catches, which may be thrown forth against the travelling bar and under two catch-blocks attached to the travelling bar, for the purpose of preventing the grippers cutting the runners on landing at the plats when pulling quartz, mullock, or water. But these catches should at all times be thrown back when men are about to ascend or to be lowered, otherwise they would prevent the action of the springs and render the grippers inoperative. When the cages are not in work, he deems it advisable to protect the indiarubber from the rays of the sun. Mr. Cock states that the cage has withstood some very severe tests.

“*Description of Plans of Cage, &c., showing Auxiliary Grippers.*—No. 1 plan shows the auxiliary grippers out of action. No. 2 plan shows the auxiliary grippers out of action. No. 3 plan shows the auxiliary grippers in action; *a*, the slope of the cage; *b*, the grippers which act upon the face of the runners; *c*, brackets rivetted on to the slopes; *d*, the pinion or shaft to which the grippers are keyed, and to which the sweep rods *e* and *f* are pinned, and working in the bracket *c*; *e*, sweep-rod pinned on to the pinion at one end, and having an eye forged at the other and turned outwards, so as to allow the rod *f* to pass smoothly through the eye; *f*, sweep-rod pinned to the pinion, and which works through the eye in *e*, but it is much longer than the rod *e*, and of quicker sweep, quickening as it extends; *g*, small indiarubber spring, with just sufficient tension to steady the grippers from the rebound of the cage; they also retard the action of the grippers until sufficient force is applied to put them in action.

“In reference to this cage, Mr. Grainger, Inspector of Mines for the Sandhurst District, reports as follows upon a trial of the apparatus witnessed by him: ‘The trial took place on the surface, temporary skids having been erected for the purpose. On the rope being cut, the distance the cage fell was hardly perceptible. A second trial took place, when the manager, Mr. Cock, got into the cage, and, on the rope being cut, the cage was instantly caught. I was well pleased with this part of the trial, as the grippers proved to be most effective. I then descended the shaft with the manager, at the ordinary speed, when, at a depth of 1,180 feet from the surface, in order to prove the efficiency of the auxiliary grippers, I applied one of the sweep-rods indicated in the letters *e* and *f* on plan No. 1, and the auxiliaries acted at once, stopping the cage instantaneously. The main grippers also acted at once. I may add that the auxiliary grippers, as well as the others, took such a hold that they cut right into the skids. The auxiliary grippers of this cage are by far the best and most effective that I have seen. The cage at the mine has been in use since October, 1879, and is now in good order. The trials which I witnessed were most satisfactory.’

“Mr. Grainger, the Inspector of Mines, at Sandhurst, has furnished sketches, from which the accompanying drawings and description of a safety-cage known as Datson’s have been made. The cage is said to have been in successful use for some time in the mine known as Lansell’s No. 180 at Sandhurst: ‘Datson’s safety-cage, which is 7ft. 6in. in height, is constructed in the ordinary manner, and is suspended from the centre-bar by two chains (*a a*), which are attached to circular pulleys (*b b*), keyed to horizontal bars which cross the cage. On each side of the inside of the cage is a pair of eccentrics (*c c*) keyed to the bars, carrying two pairs of grippers (*d d*) outside the cage, which, when required, work against the skids. The eccentrics are each connected on the underside by strong bands of indiarubber (*h*), which, when the rope is disengaged by any accident, compress the grippers, so as to bring them against the skids, and thereby arrest the movement of the cage. On the inside of the cage two cranks (*f f*), pointing inwards, are fixed to the cross-bars actuated by a lever (*e*) connected at its short end by a chain with both cranks. On the lever being pulled down by any one inside the cage the raising of the cranks brings into play the outside grippers, and the cage is stopped. The least weight on the lever brings the eccentrics into play.’”

#### CONCLUSION.

In concluding my report on the inspection of mines: Too much care cannot be taken in using explosives, and these seem to be kept and handled by several companies’ workmen in the most careless manner. It is not sufficient for a mine manager to merely give directions to the workmen to be careful, but it is and ought to be a part of his duty to see that explosives are taken into the mine in proper boxes or canisters, and that there should be certain safe places for these to be kept in inside the mine. They have now been fully warned with regard to explosives, both by Mr. Binns and myself, and, if any further infringement of the rules be made with regard to this, legal proceedings ought to be taken in order to force them to use every effort to guard against accidents occurring. The following table shows the principal mines at work in Westport District during the year ending 31st March, 1884.

The Under-Secretary for Mines,  
Wellington.

I have, &c.,

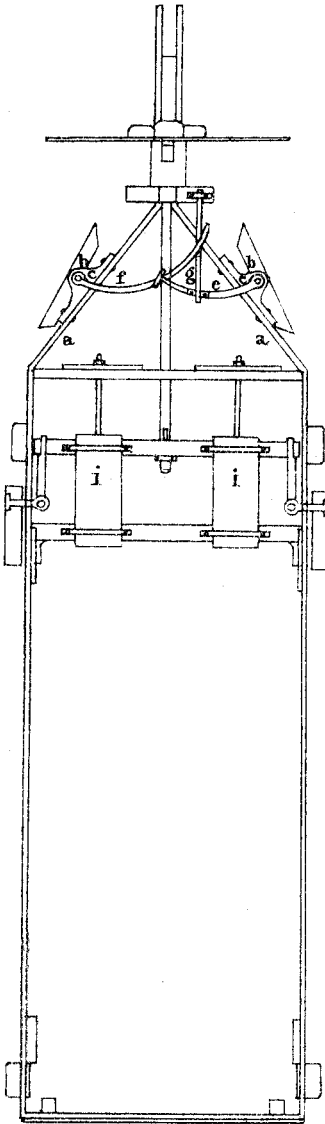
HENRY A. GORDON,  
Inspector of Mines, Westport District.

# VICTORIA REEF GOLD MINES C<sup>o</sup>

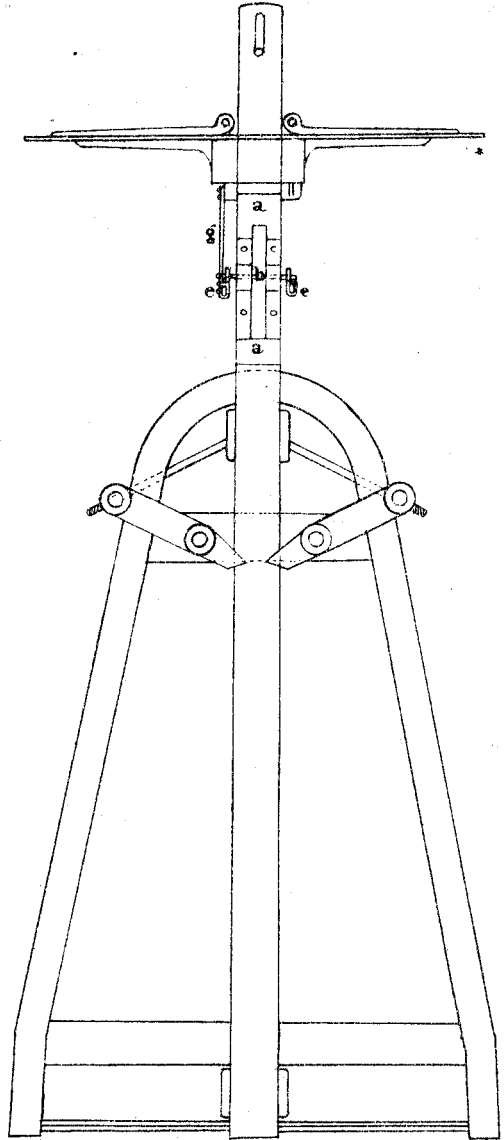
## SAFETY CAGE

SCALE  $\frac{3}{4}$  of an In. to 1 Ft.

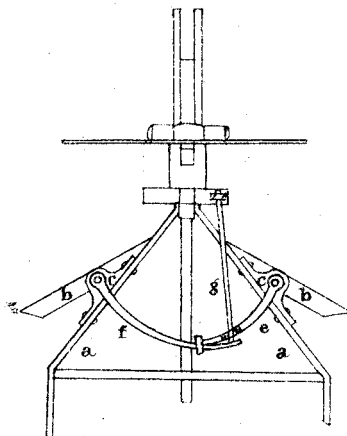
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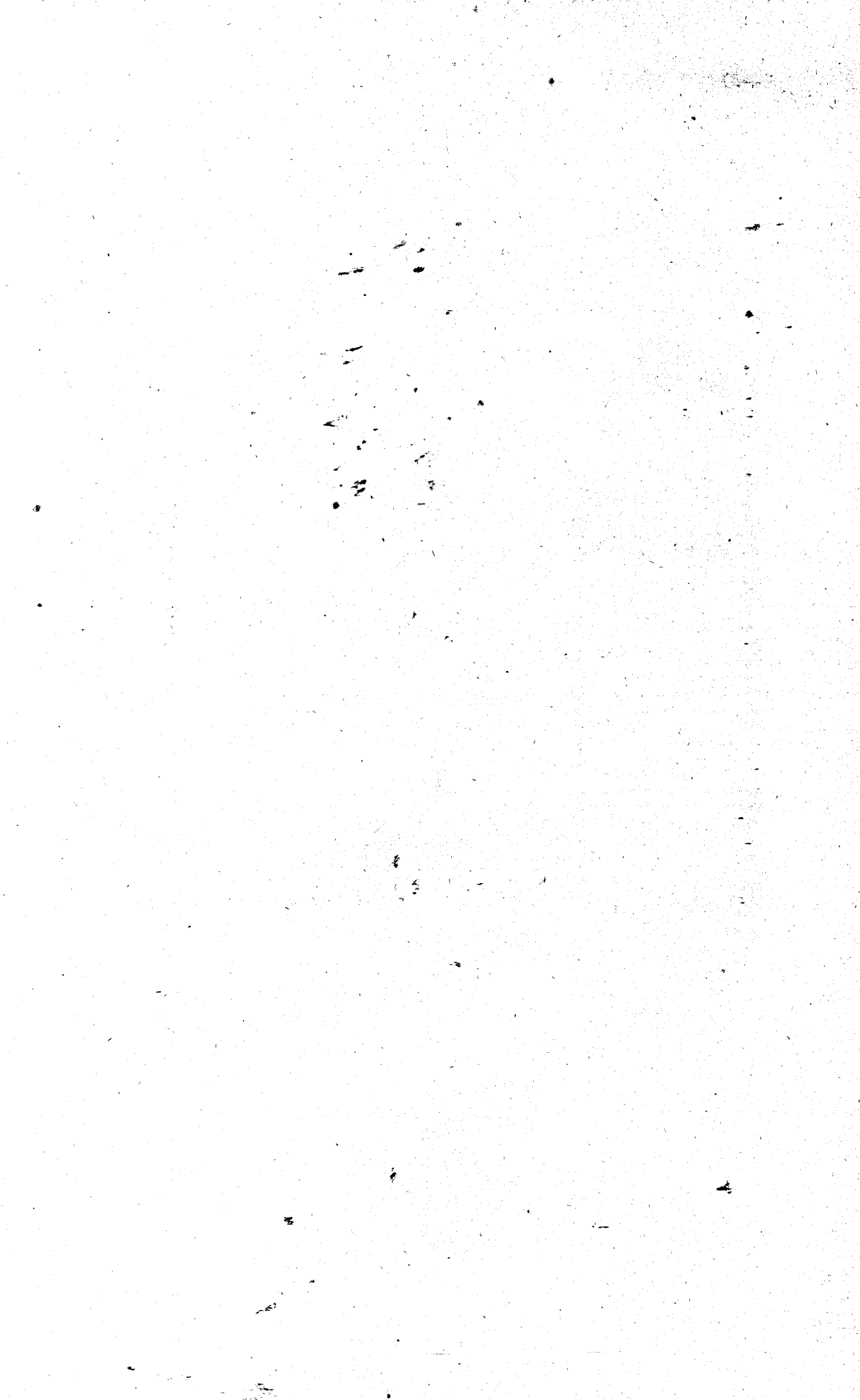


2.



3.



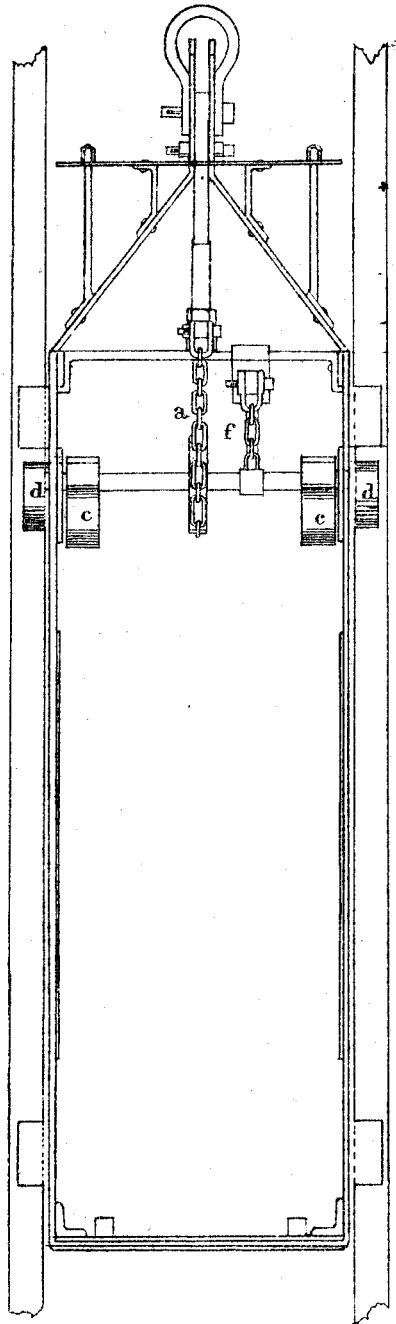
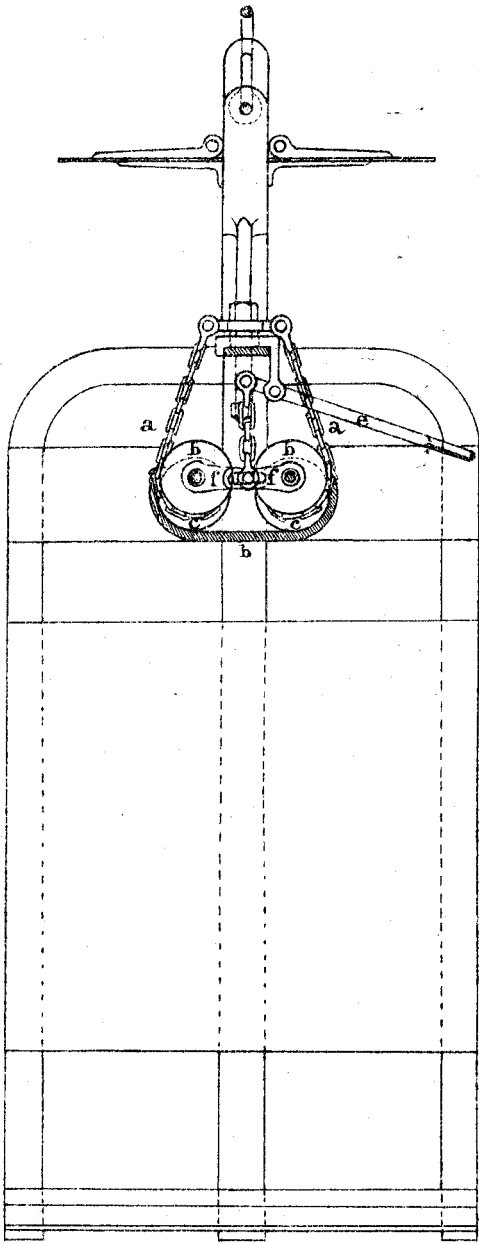


# DATSONS SAFETY CAGE

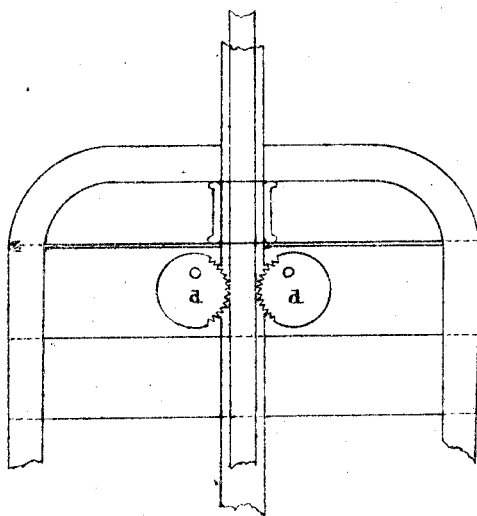
Scale —  $\frac{3}{4}$  of an Inch to 1 Foot

SECTIONAL ELEVATION

FRONT VIEW



SIDE VIEW



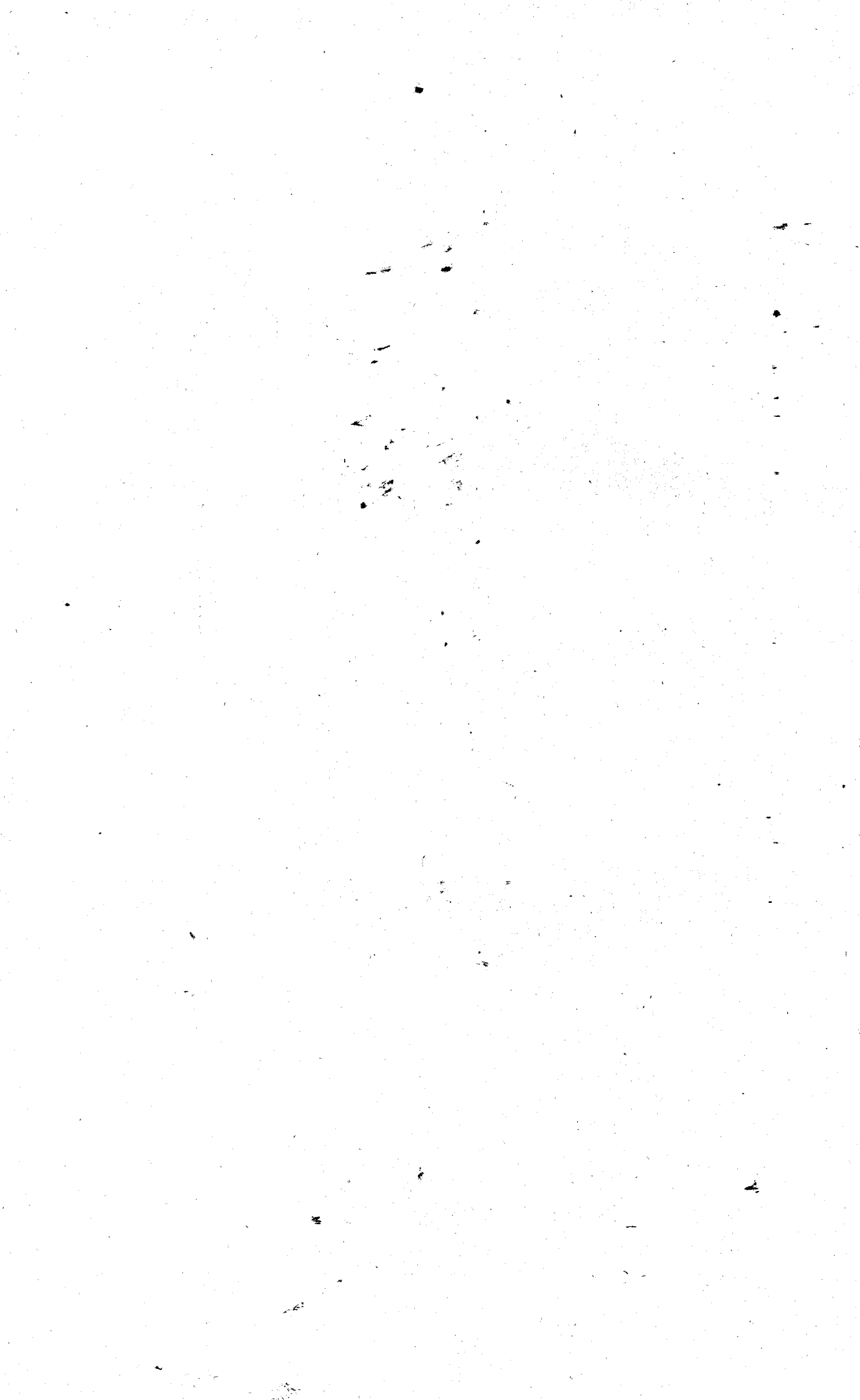




TABLE showing the principal QUARTZ MINES at work in the WESTPORT DISTRICT on the 31st March, 1884.

Locality and Name of Mine.	Name of Legal Manager.	Name of Mine Manager.	Output of Quartz delivered by	Machinery Employed.			No. of Heads of Stamps.	No. of Berdans.	Tons of Quartz Crushed.	Approximate Yield of Gold in Ounces.	Men Employed.		Date of Inspectors' Last Visit.
				Winding.	Air-Compressing.	Crushing.					On Surface.	Under-ground.	
<b>REEFTON—</b>													
1. Golden Fleece Extended..	G. W. Moss	M. Bradbury	shaft	steam power	steam power, 2	steam power	15	2	697	477	5	16	24/3/84
2. Golden Treasure	J. Hunter	A. McKay	shaft	steam power	..	steam power	30	2	..	11	1	6	21/3/84
3. Energetic	G. W. Moss	J. McCallum	tunnel	..	..	steam power	15	4	280	70	2	2	21/3/84
4. Wealth of Nations	W. Rae	T. Watson	tunnel	..	..	water power*	20	2	180	122	..	6	20/3/84
5. Keep-it-Dark	G. C. Beaumont	R. Fitzmaurice	shaft	water power	water power, 1	water power*	20	2	7,373	5,510	11	27	20/3/84
6. Golden Point	G. Peotti	..	tunnel	..	..	water power†	10	1	1,000	271	..	..	22/3/84
7. Globe	W. S. Hindmarsh	J. Adams	tunnel	..	..	water power†	20	2	4,000	1,312	9	22	22/3/84
8. Oriental	P. Brennan	G. Black	tunnel	..	..	steam power	10	1	2,580	746	..	..	22/3/84
<b>BOATMAN'S—</b>													
9. Welcome	P. Brennan	F. Rooney	shaft and tunnel	horses and steam power	steam power, 1	water power*	15	15	2,842	4,247	9	53	19/3/84
10. Fiery Cross	G. W. Moss	J. McKenney	shaft	water power	..	water power*	15	2	2,108	2,811	..	..	18/3/84
11. Hopeful	P. Brennan	J. Bates	tunnel	..	..	..	..	..	853	578	3	6	19/3/84
12. Eureka	W. S. Hindmarsh	J. Tawchke	engine incline	steam power	steam power, 1	..	..	..	..	..	3	6	18/3/84
13. Just-in-Time	G. Wise	J. Wilson	shaft	water power	..	water power*	10	1	..	..	2	6	19/3/84
14. Imperial	G. Wise	J. Galbot	shaft	water power	..	..	..	..	..	..	2	6	19/3/84
<b>LARRY'S—</b>													
15. Caledonian	G. Wise	E. Lavn	shaft	water power	..	water power*	10	1	..	..	1	3	17/3/84
<b>LYELL—</b>													
16. United Alpine	J. Inglis	M. Conradson	tunnel	..	..	water power*	20	2	1,250	509	2	14	14/3/84
17. United Victory	H. Churton	..	tunnel	..	..	water power†	10	1	380	285	..	2	13/3/84
<b>REEFTON—</b>													
18. Phoenix	P. Brennan	J. Harris	tunnel	..	..	steam power	10	1	..	..	6	2	21/3/84
19. Ingleswood	T. Lee	A. Seawright	tunnel	..	..	steam power	30	4	..	..	6	5	21/3/84
20. Inkermann	F. Street	..	tunnel	..	..	..	..	..	..	..	16	..	20/3/84
21. Deep-level Tunnel	E. Wise	..	tunnel	..	..	..	..	..	..	..	6	6	24/3/84
22. Nil Desperandum	Thos. Lee	..	..	..	..	..	..	..	..	..	..	..	..
<b>BOATMAN'S—</b>													
23. Low-level Tunnel	P. Brennan	..	tunnel	..	..	water power, 1	15	2	..	319	8	22	19/3/84
24. Specimen Hill	P. Brennan	H. Cosgrove	tunnel	..	..	..	..	..	..	..	..	..	18/3/84
<b>MOKUHINI—</b>													
25. Red Queen	Z. C. Horne	C. Rasmussen	tunnel	..	..	water power*	10	2	..	..	..	4	6/3/84
<b>Total</b>	..	..	..	..	..	..	285	47	23,443	17,268	83	214	297

\* Overshot. † Turbine.

RETURN No. 1.  
STATISTICS of WORKINGS in COAL MINES, 1883.

Locality and Name of Mine.	Name of Manager.	Number of Years at Work.	Quality of Coal.	No. of Seams Worked.	Thickness of Seams.	Thickness Worked.	Dip of Seam.	System of Underground Working.	Number of Shafts.	Dimensions of Shafts.	Output delivered by	Output for 1883.			Approximate Total Output to 31st December, 1883.	Number of Men Underground.	Number of Men on Surface.	Total Number of Men Employed.	Power used for drawing Mineral.	Stroke of Pump.	Size of Barrel.	Height of Column.	Means of Ventilation.	Date of Inspectors' Last Visit.
												Tons.	Slack.	Coal.										
KAWAKAWA DISTRICT.																								
1. Kawakawa	Moody, T. P.	19	semi-bitum.	1	2' 6" to 15'	2' 6" to 15'	varies	board and pillar	4	7' x 10'	engine-incline shaft & tunnel	nil	29,271	29,271	517,181	65	15	80	steam-engine.	8' to 7'	12"	247' furnace	29/5/84	
2. Kamo, near Whangarei	Kerr, George	7	brown	2	4' to 12'	4' to 12'	"	"	3	6' x 15'	tunnel	"	18,455	18,455	64,049	33	7	40	st.-en. & horse	3' to 7'	10"	221' natural	21/5/84	
3. Whauwhau, near Whangarei	Love, Alexander	19	"	1	5' to 10'	5' to 10'	"	"	1	"	tunnel	"	6,743	6,743	31,091	8	4	12	horse	"	"	"	22/5/84	
WAIKATO DISTRICT.																								
4. Taupiri, Huntly	Collins, William	8	"	1	6' to 45'	6' to 35'	"	"	25'	3' diam.	eng.-pln. tunnel	"	33,290	33,290	132,217	42	8	50	st.-en. horse	Tangye	105'	"	17/5/84	
5. Waikato, Huntly	McClynn, A.	7	"	1	10' to 18'	10' to 18'	"	"	1	"	tunnel	"	5,003	5,003	50,083	6	4	10	horse	"	"	"	16/5/84	
PELOPUS DISTRICT.																								
6. Picton, Picton	Renfrew, John	3	"	2	5' to 12'	"	90°	stopping out	2	4' x 6' 5' 10' x 10' 6"	shaft	"	100	100	183	6	5	11	steam-engine	4'	6"	150'	6/2/84	
7. Picton and Shakespear Bay, Picton	Pugh, W.	3	"	"	"	"	"	"	"	"	"	"	"	"	53	2	1	3	hand	"	"	"	13/12/82	
8. Queen Charlotte Sound, Picton	Adams, T.	1 1/2	"	"	"	"	"	"	"	"	"	"	"	"	"	2	1	3	"	"	"	"	14/12/82	
WEST WANGANUI DISTRICT.																								
9. Wallsend, Collingwood	Rees, J. R., M.I.C.E. Hughes, H., General Manager	15	bitum.	3	16' to 28'	all	W. 12 1/2°	longwall	2	6' x 4'	tunnel	1,150	1,750	2,900	11,132	7	5	12	"	"	"	"	18/2/84	
WESTPORT DISTRICT.																								
10. Koranui, Westport	McMurray, Mine Manager, Dickson, W. H., General Manager.	3	"	1	7' to 10'	7'	1 in 6	board & pillar	1	"	"	300	3,000	3,300	7,902	22	8	30	self-acting-incline	"	"	"	24/5/84	
11. Banbury, Westport	Elliott, R., Mine Manager	5	"	1	4' to 7'	all	varies	"	1	"	"	3,447	31,550	34,997	115,225	100	40	140	horse & st.-en.	"	furnace	23/5/84		
12. Oriental, Reefton	Black, G.	5	pitch	1	6'	"	S.E. 7 1/2°	"	"	"	"	614	614	614	1	1	2	st.-en.	"	"	natural	24/9/83		
13. Energetic, Reefton	McCallum J.	8	"	1	10'	"	S.W. 22 1/2°	"	"	"	"	56	56	56	1	1	1	hand	"	"	"	21/9/83		
14. Golden Treasure, Reefton	McKay, A.	12	"	1	6'	"	S. 30° E.	"	"	"	"	50	50	50	1	1	1	"	"	"	"	21/9/83		
15. Lankey's Gully, Reefton	Notman, A.	9	"	1	11'	9'	W. 8°	"	"	"	250	640	890	2,480	2	1	3	"	"	"	"	21/9/83		
16. Reefton, Reefton	McGee, B.	1	"	1	6' 8"	all	W. 18°	"	"	"	"	50	50	50	1	1	2	"	"	"	"	22/9/83		
17. Newcastle, Reefton	Breen, A. J.	13	"	1	9'	6'	S.W. 32°	"	1	6' x 3'	"	100	100	200	2	1	3	"	"	"	"	21/11/82		
18. Golden Fleece, Reefton	Trennery, J.	9	"	1	16'	8'	varies	"	"	"	"	850	850	7,309	1	1	2	"	"	"	"	21/9/83		
19. Boatman's, Reefton	Poole, G.	"	"	1	6'	all	W. 1 in	"	"	"	80	261	341	1,066	1	1	2	"	"	"	"	22/9/83		
20. Burke's, Reefton	Poole, G.	"	"	1	10'	6'	N. 30°	"	"	"	120	63	183	1,034	1	1	2	"	"	"	"	22/9/83		
21. New Durham, Reefton	Connolly, J.	8	"	1	6'	all	varies	"	"	"	25	200	225	1,025	1	1	2	"	"	"	"	20/9/83		
22. New Durham (No. 1), Reefton	"	1	"	1	3	"	N. 1 in 3	prsping.	"	"	"	50	50	50	1	1	1	"	"	"	nil	20/9/83		

23. Dudley, Reefton	Joice, M.	5	pitch	1	25'	all	N. 18° S.W. 1 in 4	prsping. board and pillar	2	6' diam. 6' x 10'	tunnel & engine shaft	10	53,567	14	24	411	1	110 hand	2 pulso- meters	10'	250' furnace	17/5/84	
24. Brunner, Greymouth	Bishop, J.	19	pitch	1	8' to 16'	"	S.W. 1 in 4	"	2	6' diam. 6' x 10'	eng pl/ine shaft	14,566	88,133	294,536	90	20	1st. en- steam- engine	4'	10'	670' fan 15'	22/5/84		
25. Coalpit - Heath, Greymouth	Alexander, T.	7	"	1	16'	"	S.W. 1 in 4	"	2,231	15,659	17,940	94,627	43	12	55	engine	No. 5 pulso- meters	10'	670' fan 15'	18/1/84			
26. Greymouth District. Greymouth	Harrison, J. F.G.S.	7	"	1	16'	"	S.W. 1 in 3 3/4	"	..	1	1	12,123	8	50	58	"	22"	8'	263' steam	22/4/84			
27. Springfield, Springfield..	General Manager, Parker, O. G., Mine Manager, Moore, W.	7	brown	2	4' & 7'	"	S.E. 1 in 6 to 1 in 12	shaft	17	4	21	..	..	..	..	..	..	..	..	..	..		
28. Smithfield, Springfield..	..	3	"	3	4', 3', and 1' 11"	"	S.E. 1 in 4 1/2	engine- plane	2	1	3	..	..	..	..	..	..	..	..	..	..		
29. Bowick, WallSEND	Daniels, W.	4 1/2	"	3	1' 7", 9", and 1' 6'	"	S.E. 1 in 4	tunnel	1,350	1,350	3,543	3	1	4	horse	9'	60'	natural	4"	60'	natural	22/4/84	
30. Canterbury, Sheffield	Austin, J.	21	"	2	1' 6'	"	S.E. 1 in 3	"	30	4,603	4,633	27,931	6	3	9	"	..	..	..	..	..	22/4/84	
31. Barron	Barron J.	20	"	1	2' 8"	"	S.E. 1 in 3	"	..	..	..	..	..	..	..	..	..	..	..	..	..	23/10/83	
32. Homebush, S'th Malvern	General Manager, McIlraith, J. A., Mine Manager, Brown, T.	11	"	2	7' and 3' 6'	all	E. 10° S. 1 in 3	prsping. board and pillar	250	16,944	17,194	52,821	34	3	37	horse	..	..	..	..	..	23/4/84	
33. Hart's, South Malvern..	Ekberg, B. T.	..	"	1	10'	"	S. 60° E 1 in 3 1/2	engine- plane tunnel	187	2,180	2,367	10,777	10	2	12	steam engine hand	12'	105'	natural	8"	105'	natural	24/4/84
34. Broekley, South Malvern	Storey, C. S.	4 1/2	"	1	6'	"	varies, very high	narrow- work	..	76	76	5,606	..	..	..	..	..	..	..	..	..	10/10/82	
35. Whitecliffs, S'th Malvern	Smart, W.	3	"	2	7' 6" and 5' 8"	"	S. 52° E. 30°	board and pillar	..	1,500	1,500	1,800	8	4	12	"	..	..	..	..	..	24/4/84	
36. Mount Somers, Mount Somers	Milne, James	18	"	1	25'	20'	..	open- work	..	215	215	3,625	..	1	1	"	..	..	..	..	..	27/12/79	
37. Elephant Hill, Waimate OTAGO DISTRICT.	Lindsay, D.	3	"	1	14'	7' 6"	N. 70° E 15°	board and pillar	..	292	292	432	1	..	1	"	..	..	..	..	..	4/10/82	
38. Wharekuri, Wharekuri..	Cairns, W. B.	17	"	1	25'	14'	S. 60° W. 60°	narrow- work	..	400	400	6,370	2	2	4	"	..	..	..	..	..	30/8/83	
39. Kurov, Kurov	Scott, D.	4	"	1	18'	8'	N.E. 63°	board and pillar	50	215	205	760	1	..	1	"	..	..	..	..	..	30/8/83	
40. Prince Alfred (No 1), Oamaru	Henderson, A.	14	"	2	9'	all	E. 10° S. 1 in 5	"	..	463	463	4,080	3	..	3	"	..	..	..	..	..	30/1/84	
41. Prince Alfred (No. 2), Oamaru	Willets, J.	7	"	2	9'	"	E. 10° S. 1 in 5	"	..	1,580	1,580	13,817	4	1	5	"	..	..	..	..	..	30/1/84	
42. St. Andrews, Oamaru	Nimmo, John	5	"	1	6' 6"	"	E. 13°	"	..	917	917	4,883	2	1	3	horse	..	..	..	..	..	6/10/81	
43. Ngapara, Ngapara	Nimmo, James	5	"	1	25'	7' to 8'	N. 5°	"	..	..	..	4,501	2	1	3	horse	..	..	..	..	..	11/10/83	
44. Shag Point, Palmerston	Williams, W. H.	20	pitch	2	4' to 6' 6" 8' to 12'	fall	E. 1 in 4	shaft & engine plane	1,800	22,622	24,422	160,843	77	26	103	steam engine	1' 6", 2', 4"	270'	steam & furnace	4"	270'	steam & furnace	4/4/84
45. Hill's Creek, Hill's Creek	McNight, J.	19	lignite	1	6'	6'	S.S.W. 40°	op'nw'rk	..	58	58	143	..	1	1	hand	..	..	..	..	..	24/3/84	
46. Idaburn, Rough Ridge..	Grant, W. A.	13	"	1	23'	all	N. 10°	"	..	1,646	1,646	9,001	..	2	2	"	..	..	..	..	..	25/3/84	
47. Dunsuir's, St. Bathans	Dawson, James	17	"	2	12' & 18'	13'	N.E. 1 in 3	"	20	100	120	660	..	1	1	"	..	..	..	..	..	24/3/84	
48. Cambrian's, St. Bathans	Jones, J. R.	22	"	1	25'	all	W. 10°	"	..	1,584	1,584	4,811	..	3	3	"	..	..	..	..	..	24/3/84	
49. Kyeburn, Naseby	McCready, D.	10	brown	3	25'	12'	W. 60°	nat. wk.	160	267	427	10,735	2	1	3	"	..	..	..	..	..	26/3/84	

RETURN No. 1—continued.  
STATISTICS OF WORKINGS IN COAL MINES, 1883—continued.

Locality and Name of Mine.	Name of Manager.	Number of Years at Work.	Quality of Coal.	No. of Seams worked.	Thickness of Seams.	Thickness worked.	Dip of Seam.	System of Underground Working.	Number of Shafts.	Dimensions of Shafts.	Output delivered by	Output for 1883.			Approximate Total Output to 31st December, 1883.	Number of Men underground.	Number of Men on Surface.	Total Employed.	Power used for drawing Mineral.	Stroke of Pump.	Size of Barrel.	Height of Column.	Means of Ventilation.	Date of Inspectors' Last Visit.
												Slack.	Coal.	Total.										
50. Perseverance, Naseby	Stuart, J.	5	lignite	3	6' to 16'	12'	W. 60°	nar.-wk.	2	2' 6" x 5' 2' x 3' 6"	tunnel	Tons. 1,000	Tons. 200	Tons. 1,200	3,390	1	1	2	hand	..	..	..	natural	26/3/84
51. Archer, Naseby	Stuart, J.	1	"	1	6'	all	W. 65°	board and pillar	..	2' 9" x 5' 6"	" shaft	..	650	..	..	..	..	horse	..	..	..	"	26/3/84	
52. Alexandra, Alexandra South	Thomson, W.	5	brown	1	14' to 15'	6' to 7'	W. slight	"	1	2' 6" x 4' 6"	"	..	..	..	..	..	..	..	..	..	..	"	19/3/84	
53. Manuherikia, Alexandra South	Jackson, T.	..	"	1	12'	6'	N.W. slight	"	1	5' x 3'	"	..	200	..	..	..	..	..	..	..	..	"	24/5/81	
54. Excelsior, Cromwell	Walker, M.	2	"	1	12'	7'	E. 65°	nar.-wk.	..	..	tunnel	..	..	..	..	..	..	..	..	..	..	"	21/3/84	
55. Bannockburn, Cromwell	Smith, James	12	"	1	12'	6'	N. 70° W.	brd.&pill.	..	2' x 6'	eng. pln.	200	676	..	5,812	2	1	3	st.-en.	3'	50'	"	"	21/3/84
56. Kawarau, Cromwell	Pryde, John	6	"	1	15'	7'	W. 1 in 4	"	1	2' x 6'	tunnel	..	720	..	3,770	2	..	2	hand	..	..	"	"	21/3/84
57. Clyde, Clyde	Marie, C. T.	12	"	1	20'	10'	S.E. 5°	"	2	3' 6" x 4'	" shaft	..	46	..	3,016	1	1	2	..	..	..	"	"	20/3/84
58. Clyde, Clyde	Holden, R.	3	"	1	20'	10'	E. 1 in 1	"	2	3' 6" x 4'	" shaft	..	460	..	16,402	1	1	2	horse	..	..	"	"	20/3/84
59. Earnscleugh, Clyde	Buckley, John	7	"	1	14'	8'	S.W. 1 in 8	"	1	3' x 4'	" tunnel	203	406	..	2,092	2	1	3	hand	..	..	"	"	20/3/84
60. Gibbstown, Arrow	Williams, S.	16	pitch	1	40'	all	S.W. 30°	brd.&pill. and op'nwrk.	..	..	..	20	1,500	..	6,270	4	1	5	..	..	..	"	22/3/84	
61. McPherson's, Roxburgh	Jones, J.	13	lignite	1	25'	20'	N.W. 16°	op'nwrk.	..	..	..	..	..	..	..	..	..	1	..	..	..	..	19/3/84	
62. Low and Robertson's, Roxburgh	Robertson, J.	20	"	1	28'	20'	W. 1 in 7	op'nwrk.	..	..	..	200	731	..	7,621	..	3	3	..	..	..	..	19/3/84	
63. Crossan's, Roxburgh	Crossan, R.	14	"	1	28'	20'	varies	"	..	..	..	..	..	..	..	..	..	1	..	..	..	..	18/3/84	
64. Fernhill, Green Island	Shaw, J. E.	6	brown	1	18'	7'	N. 10° E. 1 in 10	room & rance	..	1' 3' 6" x 4' 9"	tunnel	1,100	4,649	..	21,012	20	1	21	horse	..	..	furnace	..	28/4/84
65. Green Island, Green Island	Richardson, D.	11	"	1	14'	7'	E. 10° N. 1 in 10	"	2	2' x 4'	eng. pln.	1,039	4,939	..	72,173	12	2	14	steam engine	3'	180'	natural	10/4/84	
66. Saddle Hill, Green Island	Campbell, J.	9	"	1	19' 6"	7'	E. 1 in 10	"	2	4' 6" x 12' 4' x 8'	shaft	140	5,169	..	42,431	7	4	11	horse	..	..	furnace	10/3/84	
67. Glenochiel, Green Island	Bryce, D.	2½	"	1	18'	7'	varies	"	2	4' x 8'	"	100	325	..	1,293	2	1	3	..	..	..	natural	16/4/84	
68. Walton Park, Green Island	General Manager, London, J. Mine Manager, Lindsay, W.	13	"	1	18'	7'	E. 1 in 9	"	3	4' x 11' 4' 6" x 12' 6"	shaft and tunnel	4,084	17,760	..	239,949	36	3	44	steam and horse	4' 6"	11"	furnace	10/4/84	
69. Abbotsoy (No. 2), Green Island	Walker, J.	2½	"	1	16'	7'	E. 10° N. 1 in 10	"	1	3' 8" x 4' 6"	tunnel	2,840	9,231	..	62,710	17	4	21	horse	No. 3 Pulsom.	..	natural	28/4/84	
70. Brighton, Brighton	McColl, D.	3	"	1	5'	all	N.E. 1 in 10	brd.&pill.	..	..	"	..	56	..	456	1	..	1	hand	..	..	"	10/1/83	
71. Bruce, Milton	Hardwick, N.	9½	pitch	1	12' 6"	6'	varies	"	..	..	"	..	952	..	8,912	3	..	3	..	..	..	"	29/10/83	
72. Real Mackay, Milton	Young, A.	15½	"	1	25'	8'	N.E. to E. 1 in 8	"	..	..	"	..	..	..	11,269	1	..	1	..	..	..	"	7/3/84	

73. Cannon's, Lovell's Flat ..	Cannon, T.	..	13	lignite	1	20'	all	varies	open-work	..	..	600	600	1,810	..	1	1	..	..	..	4/9/83:
74. Bryce's, Lovell's Flat ..	Bryce, J.	..	5	"	1	12'	8'	N.E. 1 in 6	"	..	..	100	100	780	..	1	1	..	..	..	13/3/84
75. Paskell's, Glenore ..	Paskell, J. T.	..	19	"	1	8'	all	517°	board and pillar	..	..	54	54	131	..	1	1	..	..	..	21/12/83.
76. Benhar, Balclutha ..	Nelson, J.	..	19	brown	1	40'	8'	..	"	..	..	3,950	4,850	30,440	..	1	9	steam-engine	45' furnace	6"	7/2/84
77. Kaitangata, Kaitangata ..	Mine Manager, Samson, W.	..	8	pitch	1	24'	all	N.N.W. 1 in 7	"	3 3' 8" x 5', 2' 6" x 4', 4' x 6'	..	35,430	46,779	198,282	133	15	148	steam-engine and horses	..	..	10/5/84
78. Kaitangata (No. 1), Kaitangata ..	General Manager, Watson, W. P.	..	6	"	1	30'	"	N.N.W. 45°	"	14' 6" x 11' 9"	..	..	..	..	..	..	..	..	..	..	..
79. Adams', Lovell Flat ..	Mine Manager, Samson, W.	..	..	lignite	1	8'	8'	S. 45° E. 12 1/2°	open-work	..	..	38	38	38	..	1	1	..	..	..	5/2/84
80. Wangaloa, Kaitangata ..	Reid, John	..	3	pitch	1	10' 6"	6'	E. 1 in 6	board and pillar	..	..	110	150	616	..	1	1	hand	..	..	19/9/82
81. Wangaloa, Kaitangata ..	Smith, Joseph	..	2	"	1	5'	all	N. slight	open-work	..	..	125	125	271	1	1	2	"	..	..	20/11/83
82. Wyndham, Wyndham ..	Sewell, R. M.	..	6	lignite	1	6'	6'	..	"	..	..	423	423	1,597	..	1	1	..	..	..	28/11/83
83. Wyndham ..	Genge, Thomas	..	3	"	1	6'	6'	..	open-work	..	..	..	..	..	..	1	1	..	..	..	28/11/83
84. Dawson's, Gore ..	Milne, D.	..	6	"	1	6'	all	..	"	..	..	80	80	388	..	1	1	..	..	..	27/11/83
85. Sarginson and Telfer's, Gore ..	Dawson, T. A.	..	5 1/2	"	1	8'	"	..	"	..	..	85	85	264	..	1	1	..	..	..	27/11/83
86. McKinnon's, Gore ..	Sarginson and Telfer	..	2	"	1	8'	"	..	"	..	..	153	168	532	..	1	1	..	..	..	27/11/83
87. Chittocks', Gore ..	McKinnon, A.	..	1	"	1	15'	"	..	"	..	..	70	70	728	..	1	1	..	..	..	27/11/83
88. Chilton ..	Chittocks, C. & W.	..	7	"	1	15'	6'	..	"	..	..	465	485	1,898	..	2	2	..	..	..	27/11/83
89. Hefferman's, Gore ..	Pacey, W. R.	..	3	"	1	15'	6'	..	"	..	..	2	2	172	..	1	1	..	..	..	27/11/83
90. Pukerau, Pukerau ..	Hefferman, P.	..	4	"	1	16'	6'	W. 1 in 10	board and pillar	tunnel	..	2,239	2,239	5,142	8	2	10	hand	..	..	27/11/83
91. Hay's, Gore ..	Burkt, T.	..	2	"	1	6'	6'	..	open-work	..	..	400	400	400	..	1	1	..	..	..	27/11/83
92. Pukerau, Pukerau ..	Hay, J.	..	5	"	1	15'	14'	..	"	..	..	650	650	3,829	..	2	2	..	..	..	26/11/83
93. Mataura, Mataura ..	Swan, J.	..	8	"	1	12' 6"	all	W. 1 in 20	"	..	..	..	..	4,146	..	..	..	..	..	..	27/11/83
94. Mataura, Mataura ..	Thornley, John	..	8	"	1	12' 6"	8'	..	"	..	..	1,707	1,707	7,037	..	8	8	..	..	..	27/11/83
95. Menzies' Ferry, Wyndham ..	Beattie, John	..	3	"	1	5'	5'	..	"	..	..	195	195	715	..	1	1	..	..	..	2/11/81
96. Nightcaps, Nightcaps ..	Templeton, J.	..	..	"	1	..	..	..	"	..	..	1,000	1,000	1,900	..	3	3	..	..	..	..
97. Fairfax, Fairfax ..	General Manager, Handyside, W., Mine Manager, Lloyd, John	..	6	pitch	2	2' 4" & 9'	all	E. 1 in 4	open-work & board and pillar	2 4' 6" x 6' 3' x 6'	..	12,534	12,534	19,680	..	83	83	steam-engine	135 furnace	3' 9"	22/4/84
98. Wairoa, Nightcaps ..	Todd and Graham	..	3	lignite	1	7' 6"	6'	..	open-work	..	..	280	280	828	..	1	1	..	..	..	7/6/83
99. Orepuki, Orepuki ..	Knights, Thomas	..	1	pitch	1	15' 6"	..	varies	work prsping.	..	..	14	14	14	..	3	3	..	..	..	6/6/83
Totals ..	Todd, William	..	118	..	..	..	..	..	..	..	..	48,901	372,863	421,764	2,524	289	888	361	1,249	..	..

## RETURN No. 2.

TABLE of ACCIDENTS in COAL MINES during the Year ended 31st December, 1883.

No. and Date.	Name of Mine.	District.	Cause of Accident.	Above	Below	Fatal.	Non-fatal.	Name of Sufferer.	Remarks.
				Ground.	Ground.				
1. Jan. 27	Brunner ..	Westport ..	Fall of call ..	..	1	..	1	Pascoe, N. ..	Leg broken.
2. Feb. 8	Kamo ..	Kawakawa	Fall of coal from roof	..	1	..	1	Wilson, J. ..	Leg broken.
3. Mar. 17	Shag Point ..	Otago ..	Fall of dirt ..	..	1	1	..	McAnally, P.	Broken leg.
4. May 8	Kaitangata ..	" ..	Slipped on rail ..	..	1	..	1	Espie, Wm. ...	
5. June 1	Cambrians ..	" ..	Explosion of powder	1	..	..	1	Jones, J. R.	
6. " 9	Kaitangata ..	" ..	Chain broke: no drag	1	..	..	1	White, John..	Ribs broken.
7. July 5	Brunner ..	Westport ..	Fall of coal ..	..	1	..	1	Williamson, C.	Very serious.
8. " 16	Wallsend-Greymouth	Greymouth	Slipped on plane	1	..	..	1	Cullen, James	Leg broken: not at work at time of accident.
9. " 26	Canterbury ..	Malvern ..	Fall of dirt ..	..	1	..	1	Jackson, T. ..	Five days off work.
10. Aug. 3	Smithfield ..	" ..	Fall of coal ..	..	1	..	1	Bale, Henry ..	Leg broken.
11. " 11	Banbury ..	Westport ..	Rope broke ..	1	..	..	1	Greene, C. ...	Leg broken.
12. " 9	" ..	" ..	Fall of prop ..	..	1	..	1	Wouldes, M. ...	No bones broken.
13. " 21	Shag Point ..	Otago ..	Fall of coal ..	..	1	..	1	Andrews, Wm.	
14. " 24	Harts ..	Malvern ..	Want of drag ..	..	1	..	1	Beaman, T. ...	No bones broken.
15. Nov. 27	Brunner ..	Westport ..	Fall of coal ..	..	1	1	..	McIvor, A.	
16. " 31	Bieton ..	Pelorus ..	Fall down shaft..	..	1	..	1	Marbella, P.	
17. Dec. 19	Shag Point ..	Otago ..	Fall of coal ..	..	1	..	1	Samuel, T. ...	Broken jaw,
				4	13	2	15		

## RETURN No. 3.

RETURN of the QUANTITY of COAL IMPORTED into and EXPORTED from NEW ZEALAND during the Year ended 31st March, 1884.

Countries whence Imported.	Import.		Countries to which Exported.	Export.	
	Quantity.	Value.		Quantity.	Value.
	Tons.	£		Tons.	£
United Kingdom .. ..	2,622	3,188	New South Wales .. ..	1,350	1,350
New South Wales .. ..	119,118	148,008	Victoria .. ..	5,172	3,361
Victoria .. ..	1,800	2,151	China .. ..	120	156
			Fiji Islands .. ..	990	354
			New Caledonia .. ..	140	90
Totals .. ..	123,540	153,347	Totals .. ..	7,172	*5,311

\* All New Zealand produce.

Department of Trade and Customs,  
Wellington, 5th June, 1884.WILLIAM SEED,  
Secretary and Inspector.