1894.

NEW ZEALAND.

INSPECTION OF COAL-MINES REPORT.

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

No. 1.

Mr. H. A. GORDON, F.G.S., to the UNDER-SECRETARY of MINES.

Mines Department, Wellington, 5th July, 1894.

SIR,—

I have the honour to submit you a covering report on the coal-mining industry for the year ending the 31st December, 1893.

The total output from all the mines in the colony last year was 691,548 tons; of this, 380,901 tons was bituminous coal, 131,071 tons of pitch-coal, 156,154 tons of brown coal, and 23,422 tons of lignite. There are 153 mines in which coal-mining operations are carried on, and 1,888 men employed. During the past year there were twenty-two accidents in the mines; of these, five terminated fatally, four resulted in severe injuries, and thirteen were not serious cases.

I have, &c.,

HENRY A. GORDON, M.A.Inst.M.E.,
Inspecting Engineer.

No. 2.

Mr. GEORGE WILSON, Inspector of Mines, to the UNDER-SECRETARY of MINES, Wellington.

Inspector of Mines' Office, Thames, 5th May, 1894.

SIR,—

I have the honour to transmit to the Hon. the Minister of Mines the following report on coal-mines in the Auckland District, made in compliance with section 67 of "The Coal-mines Act, 1891":—

KAWAKAWA DISTRICT.

1. *Kawakawa Mine.*—The new incline mentioned in my last report was driven, and all available pillars worked out down to water-level. Another level was commenced in the gully further to the southward, and a further discovery made of a pillar of considerable extent which had been left during McLeod's time of working the mine, and which was not shown on the plan kept by the Bay of Islands Company. There is, therefore, every prospect that a considerable output of coal will continue from the mines. The work of taking out the pillars has been carefully carried out.

The output for the year was 10,950 tons. Twelve men on the surface and eighteen men below were employed.

HIKURANGI DISTRICT.

2. *West Bryans Mine.*—The output of coal from this mine was 357 tons, chiefly house-coal. A tramway about half a mile in length is made from the mine to the railway, and hoppers erected, so that when the line is open for traffic the output can be largely increased. Three men were employed on the surface and below. The seams of coal adjacent to the railway are of easy access and of considerable extent, so that there will be no difficulty in maintaining a large output from this district when the Hikurangi Coal Company make a start to supply coal.

WHANGAREI DISTRICT.

3. *Kamo Mine.*—A large output of coal—20,682 tons—was made from this mine during the year. Twelve men above and thirty-seven below were employed. At the end of December the owners resolved to shut down the mine.

NGUNGURU DISTRICT.

4. *Kiripaka Mine.*—The new heading driven on the seam was continued for a distance of 2 chains, when the coal dipped, and the seam became irregular; a slant in the heading was then made to the northward, and about 4 chains further were driven. The output for the year was 2,697 tons. Fifteen men were employed on the surface and thirteen below.

The manager, in the endeavour to keep up the supply of coal before the mine was opened up, worked out portions of the seam which should have been left standing. A stoppage was made in November, but a fresh manager has been appointed, and work is going on satisfactorily, and the output increasing.

WAIKATO DISTRICT.

5. *Waikato Mine.*—The work in this mine is carefully carried on. The ventilation, which was not always satisfactory, will be perfected when a fresh upcast shaft is sunk higher up the hill than the old upcast. The output for the year was 7,687 tons. Six men on surface and fifteen below were employed.

6. *Ralph's Taupiri Mine.*—This mine was worked until the 29th of May by the owners. The mine was then leased for a period of five years, with right of an extension of term to ten years, to the Taupiri Reserve and the Taupiri Extended Companies, who took possession of the mine at that date and suspended all work; the pumps and machinery were since removed. The output to the 29th of May was 3,432 tons. Six men on surface and nineteen below were employed.

7. *Taupiri Extended Mine.*—This mine continues to be carefully worked; the bords are safe and the ventilation good. The output was 26,025 tons. Ten men on surface and fifty men below were employed.

8. *Taupiri Reserve Mine.*—This mine has been worked chiefly to the westward of the extension of the incline. There has also been a considerable quantity of coal taken from the bords under the lake. The mine is well ventilated, and good cover left in the roof. The output for the year was 20,107 tons. Thirteen men on surface and thirty-two below were employed.

MOKAU DISTRICT.

9. *Mokau Mine.*—Operations in this mine have not been carried on with much vigour during the year, the output being 781 tons. Three men were employed.

ACCIDENTS.

The accidents reported are as follows, none being of a very serious nature:—

Joseph Yuracka was scalded by hot water from Tangye pump on the 28th January, 1893, in the Taupiri Reserve Mine.

James Harris: Injured between buffer and truck on the 9th February, 1893, in Ralph's Taupiri Mine.

John Guilliford was slightly injured by being struck on the back of the leg by a piece of stick on the 8th February, 1893, in Ralph's Taupiri Mine.

David Taylor: Injury to finger on the 1st March, 1893, in the Kawakawa Mine.

Albert Schlinker: Fracture of forefinger on the 18th March, 1893, in Ralph's Taupiri Mine.

J. H. Evans: Injury to eye on the 21st April, 1893, in the Taupiri Reserve Mine.

Richard Pedro was slightly injured by being knocked down by a wagon on the 6th July, 1893, in the Kiripaka Mine.

Joseph Gomez was injured by a piece of stone falling from the drive, breaking his collarbone and fracturing three ribs, on the 29th September, 1893, in the Kiripaka Mine.

Timothy Callaghan: Injury to eye, by a blow from a piece of coal, on the 3rd November, 1893, in the Taupiri Extended Mine.

Thomas Bell, junior: Injury to thumb on the 29th November, 1893, in the Taupiri Extended Mine.

REMARKS.

The output for the district north of Auckland is 6,247 tons in excess of that of last year, while in the Waikato and Mokau district there is a decrease of 1,685 tons, leaving a total increase for the year of 4,562 tons. The increase in the north was due to the Kamo and Kiripaka Mines, the Kawakawa and West Bryans having shown a decrease. It may be assumed that the Hikurangi Field will be a large producer for the current year, as the coal is suitable for ocean-going steamers. The Kiripaka coal is also obtaining a good market, and is giving satisfaction when used in ocean-going and coastal steamers.

The contributions to the Accident Fund have been paid on all coal sold except by the Mokau Company, who had not paid the amount when I inquired at the post-office, New Plymouth.

Coal-leases have been applied for in the Hikurangi district, and probably new mines will be opened in that district.

The output for Kawakawa is not likely to increase, as, although there may yet be a considerable quantity of coal obtained from old pillars, it cannot be depended on for a continuous supply to any great extent.

I have, &c.,

GEO. WILSON,

The Under-Secretary, Mines Department, Wellington. Inspector of Mines.

No. 3.

Mr. N. D. COCHRANE, Inspector of Mines, to the UNDER-SECRETARY of MINES, Wellington.

SIR,— Inspector of Mines' Office, Westport, 24th April, 1894.

I have the honour, in compliance with section 67 of "The Coal-mines Act, 1891," to report as follows for the information of the Hon. Minister of Mines, and to enclose list of the serious accidents and table of statistics for the West Coast coal-mines:—

Wallsend Colliery, Collingwood.—This mine was not inspected during the year, owing to pressure of other work.

Brownville Coal-mine, Takaka.—No work has been done in this mine during the year, and the lease is said to be given up by Mr. Brown, but Mr. Charles, who formerly worked in it, has taken it up, and intends giving it a further trial.

Mokihinui Colliery.—(24/10/93): A new main roadway has been driven which will do away with the curves, and this is at present being well timbered with heavy sets. Air-current fairly fresh, but too small in quantity for the number of men, even although gas has not been seen, and next to no powder is used. On drawing Mr. Straw's attention to this he at once had the furnace improved, and the upcast-shaft chimney or cupola heightened, so that ample air was provided. The coal appears to maintain its thickness of 30ft., and a coal roof is usually left, which is often very soft, but timbering is done where required. The rules, with names, were posted, and the report-book of the examinations of the workings duly kept. At the above date two shifts were at work, employing in all forty miners and truckers, but all mining was stopped a few days later. This was said to be on account of want of orders for the coal. The contracts which have since been secured by this company ought to insure more regular work in the future.

The company's railway has been much improved for traffic at considerable expense during the year, and bins have been constructed at the end of the tramway, about half a mile from the mine, which are capable of holding about 1,000 tons.

Westport Cardiff Coal-mine.—A company having been floated to work the coal in Bayfield's lease, a deposit of £2,000 was required to be made with the Public Trustee to insure *bonâ fide* working of the mine. This amount was repayable in monthly sums of £250, on my certificate that work to that amount had been done in opening up the coalfield; hence my visits have been very frequent. Work was gone on with rapidly; surveys were made of the lines for the railway-sidings and tramway, which are now constructed and nearly in working order; a good deal of boring was done, also prospecting of the outcrops; No. 4. outcrop opened up by drives; large roofed-in bins constructed; and workshops, &c., erected. The deposit was fully reclaimed before the end of the year. Messrs. Broome and Elliott are respectively engineer and manager.

The coal seam where opened at No. 4 outcrop showed a fine face of coal, but when driven on under the hill a parting in the centre of the seam thickened and split the seam in two. Further driving requires to be done, as the seams thinned down rapidly. The main area of workings, however, is intended to be more in the direction of the Amy Hector outcrop, where the bores showed a considerable extent of coal-bearing ground.

This district, at date of writing, has been opened up by an adit, which is an extension of the tram-line. Two or three faults have been cut, and the coal shows signs of movement, but is a thick seam and of good quality.

Granity Creek Coal-mine.—(18/2/93): The land at the foot of the incline was inspected in connection with an application of the Westport Coal Company for an area of 12 acres for workshops. It appeared a large area for the purpose stated, and included the site of the house and garden of one of the company's workmen. An application has since been made for a smaller area. (6/6/93): Special and general rules posted at mine mouth with names. Mr. Murray is mine-manager. A short drive runs south, ventilated by an air-shaft which gives sufficient air at present. Another drive running east is in a distance of 10 chains. Air is led in in pipes, some of the joints of which were requiring to be seen to. Drew manager's attention to some flakes in the roof. Both these Mr. Murray at once agreed to attend to. Eight men in all were employed, in two shifts. During the year considerable progress has been made with the works for opening up this coalfield, and Mr. Brown informs me that on these and stores over £16,000 have been expended. At date of writing, this lower coal-area, which was formerly thought to be of little value, is turning out well, the coal away from the gullies and a few small faults being of good quality. Both tunnels, 660ft. and 787ft. respectively in length, for lowering the coal on the incline have been put through. The second was considered necessary for the successful working of the proposed endless-rope system, which would otherwise almost certainly have proved a failure. The undulations also on the lower portion of the incline have been largely done away with by cutting and filling. The low ground adjoining the main line of railway has been filled in for sidings, and well equipped workshops have been erected. A locomotive line has been surveyed to run from the top of the incline to near the mine mouth, and this will be gone on with whenever the reserve is granted.

Coalbrookdale Colliery.—(17/2/93): In the Coalbrookdale section the roof appeared better than it had been, though still far from good. Plenty of timber. Spragging fairly well observed. Air in the aggregate sufficient.

In the Cascade section the dip-headings are now in the lower seam, which is about 20ft. thick, and are down a distance of 19 chains. Coal roof and floor. Water drained by three-plunger pump, driven by endless rope from surface. Very good current of air.

In the Ironbridge section pillar-work is going on at four places, employing eight of the sixty-two men. Air fresh. Plenty of timber set, and the roof, as a rule good.

The freedom from serious accidents, which was so marked last year, has not continued, no less than three fatal accidents having occurred. All these were carefully investigated by me.

On the 1st of May a miner named John Pollock was killed by a large block of stone dropping out of the roof without warning. He had been cutting off a corner of coal which had evidently been supporting it. The place had been sounded by the Deputy that morning, and then had been found safe.

On the 18th of May, Mark Dixon, miner, received injuries from a fall of stone and prop, from which he died two days later. I saw him the day after the accident, and he blamed no one.

On the 3rd of July a miner named Alexander Hunter received injuries from a runaway truck, from which he died the following day. The horse drawing the truck had been fiery, and the driver having got slightly hurt, another took his place, with whom the horse bolted, and in plunging uncoupled the truck, with the result stated. If a "devil" had been attached to the truck this accident should not have happened. It is the custom to have such attached, but Hopkins, the mate of deceased, had told the new driver not to use it. There was ample room for keeping clear of the runaway truck.

(10/10/93): In the Coalbrookdale section 10,000 cubic feet of air per minute were circulating to supply eighty-one men. This is above the amount required by the Act, but a larger current is desirable, which will be supplied by the fan now erected. The plan is now kept well posted. Report-books duly kept. General and special rules posted up. No prosecution under the latter has been undertaken by Mr. Cameron since he became manager.

The Coalbrookdale section at the foregoing date was proved to be a basin with the coal thinning at the edges in both seams. With the view of seeing that no coal should be lost, inquiry was made of Mr. Cameron as to how he meant to work it, but he evidently thought I had no power to interfere in the matter. Mr. Brown, the general mining manager, subsequently went fully into the details with me of the intended method of working that area.

Generally speaking, there is no fear of the coal giving out, although the four working districts of the colliery are comparatively limited. Unlike the Grey Valley mines there are not great faults, and heavy water at a great depth to contend with, so that when the seam thinned, or a slate roll occurred, an extension of the above-ground system of haulage has hitherto sufficed to open up further areas. It is now, however, intended to build a locomotive line to supersede the most of the now lengthy endless rope.

Waimangaroa and *Wellington Mines* have been abandoned.

Waitakere Coal-mine, Charleston.—(7/11/93): No one about. Still openwork as formerly. Evidently very little doing. Face in good order. Mr. Flynn, the owner of this mine, has also bought Powell's old mine, where stripping is now done before the coal is hewn.

Whitecliffs Coal-mine, Buller Road.—(4/12/93): Work has been resumed in this mine since the dredge was raised, to supply it with fuel, but very little is doing. One man working in a short drive near the old one, but at a slightly higher level. Sufficient timber used. No Act, but copy is to be got.

Murray Creek Coal-mine, Reefton.—(11/7/93): This mine was stopped, but has been bought and reopened by Mr. Bolitho, who started work at the beginning of this month. Copy of Act at mine, but no report kept. (20/11/93): Mr. Bolitho and son working; the former is an old quartz-miner, but appears to take every care. Air right. A new drive is to be started shortly.

Golden Treasure Coal-mine.—(10/3/93): Mr. Rear, who was formerly in charge, has left, and Messrs. Moore and Roxburgh were mining in the old workings. Roof bad, and mine not in good condition. Cautioned both, and notified Mr. Roxburgh, who applied for a permit, that this would be deferred till the mine was revisited to see that it was made safe. On the 15th May found it had been abandoned. (11/7/93): A start had been made with a new drive by Mr. P. Woods, who shortly afterwards notified me that he had abandoned it. (20/11/93): Work resumed by Mr. J. G. Davidson, an experienced coal-miner, in the new drive. Act not observed. Mine mouth not in good order, so requested Mr. Davidson to have it made safe, and deferred granting permit until mine is again inspected to see that requirements have been carried out.

Phœnix Coal-mine was inspected in February, and again in July. (20/11/93): Mr. McMurtrie now in charge, working without a permit; but, having had some experience in coal-mining, one was granted. It was found that, for convenience, he had taken his keg of powder into the mine; but he arranged to have it taken to a proper place.

Ajax Coal-mine.—(10/3/93): A start had been made to open up a fresh portion of this old lease, adjoining the old Inglewood Mine. So far, the workings were opencast. On revisiting this mine in November there was no one about, and the only underground work was one short drive.

Lankey's Gully Coal-mine.—(15/11/93): Mr. Lamberton and one man working from the same level as formerly. As the workings progressed in from the outcrop the coal has much improved in quality, and the roof has become stronger. Air a little dull, but a place is to be driven out to the other side of the spur. Cautioned Mr. Lamberton as to spragging.

Reefton Coal-mine.—(10/7/93): Driving has still been continued on the thin coal some 2ft. in thickness, a contract having just terminated. I went over to the back of the lease, where a seam was formerly worked said to be 30ft. thick. The full thickness could not be seen, but it was over 6ft. of coal, which was overlaid by dark, marly shale. An old shaft which had been sunk directly on the track was quite unprotected, and Mr. Joice was requested to have it seen to at once, and this he arranged before leaving the ground. Work has since been stopped, presumably on account of not finding the thick coal.

Cochrane's Coal-mine.—(9/3/93): This is an outcrop in the Painkiller district, to which Mr. Cochrane has made a tramway from the Boatman's track. Two men working. Only a little driving has been done, and the coal so far appears of poor quality. As it rises with the hill, the prospects at that point are not too good.

Devil's Creek and *Inangahua Coal-mines* have been abandoned, the coal where worked near the outcrop being of too poor quality.

Progress Coal-mine.—(7/3/93): Arthur Smith, a quartz-miner, working without a permit. A new drive has been made for air, which is good. Roof bad. Act not well observed. (12/5/93): Loughnan and Hally now working this mine. Roof very bad but good strong timber. No sprags, but these will be used in future. (27/9/93): Mr. Hally had left, so Mr. Loughnan was working alone. He is not experienced in coal-mining, so I advised him to get a practical coal-miner for a mate, and in the meantime deferred granting a permit. Roof still irregular and bad. Timbering strong. Copy of Act at mine. Report kept of examinations of mine. Mr. Hally has since returned to work, so the question of the permit is settled.

Sir Francis Drake Coal-mine.—(14/11/93): Is now worked opencast. The seam is 4ft. thick, with 7ft. of stripping. Only sufficient to supply the battery is worked.

Cumberland Coal-mine.—(15/11/93): This is only a short drive, which is too wide, far too much coal having been taken out. As the young man who had worked in it had only had experience as a quartz-miner, I called on Mr. Irving, the legal manager, that night. He stopped work, and agreed that no more should be done till an experienced coal-miner was sent out.

Coghlan's Coal-mine, Boatman's.—(9/3/93): Not working.

Archer's Coal-mine.—(9/3/93): The most of the coal that is used at Boatman's appears to be now supplied by this mine; but there has not been much done since my last visit. Fairly well timbered, and so near the surface that the air is good.

Alexandra Coal-mine.—(22/4/93): This is a mine which has been opened to supply the dredge at Fern Flat, eight miles distant. The seam is very thin, being only 2ft. 4in. in thickness, including a 7in. band of stone. The level runs in some 200ft. The coal had been all worked, and far too much ground had been left standing on timber without filling in. As attention was drawn to this being required at the time of a hurried visit, some two months earlier, Mr. Phillips was informed that if any more work was done prior to filling in I would cancel the permit, and take further action. The legal manager was also notified. Two men were at once put on to fill in. Shortly afterwards Mr. Phillips sent me a well-made plan, showing ground worked, filling-in, coal face, &c. The charge of the mine also has been transferred to Mr. Rear, a practical coal-miner.

Blackball Colliery.—(18/12/93): The aëriel tram-line to connect the mine with the Midland Railway has been completed, and is working smoothly and well. The trucks as they come out of the mine run under the main or stationary rope, to which they are attached by a hanger consisting of two travelling pulleys and skeleton frame for holding the body of the truck, which is lifted out of the carriage and wheels when the hanger is clipped on to haulage-rope. This is done by means of a short lever arc-clip fixed in each frame, which is closed on the travelling rope by the man whose duty it is to hang on the truck, which then moves forward across the tram-line, a distance of over three miles, without further attention. Arrived, it is automatically detached and counted, then run round to the screens and tipped by manual labour, on a specially-constructed tippler, into the bins, which hold 500 tons. The rate of travel is four miles per hour, and Mr. Lindop informs me that 400 tons can be taken across in eight hours.

At the mine, three shifts are working, employing thirty miners. Gas has not yet been seen in the workings, which are not dry and dusty. The roof is very soft, requiring a lot of timber, which is supplied, though of rather a small size, but perfectly safe for the present. Rules with names posted. Report and plan properly kept.

Coal-pit Heath Colliery.—(23/1/93): The lower workings were again drowned out. The water had risen several chains above the 9in. plunger-pump, but it was expected that with fine weather the 12in. pump being put in would be capable of draining the mine. Three shifts working, of thirty-two men each. Five men extra were employed down the dip taking out the bottom to make ready the seat for the new pump, and connecting the dip-heading with the back drift. Nothing but pillar-work was doing, and that in the top level. Coal soft, but plenty of timber. Air quite sufficient. (10/6/93): Report-book of 1st June shows that the men were withdrawn from the middle level on account of the influx of water, which is still rising. This mine was shortly afterwards abandoned, as the water could not be coped with. There was a comparatively small amount of coal lost, and many of the pillars would, even if the ordinary inflow of water had not increased, have had to be left for the protection of the miners. In last year's report I mentioned that this mine would probably be exhausted this year.

(Full particulars regarding the Grey Valley mines are given in the report by the Inspecting Engineer of Mines, Mining Geologist, and myself, which is already published.)

Brunner Colliery.—(24/1/93): Work now confined to fast places, all the available pillars above the water-level having been worked out. The present workings are from the dip-drive, the lower levels of which are under water, owing to the pump having been removed to Coal-pit Heath; but this district can be easily drained when desired. Bad roof at a few places. Spragging well observed. Good air-current. Three shifts of forty-six men each employed. A miner named William Maddox got burned on the 18th September by entering a place where there was a little fire-damp. A fall had occurred shortly before which had changed the direction of the air, but the fireman, Morris, had not put up a caution-board. I desired to prosecute, but, as Morris had freely confessed his fault when he could easily have screened himself by a lie, the prosecution was not gone on with.

This mine was inspected several other times during the year. Full details of its prospects will be found in the joint report already mentioned. The tramway to open up the rise coal, towards the construction of which a rebate of royalty has been given, is now nearly completed, and at the date of writing the coal is turning out better than Mr. Bishop expected. It is still uncertain whether the present company will give up their lease or not at the end of this year.

Coal Creek Coalfield, Greymouth.—An engineer, Mr. J. D. Gillies, has been appointed for this company, and, at the date of writing, tenders are being called for clearing bush and formation of over three-quarters of a mile of railway, so that there is every prospect of this mine now going ahead.

Sick and Accident Relief Funds.

The regulations are being complied with in the administration of these funds, and the contributions are being duly paid by the mine-owners, except in the case of one or two of the smaller mines.

General.

Section 21 of "The Coal-mines Act, 1891," which provides that where less than six men are employed the acting-manager shall be the holder of a permit. This is a very satisfactory provision, and one in regard to the compliance with which there could be no conflict of evidence. If any of the smaller mines working, under new management, in an unsafe manner, I defer granting the permit till my next visit, and then only if managed in a thoroughly satisfactory way.

I have, &c.,

N. D. Cochrane,

The Under-Secretary, Mines Department, Wellington. Inspector of Mines.

LIST OF SERIOUS ACCIDENTS.

15th February.—Coalbrookdale: Thomas Clark; taking out truck, it ran over and broke his leg.
1st May.—Coalbrookdale: John Pollock; killed by fall of stone.
18th May.—Coalbrookdale: Mark Dixon; seriously injured by fall of prop and stone. Died on 20th May.
3rd July.—Coalbrookdale: Alexander Hunter; fatally injured by runaway truck.
18th September.—Brunner: William Maddox; burned by slight explosion of firedamp.

No. 4.

Mr. J. Gow, Inspector of Mines, to the UNDER-SECRETARY of MINES, Wellington.

SIR,— Dunedin, 4th April, 1894.

I have the honour, in compliance with section 67 of "The Coal-mines Act, 1891," to report as follows, for the information of the Hon. the Minister of Mines:—

My remarks on the several mines will be found to follow my list consecutively, commencing at—

CANTERBURY.

1. *Springfield Mine.*—(23/6/93): The old shaft is closed, the poppet-head pulleys taken down, and the engine-boilers stripped of the brickwork. The old company no longer exists. Previous to closing the old shaft, a sufficient quantity of fireclay was hoisted to the surface to keep the pottery-works going for about two years. Since then, a 2ft. seam of coal has been opened from the outcrop, quite handy to the pottery-works, where nearly all the output is used. The new discovery dips in the direction of the old shaft, and is being opened on a small scale only at present.

3. *Sheffield Mine.*—(23/6/93): Examined the mine and the two working-faces, and found fault with the insufficient current of air passing through them. The air was so sluggish in one part of the mine that I had to request the men to at once improve it. A dip-drive is now being put down to the coal at a spot a little to the westward of the old shaft. The dip of this tunnel is 1½ft. to the yard, and it has already been driven 180 yards. The coal is expected to be reached in another 40 yards. The tunnel is 6ft. by 5½ft. A portion is timbered, but other parts are yet to be done. A horse will draw the coal.

4. *Snowdon Mine.*—(19/6/93): This seam is probably 15ft. thick, and stands nearly vertical. It is opened from a nearly perpendicular face on the east side of the Rakaia Gorge. A tunnel was driven in some distance, and then a shaft was sunk on the terrace to a depth of 70ft. on to the tunnel. Up this shaft all the coal is hoisted by a horse, and then carted to the station for home use only. The mine is in good order.

5. *Lake Coleridge Mine.*—(20/6/93): There is about 4ft. of coal, with a stone roof and good floor; but the coal does not appear to maintain the above thickness any distance under the terrace. There is an outcrop of coal a short distance higher up the creek, where the coal-hewer intends to put in a tunnel at an early date to test its value.

6. *Mount Hut Mine.*—(21/6/93): This mine is situate on the south side of the Rakaia Gorge, and a little west of the Snowdon Mine. It is very clear the seam of coal on the south side of the river is not the same as that on the east side. In lieu of the large seam, there are a number of small ones standing at a different angle, and all very friable. They range from a few inches to 2ft. thick, and the coal is bagged as it is hewn out of the open workings. A tram-line from the top of the terrace leads down the cliff to the coal at an easy gradient, all things considered; a horse does the haulage. The coal is used on Mr. C. P. Murray-Aynsley's station only.

9. *Homebush Mine.*—(17/6/93): Examined all the working-places. The top one of all, near the outcrop, is being blocked out toward the main heading, where there will be nearly a solid chain of coal left for some time yet. The roof is generally very good, and, where it is inclined to flake off, timber is at once put in to prevent a fall by which men are likely to be injured. The air is good throughout the workings.

10. *Whitecliff Coal-mine.*—(16/6/93): The pit from which the coal has been taken for the past two years is considered about worked out. A fault was met with at a distance of about 3 chains down the main dip-drive from the surface, by which the coal was cut clean off at a right angle to the dip of the drive. Mr. Leeming intends, at at early date, shifting his engine and plant about 10 chains south of the old pit, where the same seam of coal crops out on to the face of the terrace, and apparently dips at about the same angle into the hill as at the old workings. The men are now working toward the pit mouth, removing the pillars as they work back to the engine-plane. They expect to get out all the coal that can be removed with safety in about three weeks, and it is thought the engine and plant can be removed and refixed in position at the new place in about ten days.

12. *Mount Somers Mine.*—(12/6/93): Mr. Harris is now hewing coal from the east and west side of the old workings, and apparently shifting about from place to place in search of a pillar that, in his opinion, could stand reducing slightly. All the coal in the pit has bands of stone in every 3ft. or 4ft. of its thickness. These bands vary in thickness from 2in. to 2ft. I think the mine is nearly worked out, and have therefore requested Mr. Harris to get a survey of the mine made, and to furnish me with a tracing of the plan of workings up to date. The air is good.

13. *Kakahu Mine.*—(9/6/93): There was no one at the mine, or any appearance of any work having been done for some time past. The mouth of the adit was filled up and covered with a slip from the hill-side. The mine is evidently abandoned, as there is no indication of any carting having been done from the pit mouth for a year or more. It is said the coal is not of good quality.

14. *Albury Mine.*—(8/6/93): The seam is about 21ft. thick, and stands nearly vertical. The outcrop was discovered crossing a branch of the Opawa Stream, and has been opened by a dip-drive to the seam and a level following the coal eastward, at a depth of about 17ft. below the flat or bank of the stream. About 5ft. of coal is being taken out on the footwall side, leaving from 15ft. to 17ft. to be taken out at some future time. It is intended to work on this level for some time, to avoid pumping the drainage to any greater height than is absolutely necessary till some power other than man-power is erected to do the work. Possibly a siphon to the creek-bed would drain to the level of the present workings. It has been suggested by some one that a small water-wheel would do the pumping, but it is doubtful if there will be sufficient water in the creek all the year through to do this work. A drive westward from the bottom of the dip has been opened some little distance, and an upcast shaft sunk at the end. At the time of my visit there were three men employed in the mine. I was told by one of the men that he had found some small pieces of anthracite coal in the creek, close to the outcrop of the big seam, but he failed to find the seam *in situ*.

15. *McPherson's Mine, Waimate Forks.*—(28/6/93): This seam, or seams—there are several exposed to view in the high face of a very steep terrace on the west side of the Waihao Stream—dip at a steep angle in a south-west direction from the stream. The most eastern part of the outcrop is very little above the ordinary flood-level, but following the outcrop to the west it is slightly higher. Two or three short tunnels have been driven on the coal into the terrace a short distance, till the drainage became a trouble: the driving then ceased. The present mining is being done in an open face, where the top 6ft. of good coal is being got out handy. This 6ft. rests on a band of a few inches thick, which is on top of more coal, said to be 4ft. thick.

16. *Studholme Waimate Coal-mine.*—(28/6/93): This was my first visit to this mine, which appears to have been working for many years. It is situated on a terrace on the north-east side of Stoney Creek, and about 15ft. above the stream. It rises gradually into the terrace as far as driven on (3 chains), and is supposed to be 20ft. thick; the bottom, 8ft. only, is being taken out at present. The first chain of the tunnel is timbered, and appears to be safe. The coal in the face is very compact and hard; do not think it commands a big sale in the district. There was only one man at the mine.

North Otago.

17. *Wade's Awakino Mine.*—(27/4/93): Wade's old pit on the east side of the Awakino Stream has not been opened since the big flood, over two years ago, which filled up the pit mouth and buried it out of sight. Some attempt was made, a few months ago, by Mr. Cairns, of Wharekuri, to get into the mine again, by erecting a small water-wheel, which worked a pump continuously for some weeks, but without making any perceptible reduction of the body of water in the mine. The creek-bed at the time of the big flood was so much altered and raised near the pit mouth—where the stream is now running—as to give strong grounds for believing the present stream to have direct communication through the gravel with the old pit mouth.

Wade's Pit on the west side of the Awakino: Since the flood, this old pit has been reopened, and put in working-order. The seam stands nearly vertical, and lines nearly north and south. A new adit above the highest flood-mark was driven into the terrace a distance of 3 chains, where it intersected the seam at a depth of from 50ft. to 60ft. from the surface. The old workings at a higher level were then driven into; a drive in this about 3 chains long going northward was examined, where the coal is said to be from 18ft. to 20ft. thick, the mining here having been done six years ago, it is said, from a shaft which is now used as an air-shaft. The air is good throughout the workings.

18. *Phillips's Awakino Mine.*—(27/4/93): A vertical seam opened on the east side of the Awakino. The pit mouth is a little below the highest flood-mark, and the workings are about 50ft. below that level. The seam is about 20ft. thick, but only a portion of it is hewn out. The coal is hoisted by a horse-whip, and the pump is driven by a small water-wheel. The output of coal is small.

19. *Cairns's Wharekuri Mine.*—(26/4/93): This mine was on fire when I was placed in charge of this district, and was for a time abandoned. It is again opened by a new dip-drive to a level where the roof is said to be 6ft. below the floor of the old workings—which I have not yet seen—and 100 yards has been driven along the seam, 9ft. wide by 6ft. high. There is an airway about midway along this tunnel going up to the surface 60ft. overhead, creating a good current of air. Cairns promised to make another upcast shaft further ahead when the work is advanced the required distance. The seam stands nearly vertical, and is calculated to be 30ft. thick. The present level is the fourth in this mine, and now on a level below the bed of the creek, a short distance in from the tunnel mouth. The drainage is taken out in a barrel on a trolly by a horse. There is a doubt about the coal extending to any great depth, since the Lias bottom is to be seen at a lower level down the creek, at the road-crossing.

20. *J. Collins's Mine, Wharekuri.*—(26/4/93): Since my previous visit this mine has been opened in a second place 250ft. higher up the creek, but at a slightly lower horizontal level. This new opening has a dip of 1 in 12, and intersects the coal at a distance of 5 chains, through very good standing ground all the way. The coal stands nearly vertical, and is said to be 30ft. thick. The previous workings were examined, and found in good order. There is generally 20ft. of the seam hewn out, which leaves about 5ft. of coal on each side to keep the walls intact. The new workings are through into the old, which keeps the mine well ventilated. A shaft has been sunk 28ft. below the floor in good coal all the way. There is no water in the workings, although they are below the bed of the creek, only a short distance from the mouth of the tunnel. The bed of the creek is stiff clay, with a very steep fall to the Waitaki.

21. *Papakaio Mine.*—(30/6/93): In consequence of the peculiar nature of the coal roof, chipping upward into a narrow crevice, the main levels have to be driven as narrow as it is possible for a man to work in, and then allowed to stand idle for some time. After the lapse of a few months' time, these places can with safety be widened out to the usual size, and the ordinary mining operations followed out. In this way, with ordinary care, the roof may be maintained in fairly good order. The mine is well ventilated.

22. *Willitt's Mine, Papakaio.*—(30/6/93): The working-faces were all examined where coal is now being hewn, and it was found that the good blocks of coal are now few and far between. It appears the bulk of the coal in the mine is now soft and useless; there are blocks of good coal in places, but very difficult to follow any distance, in consequence of the many soft places coming in. Sometimes in the top, and at other times in the bottom, of the seam bands of stone also come in, and cut out in places. It is a difficult mine to work, and one in which there must be a considerable amount of lost labour.

24. *Rosebury Otepopo Mine.*—(4/8/93): All the working-faces were examined, and found in first-class order. The roof is remarkably good throughout the mine. The thickness of coal taken out is 4ft. In consequence of the very bad state of the road to the mine, Mr. Lowe is thinking of opening a new pit at a much lower level, to avoid about a mile of a steep hill gradient. The new pit would also shorten his carting to the farmers and to the railway-station by about a mile and a half.

25. *Willitt's Early Bank Mine.*—(4/8/93): At the time of my previous visit, twelve months ago, a new dip-drive was being put down, at an easy gradient. This was completed, but the seam of coal proved to be very thin, the best of it not more than 3ft. thick, and of poor quality. The output, therefore, has been very small, and is likely to be less in the future.

26. *Shag Point Mine.*—(2/8/93): The working-faces in No. 5 seam were inspected, which was about 3½ft. thick at the boat-harbour, about 30ft. below No. 4 seam and 275ft. from the surface. The coal is clean and good, with a strong conglomerate roof 17ft. thick. No. 5 seam has been bored through at the shaft where it is 410ft. deep, and has thickened to 4ft. 5in., but here it has a 6in. band of clay in the centre. The roof has also altered for the worse, there being an 8ft. layer of fireclay instead of the 12ft. of conglomerate at the boat-harbour. It is the intention now to sink the main shaft to No. 5 seam and open out on it. The present workings in the main shaft are in No. 4 seam, which is 7ft. thick, with a 40ft. conglomerate roof; but it is not considered a good seam, in consequence of several small bands of stone through it, which render it almost unsaleable. It is certainly more trouble than it is worth. Another seam, No. 3 (3ft. 3in. thick), is being worked at the main shaft at a depth of 285ft. This coal is very good, with a strong conglomerate roof. These new workings are about 50ft. below the original and extensive old workings in this mine. The manager stated his intention to sink the shaft to a depth of about 460ft., and from that level drive a tunnel seaward till it intersects the several seams known to exist, and then open out on one or more promising the greater yield and the best quality of coal. (6/4/94): The shaft has now been sunk to the depth stated, and a tunnel driven seaward to No. 3 seam, where it is no thicker than it is at the shaft. Other seams passed through are no better in quality than they were at the shaft. I may mention the fact that in No. 4 seam smooth water-worn quartz stones 1lb. weight are found in the clean coal. I do not remember having seen them in this mine before.

27. *Allandale Mine.*—(3/8/93): All the working-faces were visited, and the roof found to be very good. In some parts of the mine the roof is shale or conglomerate, and in others coal. The coal is not as free from small stone bands as could be wished, but it is supposed they will run out as the work advances towards the dip, where the manager expects to find a large field of clean coal. The air is good throughout the workings.

Central Otago.

28. *McCready's Kyeburn Mine.*—(19/12/93): The main tunnel is now undergoing a thorough overhaul, and all doubtful pieces and sets of timber are being removed and replaced with new timber. The coal stands at an angle of 45° south. There are two seams of coal; one is said to be about 2ft. thick, and the other from 10ft. to 8ft. The depth of the coal seam below the tunnel level is not known. The present workings are a good many feet above the Kyeburn Stream.

29. *Archer's Kyeburn Mine.*—(19/12/93): The new adit, a few feet above the Kyeburn Stream, is now completed to the coal seam, which it intersects at a right angle. The mouth of the adit is about 8ft. above the bed of the stream to give a tip-head, but the adit dips the 8ft. in the distance to the coal, and a drain is made to that level to keep the workings dry. The coal is about 200ft. from the side of the adit and stands nearly vertical. It has been driven on north-west and south-east for a distance of 200ft. and 400ft. respectively. The seam is 14ft. thick, of which there is 9ft. of the centre taken out, the balance being left to protect the walls. The bord worked is 9ft. wide by 6ft. high, leaving from 8ft. to 9ft. of a coal roof to the floor of the old workings, from which the coal was hoisted up a shaft in the terrace flat some two years ago. The mine appears to be carefully worked, and is in good order.

30. *Hill's Creek Mine.*—(16/12/93): Very little work has been done in this mine lately—in fact, there is very little alteration in the open face since my previous visit over a year ago. There is an excavation in the floor of the pit where only a small quantity of coal has been removed. There was no one at work at the time of my visit.

31. *McKnight's Gimmerburn Mine.*—(18/12/93): This pit is an opencast, having a 20ft. seam of coal with from 7ft. to 8ft. of stripping. The coal is lying nearly flat, and the working-face is in good order. The output is small.

32. *Beck and McLean's Pit.*—(18/12/93): The stripping is gradually getting deeper toward the gully; it is now from 7ft. to 14ft., but it is satisfactory to know that the coal-thickness continues the same—viz., 30ft. It is now more or less laminated, and some of the small layers

are the best-burning in the pit. A portion of the coal near the floor is not good, and, consequently, is allowed to remain there.

33. *White's Mine.*—(18/12/93): The stripping is from 6ft. to 7ft., and is kept well in advance of the coal face, which is about 20ft. The coal floor is level and hard. The dray-road to the pit-bottom is made on an easy gradient, and is kept in good order.

34. *Turnbull's Border Pit.*—(18/12/93): This pit is situated on Ida Valley Flat, near the flour-mill, close to the roadside and Ida Stream, and 18ft. below the bed of same. The drainage is pumped this height by a small water-wheel of 3½ft. in diameter. The stripping is loose gravel, of from 5ft. to 7ft. deep, and the thickness of coal is about 17ft. The bed of the Ida Valley Stream here is all coal.

35. *Dunsmuir's Black Stone Hill.*—(16/12/93): There was no one at work at the time of my visit, but there was evidence of coal having lately been taken away from the pit. The stripping is not heavy, and the thickness of coal continues about the same as last year.

36. *Jones's Cambrians' Mine.*—(15/12/93): The pit-drain has been deepened considerably since my last year's visit, but the water has still to be lifted 7ft. by horse-power. The coal is from 30ft. to 35ft. thick, lying on 5ft. of kerosene shale, which yields a very high percentage of kerosene per ton. The seam dips about 1 in 3 to north-west, under a terrace, consequently the depth of stripping is increasing quickly, and is now 18ft. I spoke to Jones about giving the stripped face a greater slope, in order to be perfectly safe for the men in the pit-bottom.

37. *Dunge's Cambrians' Pit.*—(15/12/93): The depth of stripping and the thickness of coal are much the same as they were last year. The stripping is nearly all hard-packed gravel, and consequently stands well all round the face of the pit. The coal from this pit is very good of its kind, and has a large sale in the district.

38. *Alexandra Mine.*—(25/5/93): Immediately on reaching the working-faces I found fault with the sluggish state of the air. Mr. Thomson, the owner, who was with me, said he could not understand why the air was so bad, because it was generally too strong a current for the Chinamen working in the mine, who always complained of the "cold wind." On our return to the surface we visited the top of the upcast shaft, which is flush with the surface, and found carefully placed thereon a quantity of timber, with a particularly close covering of sugar-bags, and stones placed thereon to keep the wind from blowing them away—evidently the work of the Chinamen. On removing some of the bags the upcast current at once became very strong and unpleasant. Mr. Thomson promised to speak to his men about it, and at the same time keep an eye on the shaft. The workings are all in good order, and the working-places nicely laid out. The main heading from the shaft going west has reached soft coal, and the roof has caved and run up to some height, which is quite a new feature in this mine. This soft discovery will most likely prove to be a fault. The output from this mine during the past year was very good.

39. *Lett's Macqueenville Mine.*—(25/5/93): The output has increased considerably lately in consequence of the consumption by many new dredges lately started between Alexandra and Clyde. The mine is in good order, and the air is good in all the workings. There is a splendid roof in every place, and the pillars are very solid.

40. *Waikerikeri Mine.*—(19/3/93): The mine has been flooded for some little time past, consequently the coal trade has been diverted to the Alexandra pits for a time. Mr. Holt, the owner of this mine, is, however, fully employed with his teams carting coal from Alexandra to Clyde and one or more dredges. Holt alleged that T. C. Main, the owner of the adjoining mine, had turned water from a race into his own mine and flooded his (Holt's) mine. I made a careful examination of the race and the surface where it was possible to do the damage complained of, but could see nothing to justify the statement. Holt was on the ground with me, but did not attempt to show where the water was turned into the mine. I then took the levels of the water in Holt's shaft and the head of Main's tail-race, and lower end of box in same, which, to my mind, after other observations, clearly show there is no connection between the two waters. The mine was again visited on the 21st December, but no one was there, and there were no indications of work having been lately done at the shaft. I then visited the new low-level adit started some months ago, and found it had been driven 189ft., all in rock, but it was very clear that this work also had stopped. I learned in the township that the work was suspended for a time only, pending some new arrangements with the mortgagee, who intends to push on the work in the adit with all possible speed at an early date.

41. *C. T. Marie's Dairy Creek Mine.*—(19/3/93): This mine is said to have been on fire for the past three years. On going down the dip-drive to the edge of the coal, the atmosphere was found to be hot and unpleasant. I therefore did not think it wise to go any further into the mine. Main appears anxious to get coal, and did get out some quite lately, but the fire freshening up at the time prevented him getting any more for the time being. I urged him to open the pit in another place, which could be done at a small outlay. He then promised to do all necessary work to get out coal at an early date. The mine was again visited on the 21st December, and found in much the same state as it was on my previous visit. There did not appear to be any preparations made to open the mine away from where the fire is said to be. There was no new work, neither was any one there.

42. *Excelsior Mine, Bannockburn.*—(15/3/93): The first dip-drive into this mine has been altered and redriven at a steeper angle to reach the coal at a lower level. The seam (which stands nearly vertical) has been driven on the low level to the west a short distance to where soft and useless coal was met with, consequently that side was abandoned, and the east side is now being opened. The extent of coal on this side is not known yet. The water and coal are hauled up by a horse.

43. *Cairnmuir Mine, Bannockburn.*—(15/3/93): A long tunnel has been driven into the terrace, and on a level with the bed of tailings in the Bannockburn Creek. The material driven through is fairly dry, and laminated in many places, if not all the way, to the coal, and is fairly good

standing ground. An odd set of timber has been put in in places, and others will have to be timbered after a short time, as it shows many partings and smooth faces striking in every direction, showing a possibility of V blocks dropping from the roof when not expected. All those places are promised to be timbered at an early date. The seam of coal stands in this mine as it does in McNulty's (the adjoining mine), and is being opened on the east side of the tunnel, in which direction the seam is supposed to extend for 300ft. before reaching some old workings known to exist in that direction. The length of coal seam in the west side of the tunnel is estimated at 300ft. before reaching a filled-in gully. It is supposed the coal extends to a considerable depth underfoot, but to get coal much below the present floors requires some motive-power to hoist coal and water.

44. *Nulli Secundus Bannockburn Mine.*—(15/3/93): I did not find any one at the mine, but walked round the mine-mouth to see if anything had lately been done at the tip-head. There was no indication of any work having been done since my previous visit.

45. *Kawarau Mine, Bannockburn.*—(15/3/93): The new dip-drive is now down 500ft., and will be continued till a fault or some other obstruction is met with. It is not following quite the direct dip of the coal, but has a gradient of about 1 in 5. The same thickness of coal is at the bottom—namely, bottom seam 8ft. and top seam 7ft., with a 2ft. band between them. The lower seam only is at present being taken out, in which there are now eleven faces opened, and worked by five men, who shift from place to place as it suits their convenience. A quantity of coal, in bags, is stacked in several places in the mine, ready to be delivered on the shortest notice. The mine makes very little water, and that little is drawn up in a tank by a horse. The coal is hauled up in the same way. The airway was followed from the bottom workings to where it passes up into the old workings and air-shaft, and the air was good throughout. The new working-places are being well laid out, and the sides and roof are in good order.

47. *Gibston Mine, Gibston.*—(14/3/93): On examining the lower workings, where there are only two men getting coal, the place was found to be very hot, notwithstanding a good current of air passing through at the time. The heat being caused by the large quantity of slack filled in to the worked-out ground. As there is a very large percentage of fine coal in the hewing, it is filled in behind to save labour, and at the same time to save timber. Water is carried through the workings in pipes, and always ready to put out any fire whenever it shows itself. It is generally known that some part of the mine has been on fire several times, but not lately. There is just now a prospecting-tunnel being put through broken coal in the top level in the hope of finding hard, marketable coal. The timber in the adit, which is of considerable length, is in good order.

48. *Gibston Saddle, Gibston.*—(14/3/93): A considerable quantity of coal is now exposed on the outcrop, which dips very quickly to the west. The line of the seam is nearly north and south. There is a small water-race on top of the Saddle at an elevation of about 160ft. above the floor of the open face of coal now opened, where two or three heads of water are obtained, by which from 14ft. to 16ft. of clay and gravel are sluiced off the outcrop. The covering is a very loose stuff from a high hill on the west side of the seam. The face of coal has a distinctly laminated appearance, the several layers differing a little one from the other in their burning-qualities. Most of the partings between the layers are a few inches thick, of a loose, crumbly character, and no good. The coal is sledged down a very steep hill for a distance of about two miles. An aërial tram could be constructed to the same landing in a distance of about 1 mile 30 chains.

50. *Jones's Roxburgh Mine.*—(12/9/93): This mine presents much the same appearance as it did twelve months ago. The working-face of coal, now being benched in steps, stands 30ft. high, and the length of the coal-face stripped is 90ft. The floor of the seam has not yet been touched, and is believed to be several feet below the standing-water level now being worked on. It is intended at an early date to cut up a new outlet drain at a much lower level than the one now in use, in order to get down to the floor of the coal. The stripping consists of 25ft. of clay and gravel, which is removed by sluicing it into the valley below with eight heads of water, which is conveyed to the spot in a water-race. Where there is such a body of coal, only two months' labour at stripping by sluicing is required once in five or six years, where the output of coal is over a thousand tons per annum. Mr. Jones has been requested to cast down some cracked blocks of surface on the west side of his quarry, because it was not considered safe for men or horses to pass under them after heavy rains. He promised to do so.

51. *Perseverance Mine, Roxburgh.*—(12/9/93): The coal is being mined in the bed of Coal Creek, where the stripping is a very heavy wash containing large stones, and from 10ft. to 12ft. deep. There are 12ft. of coal being hewn out to the level of the drain, but the depth of coal below this is not known. A new drain is now being cut up the flat below the present workings with a view of getting deeper in the coal in the distance of from 4 to 5 chains, which is in the direction of the rise of the seam. When the open drain has reached a face of from 12ft. to 14ft. of solid coal it is intended to mine it out, as it is supposed it will be less costly than the present stripping. The quality of coal is very good, and meets with a ready sale all over the district. Standing on top of the coal in the present workings is a small water-wheel, which pumps the drainage up 12ft. The batter of the stripping is quite safe.

52. *Mrs. McPherson's Mine, Roxburgh.*—(12/9/93): A considerable body of coal has lately been stripped at the northern end of the pit by sluicing operations. The water is plentiful, and flowing in a channel on the west boundary of the pit. The stream is a rapid, and, consequently, can be conveyed to any part of the pit by cutting a very short ditch. The *débris* is sluiced into Coal Creek, distant about 6 chains. The output of coal from this pit is nearly equal to the other two in the same place. A tunnel drain is now being driven from the bed of Coal Creek to the open pit, with a view of striking the floor of the seam, supposed to be 30ft. below the old workings. The length of tunnel required to the nearest part of the old mine is estimated roughly at 350ft. Of this about 30ft. is now driven from the top end of about 3 chains of open cutting in the creek flat. This cutting is paved with flag-stones, and the sides are strongly walled up to the level of the surfaces.

The 30ft. of tunnel driven is also paved with flags. This class of stone is plentiful in the creek and tunnel, and the sides are walled with stone to the roof, between and outside the sets of timber. The width between the props is 5ft., and the height 4ft. 6in., but the width of tunnel is reduced by the stone walls to 2ft. 6in., thus making it a very strong piece of work. The nature of the ground driven, so far, is heavy wash in the sides and soft clay in the bottom. The floor of the tunnel is said to have a full 3in. to the 12ft., which, with a head or two of water always available at the side of the pit, will carry away the small useless coal and the *débris* when stripping.

SOUTH OTAGO.

53. *Saddle Hill (Christie's) No. 2.*—(24/8/93) : All the workings are in first-class order ; but the air-current was not as strong as it should be. Mr. Christie, however, stated that he had this matter under consideration, and pointed out to me where he intended sinking an upcast shaft at an early date, by which the whole of the workings will be well ventilated. There is a strong coal roof throughout the mine. I did not see any roof down anywhere in the mine.

54. *Glenochiel, Saddle Hill.*—(19/8/93) : Seven feet of coal is taken out, leaving a large body of coal overhead for a roof. The lower end of the dip-drive has been deepened to reach the floor of the seam, which admits of 5ft. of coal being taken out all over the floor of the old workings. The mine is in good order, and the air-current is very strong.

55. *Walton Park, Green Island.*—(25/8/93): All the working-places (thirty-one) were inspected where there are thirty-six men employed, and the faces were found to be in fair working-order, but most of them require the unfailing attention of the manager, to see that the most friable of the working-places are kept narrow to prevent the coal roof chipping up to the sand and water, and to see that other places are timbered, with the same object in view. Some places require close timbering overhead to keep the main roads open. Careful attention to the nature of the coal and its requirements in the main headings as they proceed, and a little while after, saves a lot of coal and labour, since it is found that after these headings have had a rest for a time the chipping overhead ceases. In several of the working-places there was a chalk mark of even date, showing that the Deputy had done his duty, so far as clause 23 of the special rules is concerned. The quantity of air was tested that was passing through the mine.

56. *Fairfield, Green Island.*—(26/8/93) : A large block of coal supposed to exist in the old mine was not found, and after taking out a few pillars the old mine was abandoned. Mr. Harris is now preparing to open a new mine, in ground between Saddle Hill Pit and Bryce's mine, where there is a very thick seam of coal.

57. *Abbotsford, Abbotsford.*—(26/8/93) : The working-places are numerous, but most of them cramped for room overhead for the workmen. The fact is the ground crushes in in every direction as soon as an opening is made into it; therefore pillars have to be taken out quickly, following the other working-places, to avoid a considerable loss of coal. A gang of men is employed every night to renew the timber in the main roadways to keep them open. One of the working-places was decidedly warm, but this was where a solitary pillar was being taken out before closing that part of the mine. The air-current into the mine is greater than is required by the Act for the number of men employed in the mine. The crushing of the timber is now as bad as it was last year, and the floor and roof come together in a very short time, notwithstanding a large amount of timber and labour to prevent it.

58. *Chain Hills, Abbotsford.*—(26/8/93) : There was no one at the pit at the time of my visit, and since then the owner states that it is abandoned.

59. *Fernhill Chain Hills.*—This mine has again started to send out coal. A few miners are scattered through the old workings, getting down "tops" in places, and in others hewing in the solid coal beyond the old workings. The air-current was very sluggish, and, after speaking to Mr. Gray about it, we visited the furnace and found very little fire in it. I did not think the furnace in very good order, and suggested a few bricks and some mortar would improve it, which Mr. Gray promised to get done.

60. *Brighton Mine, Brighton.*—(22/8/93) : Walker has abandoned his old pit, and has started a new one on the opposite side of the gully, where the coal is reached by a dip-drive, at about 30ft. from the surface. The seam is 4ft. thick, and dips slightly south, toward the sea. A portion of the workings is wet overhead, but the drainage is not heavy, and is lifted by a hand-pump. There is not much work done yet, and the coal is hoisted by a horse. The roof is good, and the seam is not thick enough to allow a coal roof being left. An upcast shaft is to be sunk at an early date.

61. *McColl's, Brighton.*—(22/8/93): The new dip-drive is completed, and the coal followed some little distance, having a wet roof all the way. The seam is 4ft. thick, with a soft roof generally, which will require careful timbering till it improves. The man working in the mine is of opinion that the roof will be better as the work proceeds under the high terrace close by. Where the roof has come down in one or two places it has exposed a second seam 5ft. overhead, and from 5ft. to 6ft. thick. The top seam does not appear to be so good a coal as the one being worked. The drainage and coal is being hoisted by a horse. It is McColl's intention to put down a second dip-drive shortly to act as an airway.

62. *Mosgiel Mine, Mosgiel.*—(24/8/93) : The section on the east side of the mine will be worked out in two or three weeks. The men will then be shifted to the west side of the engine-plane. The coal does not look so solid on that side, but is considered fairly good. The seam is supposed to extend south considerably beyond the end of the engine-plane, but that part of the mine is not likely to be tested for some time yet, because of the extra distance to pump the water, which might necessitate some additional pumping-plant. The airway to the upcast shaft is in good order, and the air is good throughout the workings. The main travelling road to the east workings shows considerable weight on the timber in places, but is being well looked after and made secure by placing in extra sets. The coal is from 8ft. to 10ft. thick, of which from 5ft. to 8ft. only is being taken out.

63. *Salisbury Mine, Taieri.*—(23/8/93) : The system of laying out the working-places is much improved since Blackie took charge, but neither the coal or the thickness of seam has improved. There is about 4ft. of coal hewn, and about 18in. left overhead, which makes a good roof. There is said to be a 12ft. to 14ft. seam of coal on the opposite side of the hill to that now being worked, which may be reached by following the coal through, if no fault comes in the way ; with this object in view, the present workings will be pushed on in that direction. The air is good, and the mine in good order.

64. *Bruce No. 2, Milton.*—(1/9/93) : At the time of my visit the adjoining mine on Hardwick's western boundary was one huge fire, from which the flame was coming to the surface through the broken ground. Soon after the fire was discovered, and when it was seen that nothing could be done to extinguish it, Hardwick immediately went into his old working-places on the fire side of the mine, and by very hard work blocked them up tightly with clay at the most convenient places, a short distance in from the mouth of the adit. This work had, up to the time of my visit, kept back the smoke and fire from the east side of the mine, where preparations have since been made to follow the dip of the coal eastward. In order to do so a deep drain had to be cut along the floor of the long open cutting and adit into the mine, and this work was finished at the time of my visit, as also an extension of the adit to the solid coal where it is 22ft. thick. An air-shaft has also been sunk from the surface to the top of the coal, through which an opening will shortly be made from the roof of the main heading passing under it. Hardwick estimates his loss by the fire in Young's mine at £60. It will be a great loss to Milton if the fire continues to follow the coal in the same way it is said to be doing at the Pomahaka.

65. *Real McKay, Milton.*—(1/9/93) : On the 6th May last this mine was discovered to be on fire close to the west boundary of Hardwick's mine. Hardwick did all he could to prevent the fire reaching his workings in the immediate vicinity of the adit mouth, and succeeded in blocking up all the old openings with soil and clay. This work had prevented the fire from extending in that direction up to the date of my visit, but a short distance from Hardwick's work the fire was exceedingly strong. There is little or no water available at or near the mine, consequently the pillars in Young's old workings are likely to be allowed to go on burning till there is not one left. Mr. Young was at the time of my visit opening another pit a short distance off (half a mile) to the west, where there is an outcrop of coal 9ft. thick, and close to his old road. This coal is being stripped at present, but as the work advances into the terrace the stripping will shortly get too deep. It is therefore intended at an early date to put in a 6ft. tunnel and leave 3ft. of coal overhead for a roof.

66. *Wallsend, Lovel's Flat.*—(2/9/93) : This is a large open face of coal 20ft. thick, with stripping from 3ft. to 9ft. of yellow clay, kept well in advance of the coal face for safety to the workmen on the pit bottom. The coal is very solid and has to be blasted down.

68. *Elliott Hill Mine, Lovel's Flat.*—(2/9/93) : At the time of my previous visit McDougall had started a new adit into the mine, which is now completed, and extended some distance into the coal. The workings are neatly laid up from each side of the main heading. The height of coal hewn is about equal to the height of the hewer. The seam is thought to be 2ft. thick.

69. *Paskell's Mine, Adam's Flat.*—(3/10/93) : The most of the old open face is caved in and the coal face covered with *débris*. A small hole had been sunk in the bottom of the old paddock in one corner, and a few bags of coal were stacked there. Mr. Paskell now takes out coal for his own use only.

70. *Adam's Flat Mine, Adam's Flat.*—(3/10/93) : This is an open face of from 8ft. to 10ft. of clay stripping, and from 7ft. to 9ft. of marketable coal, but of poor quality. The coal dips slightly eastward under a rising ground, so that the stripping is gradually getting deeper as the work advances into the hill. There was a quantity of loose coal lying in the pit ready for carting away, but no one there.

71. *Benhar Mine, Benhar.*—(7/10/93) : This was J. Nelson's old mine, but is now being worked by Mr. Skimming, who has lately rented it and all the pottery plant from the owner. Mr. Skimming is carrying on all the works as of old. All the mining is now on the east side of the railway-line, and the main level is being driven eastward beyond any previous workings. About 12ft. of coal is being taken out, leaving a strong coal roof. The mine is very dry, but the air-current on the day of my visit was not as good as it should be: a promise, however, was made to improve it at an early date. All the small coal is used in the brick- and pipe-works.

72. *Rigfoot Mine, Benhar.*—(7/10/93) : There is nothing new to note in this mine. One man not fully employed makes slow headway in a 14ft. face of coal in the course of twelve months, where the width of the working-place is from 12ft. to 14ft. All the small coal is used at the mine in burning bricks.

73. *Kaitangata Mine, Kaitangata.*—(4/10/93) : Accompanied by Mr. Shore, the mine-manager, all the working-places were inspected, as also others that were not at present being worked. The air-current was measured several times near the furnace, and found to average 26,400ft. per minute, which is more than is required by the Act for the number of men at present (120) employed in the mine. The manager stated that he intended shortly to enlarge the furnace considerably, in order to be prepared for a larger number of men. A short distance from the bottom of the engine-plane, going north, the seam of coal is being followed to the westward down a very uneven dip. At the time of my visit 500ft. had been driven through a splendid sample of coal, said to be 25ft. thick. The coal at the bottom of the dip appeared to me to be the hardest and best in the 500ft. driven, and perhaps the best coal in the mine. Preparations are now being made to meet this dip-drive by another tunnel from the bottom of the pumping-shaft at the 700ft. level, and the two tunnels are expected to meet at a level about 450ft. above the shaft bottom. When the coal-hewing is in full swing in this part of the mine, it will be sent to the surface up the shaft and engine-plane at the same time. Since this seam has been tested for half a mile north-east of the engine-plane, where it is known to be much wider between the two faults than at the 500ft. spot just reached in the dip

there can be no doubt about the large quantity of good coal available in that side of the company's property. The office books show that a little gas is frequently found in the south workings, but in small quantities.

74. *Castle Hill No. 1, Kaitangata.*—(6/10/93): There were two men employed splitting some of the pillars where it is said the coal roof is from 4ft. to 5ft. thick. The roof and sides of the old workings are in splendid order, and do not appear to have altered since the coal was taken out—from three to four years ago. Although the coal is similar to the Kaitangata, no gas is found in this mine. The old workings are very dry and comfortable to work in.

74. *Castle Hill No. 2.*—The company, after spending much money and time in sinking a large shaft to a depth of 430ft., chiefly through hard-packed sand carrying a large body of water in places, eventually abandoned it, as it appeared hopeless to make satisfactory progress when the water gained on the tanks and pumps throwing 30,000 gallons per hour. I think the pumps worked continuously for weeks after an inburst of sand and water, when the latter gained on the pumps to a height of probably 200ft. in the shaft, and maintained that level against pump and tanks together, till the work was abandoned in favour of constructing a dip-drive, which, after a little delay, was started a short distance from, and on the east side of, the shaft. The dip is 1 in 4 to the eastward, where the hard conglomerate formation is supposed to exist from the surface to the coal. This tunnel is 11ft. wide by 6½ft. high, with a brick centre-wall 9in. thick, built up to the roof-laths and caps. The latter are chiefly ironbark timber, 10in. by 6in., placed 2½ft. from centre to centre in soft places, and as much as 6ft. from centre to centre in hard conglomerate formation. Sills are placed under each set of timber in soft places, and the brick centre-wall is generally into the floor 9in., but more in soft places. There are openings 3ft. wide to the roof at short distances along the centre-wall to allow men to pass from side to side when employed doing repairs, &c. These openings are temporarily closed with scrim so as not to interfere with the air-current. The pump side is made to answer the purpose of an upcast, in which the steam from the Tangye pump assists to create a good current of air past the working-face. A large three-plunger pump, capable of throwing 30,000 gallons per hour, is to be placed at the coal seam when it is reached, and is to be driven by an endless wire rope on a surging-drum 7ft. 6in. in diameter. The pump is now being constructed at Sparrow's Foundry, at a cost of £500. The wall and timbering in the tunnel is kept as close up to the face as is necessary for safety to the workmen, who number about ten each shift, but not so close as to crowd the men. Some necessary alterations of the surface-plant, to drive the new pump, and wind the coal by the endless-haulage system, are being proceeded with simultaneously with the other preparations, so as to be ready to do a large output of coal as soon as the seam is sufficiently opened out to make room for men. The old pit, No. 1, supplies this No. 2 with fuel. (3/2/94): The tunnel is now driven 1,900ft., and is supposed to be within 200ft. of the coal, and equivalent to a vertical depth of 570ft. from the surface, or 420ft. vertical depth below the tunnel mouth. A considerable body of water was tapped at 700ft. down the tunnel, equal to 8,000 gallons per hour for a time, but now drained off to half that quantity. Again, at 1,400ft. down, in September last, another fissure was cut into, which gave 10,000 gallons per hour, making in all 14,000 gallons to be lifted from this depth. Since then the drainage has been getting less, and the conglomerate cutting comparatively dry. Much more water is not anticipated till the coal is reached. At a distance of 1,300ft. from the tunnel mouth, a downthrow fault was cut through, and to ascertain its depth a bore was put down 170ft., which passed through the coal. From this it is calculated that the seam will be found at a total length, 2,100ft. of tunnel.

The small 500ft. shaft on the property, sunk to the coal over three years ago, is now being enlarged to a 9ft. circular air-shaft. The first work necessary, from the bottom of the tunnel or engine-plane when the coal is reached, will be a tunnel of probably 18 or 20 chains to the proposed air-shaft. A similar tunnel should be started from the bottom of the shaft when it is finished to meet the one coming from the engine-plane.

The three-plunger pump now fixed in the engine-plane is driven by a wire rope on a surging-drum, and does the work very well.

75. *Wangaloa (Smith's) Mine.*—(6/10/93): The output of coal from this mine is now very small indeed. I examined several of the old working-places, and found them in good order.

76. *Lesmahagow, Wangaloa.*—(6/10/93): Examined all the working-places, which are not far in from the face of the terrace. The sales are now very small—too small to enable the poor old man, now seventy-four years of age, to make a living. The mine is in good order, and is carefully worked.

77. *Crofthead Mine, Kaitangata.*—(6/10/93): Examined the present, and some of the old, working-places, and found them in good order. No gas is reported to have been found in this mine. The most southern portion of this pit is nearly worked out, but there is a large body of coal on the north side of the main travelling road—three years' work—but that is in the dip of the mine, and the old workings in that quarter are at present full of water. Some attempt was made some time ago to take out the water by a horse and a tank fixed on a trolly, but this plan only equalled 250 gallons per hour, which was too slow and too costly to be continued. There is some other plan in view for getting rid of the water, but no definite plan has yet been decided upon. The dray-road from the mine to Kaitangata (two miles) is in a very bad state indeed, and requires four horses to take one ton on a dray, notwithstanding most of the distance being downhill. The body of the dray at places drags along on top of the mud, and in this way levels it down, leaving a smooth surface behind it. The road is a disgrace to the county.

78. *Mainholm (Lischmer's) Mine.*—(10/10/93): This mine is, if anything, in better order than at my previous visit. The stripping continues much the same in depth and character, and is now more in advance of the face of coal, which continues as nearly level as possible. Since my former visit a new industry has been started at the pit, by which at least a portion of the clay stripping is to be utilised in making bricks. The good clay will no longer be wasted by dumping it into the worked-out ground, as of old.

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79. *Waikoikoi, Pukerau.*—(11/10/93): Mr. Cullan was not at home when visiting the old mine, which did not appear to have much done in it since my former visit ten months ago. A second place on the face of a terrace, much nearer the house, has been stripped, exposing some coal, but it did not look very good from a little distance off, so it was not examined.

80. *Valley Road Mine, Pukerau.*—(11/10/93): Orchard had to abandon his old pit in consequence of the very heavy stripping, which was bad standing ground. He quite lately, and by accident, discovered a good 25ft. seam of coal quite close to the surface—stripping from 4ft. to 7ft.—and handy to the Main Valley Road. This pit was being opened at the time of my visit, and at the same time the stripping was being carted into a small gully in order to make a passable road to the pit. This promises to be a splendid pit, and convenient for the farmers about the Koikoi. The Valley Road, however, is a disgrace to the county.

81. *Pukerau, O'Hagan's Mine.*—(10/10/93): This mine is, as usual, in good order throughout. From 8ft. to 11ft. of coal is being taken out, which leaves from 4ft. to 6ft. of coal overhead for a roof. The pillars are large and solid. There are larger and longer logs found in this mine than in any other in Southland. Nearly full-length trees can be shown crossing several of the working-places many yards apart. Very large lumps of resin are also found. Big and unwieldy stumps are often met with, and their removal entails much labour. There are at present three men employed in this mine.

83. *Dudley's Mine, Pukerau.*—(10/10/93): The stripping is gradually getting deeper as the work advances into the terrace, especially so on the left-hand side of the gully, which is being followed up on account of its being the shallowest stripping. Mr. Dudley will soon be obliged to start mining the coal out, which he will find to be more economical than deep stripping when there is so little room to get rid of the stuff.

85. *White Craig, Gore.*—(12/10/93): Opencast, with about 5ft. of stripping, which, at the time of my visit, was being removed by three horses, a road-scoop, and plough. The thickness of coal appears to improve going north, but it is unfortunate for McKinnon that he is now near his north boundary fence. He injured one of his knees some eight or nine months ago, and neglected to send me notice, as required by the regulations made under "The Coal-mines Act, 1891," thereby forfeiting 10s. per week which he would have been entitled to draw from the Sick and Accident Fund all that time.

86. *Heffernan's Pit, Gore.*—(12/10/93): This pit presents much the same appearance as it did about this time last year. The stripping and coal-hewing is at the north end of the opencast, where the quality of coal has improved. The stripping is very shallow.

87. *Sarginson's Pit, Gore.*—(14/10/93): This pit had been reported to me as abandoned. I, however, when in that locality visited the spot, and found the pit filled with water, and did not see any one about the place.

88. *Fryer's Excelsior Pit, Gore.*—(14/10/93): Fryer abandoned the pit where he was working at the extreme northern of the coal reserve, East Gore, twelve months ago, and is now reopening an old pit a little south of his previous workings, where the stripping is from 8ft. to 10ft., exposing from 6ft. to 9ft. of coal. The stripping has sufficient sand in it to make it good shovelling-ground. A short, open drain keeps the pit open.

89. *Dryden's Pit, Gore.*—(14/10/93): I received notice of the abandonment of this pit six months ago; but I visited it to see if work had been resumed, but found it full of water.

90. *Heffernan's Pit, Gore.*—(14/10/93): A new pit is being opened eastward of the old one about 130 yards, where the stripping is from 2ft. to 4ft. only, exposing 17ft. of coal. The seam dips to the east rather quickly to be worked to advantage for any great distance, but it is supposed the coal will rise again in a short distance. Most of the seams in the immediate neighbourhood are nearly flat, and the stripping generally shallow.

91. *Regifsky's Mine, Gore.*—(14/10/93): No more coal than is required for his own use is taken out of this mine. There are from 3ft. to 5ft. of stripping and 3ft. of good coal. When the coal is removed the stripping is again returned to the pit, and the original surface spread on top as before, and cultivation goes on more vigorously by the turnover. The seam is not followed to the dip, because of the extra stripping in a very short distance.

92. *Kirk and Sheddow's Pit, Gore.*—(14/10/93): This pit looks much in the same state as when visited by me twelve months ago. The bottom of the pit was filled in to some extent and covered with water. There appears to be from 6ft. to 8ft. of coal and 4ft. of stripping. Coal for home use only is taken out.

93. *Cluckoski's Pit, Gore.*—(14/10/93): This is an opening in a ploughed field, where a 3ft. seam is found from 3ft. to 4ft. from the surface. The stripping is carefully heaped up handy to return again into the worked out ground, and levelled for the plough. The output is for home use only.

94. *Littzi Pit, Gore.*—(14/10/93): This is situated in the low-lying flat in the coal reserve, East Gore. The stripping is only from 2ft. to 5ft. The opening made is about 55ft. by 25ft., from which there is a drain cut down the flat about 4 chains. The depth of coal was not ascertained because of the *débris* and water in the pit; but there does not appear to be more than what is necessary for home consumption taken out of late.

95. *Green's Mine, West Gore.*—(12/10/93): The advantages of underground mining in this shallow ground are now fully realised and appreciated by the workmen and landlord. The workmen are now enabled to work whether it be rain or sunshine, and the surface of the land is allowed to remain as it was, always producing good pasture. The dip-drive is being continued in the coal, and from it other working-places are being opened at the sides as the work advances. A good thickness of coal is left overhead, which makes a splendid roof, and if sufficient care be taken to test its thickness at short distances apart the surface should remain intact for any length of time. Since my former visit, now twelve months ago, a small vertical engine has been placed at the tunnel mouth to do the pumping only. The quantity of drainage, however, is very small.

96. *Smith's Mine.*—(12/10/93): The open-face work was discontinued as advised at the time of my previous visit, about twelve months ago. Since then a tunnel has been driven some distance into the coal from the old open face, and is following the dip to the south, where the coal seam is found to be gradually thickening to 14ft. or 15ft. This thickness of seam admits of about 10ft. being hewn out, and leaving from 4ft. to 5ft. overhead for a roof. The working-faces are being made rather wide when so near an open face. A promise was, however, made not to make them so wide in future, so as to leave the open face very strong. The young men in the mine recognise the advantages of the underground workings compared with the old opencast and deep-stripping system of getting out coal. The coal is hard, and makes a good roof.

97. *Richard Smyth's Mine.*—(12/10/93): This is a new pit, at Gore, a little to the north of Green's. The stripping is from 8ft. to 10ft., and 6ft. of coal close to the outcrop. It is likely to get much thicker under the rise of the hill going south.

98. *Pacey's Pit, Chatton.*—(19/10/93): For some reason not very clearly explained to me, the output of coal has been very small compared with that of previous years. There has been nothing done since my visit last year to lift the bottom coal to the floor of the seam in the old open pit. The small quantity sold was taken from the old working-face, so that the pit is much the same as it was when last visited. Mr. Pacey hopes to show more work done by the end of next year.

99. *Pemble's Mine, Chatton.*—(13/10/93): The seam (vertical) is being followed by an opencut south, where the stripping is at present about 12ft., but will be much less 40ft. further ahead on reaching a depression at the head of a small gully. From 10ft. to 14ft. of coal is being taken out of the 20ft. seam. There are several bands of clay, from a few inches up to 1ft. thick, in the coal removed. A new drain is being cut up the gully referred to, where £6 has already been expended on it. It is estimated to cost another £10 to finish it up to the coal seam.

100. *Hunter's Mine, Chatton.*—(13/10/93): Hunter has started to get coal in the northern end of the seam where first opened by Pemble, who followed it to the south. Hunter had simply to remove a landslip to get on the coal, which he is now following to the north, where the terrace rises very quickly. The deepest stripping is 18ft., but it will be less some little distance in the terrace away from the gully where the start was made. The thickness of the seam here is from 26ft. to 28ft., but has a band of clay in it 9ft. from the west side. There appears to be plenty of coal to admit of its being mined 10ft. high through the hill with safety, without timbering, by leaving a strip of coal on the sides to keep back the clay walls. A very good prospect of fine gold was obtained from some smooth quartz-wash lying in the coal by washing a small quantity in a shovel. Hunter's old pit, Otama, was not working during 1893.

101. *Irvine's, Knapdale.*—(13/10/93): This mine, although a mile and a half from Pemble's pit, is, no doubt, a continuation of the same seam. It can be traced some distance south of this mine, especially where it crosses the Mataura River, where it forms a "bar" standing out of the water in places, causing a rapid. The thickness of seam is 30ft., of which from 14ft. to 16ft. are being taken out in the centre of the seam by 26ft. in height, taken out in benches. Quite lately a shaft has been sunk from the top of the terrace to the roof of the present workings, a depth of 58ft., of which 27ft. were in coal, and the balance through water-worn gravel. In this shaft was placed a square box, or tube, to the coal, and the space filled in round it. The box stands some feet above the surface, and can be added to if necessary to assist the air-current. Previous to the upcast shaft being made the powder-smoke used to remain in the roof of the workings for four hours. Since the upcast has been finished the smoke clears away in fifteen minutes. The height of coal overhead at the present workings is 27ft., and there is no indication of it being any less while following the seam to the north. It is more than likely that shores will have to be placed at intervals in the mine in case of any unevenness in the thickness of the seam and coal walls being discovered when too late. The shores would give warning and prevent a collapse of the mine. The adit is about 10ft. above the Mataura Flat.

102. *G. H. Evans, Wendon.*—(18/10/93): The pit is in much the same condition as when visited last year. The coal is from 12ft. to 14ft. thick, and the stripping 25ft., and getting deeper as the face advances into the hill. There are now about 3 chains of an open face of coal, and the stripping is very neatly sloped back, and not the least likely to cave into the pit. The open drain, which was being deepened last year, is now completed, and will drain the mine to a level that will admit of several years' work being done without bailing or lifting any water. There is a second seam of coal 10ft. thick quite convenient on the east side of the gully, and from 14ft. to 15ft. above the one being worked, but it is said the coal is not so good.

103. *Edge, Waikaka Mine.*—(18/10/93): The opening extends to both sides of the gully. On the north side the stripping is from 12ft. to 14ft. of clay. The face of clay had caved in so much as to prevent the coal being seen to the floor. On the south side of the pit the stripping does not appear to be so deep. The pit is not properly drained, which could be done at a small outlay of labour, and to the great advantage of the coal-hewer.

104. *McDonald's, Wendon.*—(18/10/93): This pit is in a small gully, convenient to the house, and where coal has been obtained from it for home use for some years past. The stripping is quickly getting deeper as the coal is followed into the hill-side, and the seam appears to be 4ft. or 5ft. thick. A good road is being made, but very slowly, to the pit.

105. *Ayson's, Waikaka.*—(19/10/93): This is a new pit on the west side of the Waikaka Township, and probably two miles from it. The seam is tilted on edge, and where exposed is about 25ft. thick, with a 5ft. band of shale near the centre. The spot chosen to open the pit is at the side of a small gully, where the stripping is from 5ft. to 6ft. Not much as yet has been taken out. It is not a seam that can be extensively or easily mined out, nor satisfactorily worked as an open pit, to compete with others in the locality. It is very convenient to supply coal for his own use.

107. *Waimea (Smith's) Mine.*—(19/10/93): Smith has shifted 200 yards to the north from the working-place of last year. The stripping is from 12ft. to 15ft. of stiff clay, and the coal is 8ft. thick. The coal shows the action of a rapid stream having flowed over it for ages, carrying sand and gravel,

which has scoured channels in it in the same direction as the Mataura now flows. The present operations are close to some old underground mining, where the tunnels are more or less filled with water. I do not think Smith can get very much coal here.

108. *Maslin's Pit, Wendon.*—(21/10/93): There were two men working at the lower seam at the time of my visit. The coal (vertical seam) has been followed from a gully into the side of the hill by an open cutting some little distance, where they have 20ft. of coal and 7ft. of stripping on top of the outcrop. Unfortunately for them, they neglected to secure the open cutting with timber to keep the sides up, so they were coming in very much to a natural slope, showing the absolute necessity for strong timbering in such places when all the coal is being taken out. When the seam is vertical, it is a mistake to take out all the coal. A strong wall of it should be left on each side where the formation is little better than clay. The top of the seam, in this case, should have been left to keep the surface intact. It would have been much better to have driven a tunnel in the centre of the seam, of a perfectly safe width—which could always be ascertained by testing the thickness of coal in the sides at short intervals as the work went on. In this way the seam can be driven on any distance and much coal won, with comfort and safety to the men. In this way the seam can be worked on many levels, and to any depth. I have recommended the timbering of the open cutting for some safe distance into the hill, and then half the coal to be taken out by following it through the hill in the way above suggested. In a second seam, at a higher level, not far off, a 10ft. tunnel was driven some years ago in the centre of the seam till soft coal was reached. Maslin has lately started at the far end to take out 5ft. of coal from the floor, working back to the mouth of the tunnel. The present height of the tunnel is nearly 6ft.

109. *Vial's Perseverance Mine.*—(21/10/93): The part of the terrace now operated on shows 11ft. of coal, and from 5ft. to 15ft. of stripping. The water-race carrying the water to do the stripping is from 90ft. to 100ft. above the coal, but the quantity of water generally available is not more than one head. Lying on the top of the coal is a petrified seam of shale, from 1ft. to 3ft. thick, which is very difficult to break up and remove. It will, however, be a valuable assistance to a coal roof when the coal is being mined, instead of doing the very deep stripping a very little distance ahead of the present face.

The coal dips from the river, and the drainage is at present lifted by a hand-pump, but the water available naturally suggests itself as being more convenient and economical to do the work. It is to be utilised as the motive-power.

110. *McIvor's Cambrian Mine, Waikaia.*—(21/10/93): The coal is about 15ft. above the river, 5 chains off, which allows a fair fall to sluice off from 30ft. to 60ft. of fine gravel lying on it. The sluicing the top off is a part of the work in connection with the gold-mining, which is carried on at the same time, and the best gold-bearing wash is found on the coal. The quantity of water available is said to be four or five heads, which is a very useful quantity to do the work. The thickness of coal is from 7ft. to 12ft. Several tunnels have been driven in from the face of the terrace, close to McIvor's claim and pit, and they are all getting fairly payable wash on the coal. When, as a gold-mine, this ground is worked out by underground mining, the coal can be removed in the same way by leaving a coal roof, and at less cost per ton than it now costs to strip it. There is a sufficient thickness of coal to leave a strong coal roof.

111. *Northcote's Mine, Waikaia.*—(21/10/93): The working-faces are about 1½ chains in from the old sluiced face of gravel. The work in the mine shows a want of system, or knowledge of this kind of mining. Fortunately there is a well-defined roof-parting at about 7ft. or 8ft. from the floor, following the coal throughout to the present faces, and is a remarkably good roof. The output from this mine is not large, and, notwithstanding the dip from the river not far off, the floor so far is dry. There was no one in the mine on the day of my visit.

113. *Sleeman's Pit, Mataura.*—(7/11/93): To the north-west the seam begins to dip slightly, but the surface keeps nearly level, so that to follow the seam in that direction, the stripping now being as much as 21ft., will very soon be beyond a paying depth. A short distance to the south of this the stripping is from 17ft. to 18ft., and the coal thickens from south to north from 16ft. to an 18ft. seam. The little water-wheel is still equal to the amount of work it has to do, notwithstanding two additional pumps having been added since my previous visit, eleven months ago. There are now four pumps, lifting the water about 25ft. Most of the stripping is now carted and dumped into the worked-out ground. Some harrows are also used to do the stripping and skim the poor coal off the top. The bank is fairly well sloped.

114. *Beattie and Coster's Pit.*—(7/11/93): This is a very old pit, abandoned fourteen years ago, and since then filled up by the sides caving in. It is again taken up to work two acres adjoining, belonging to H. Cameron. Preparations were being made to do some stripping on the east side of the old workings at the time of my visit. A portable engine of five-horse power is to be placed on the ground to do the pumping, which is likely to be heavy in consequence of a small creek passing through the ground, which is very open, and the standing level of the water is flush with the top of the coal. The seam is supposed to be 13ft. thick, and nearly horizontal. Beattie expects to have the pit opened and ready for a large output before the end of the year.

115. *C. Town's Pit.*—(7/11/93): The open face of coal is now fully 3 chains in length and 14ft. deep. The stripping consists of fine gravel, and will average about 18ft., well sloped back. A little water-wheel of 8ft. diameter does all the pumping with two small pumps, and the quantity of water lifted is considered heavy. The output of coal lately is small.

116. *McGowan's Pit.*—(8/11/93): No work appears to have been done since my previous visit, twelve months ago. I did not find any one there.

117. *Townshend's Pit.*—(8/11/93): As nearly as can be judged, there are 14ft. of coal, and 9ft. of clay stripping, which appears to be continually slipping into the open face in larger quantities at a great slope. There is a sufficient thickness of coal to admit of it being mined out and leave a good coal roof, which would be more economical than working in mud foot-deep all round the face of the pit.

118. *Mutche's Pit.*—(8/11/93): There was no one at the pit. The stripping is from 2ft. to 3ft. only. I could see about 4ft. of coal, but cannot say if this is the full thickness of it. The drainage is lifted about 4ft. into a long open drain to the spot by a very small water-wheel. The floor of the pit was covered with water and rubbish at the time of my visit.

119. *Nicol's Pit.*—(8/11/93): Since my previous visit some of the stripping has been done at the head of the open cut, and in the bed of the gully in which the coal was originally found, where it is 4ft. deep, and from 6ft. to 8ft. thick. The floor of this pit is so much covered with *débris* that the thickness of coal could only be guessed at. There was no one at the pit.

120. *A. McDonald's Edendale Mine.*—(10/11/93): On the day of my visit the low-lying land at the pit and around it was covered with water by the heavy rains of the previous day, the Mataura River being also in high flood, and backing the water over the low-lying lands. Mr. McDonald has gone over considerable ground during the past year, and his working-face is now gradually approaching the higher ground and terrace. On the low flat the stripping is 3ft., and at the edge of the terrace from 4ft. to 6ft., and all good moving-ground, which is thrown into the worked-out place. The coal is hewn out with very little labour; but it requires plenty of horse-power to cart it through the fields to the main road, near Wyndham.

121. *Shields's Pit.*—(10/11/93): The work is being continued into the terrace from the low flat, and the coal appears to keep very level, with about 6ft. of stripping, which consists of fine sand and gravel, easily removed. The thickness of coal taken out is from 5ft. to 9ft. The stripping is thrown into the pit to reduce the body of water to be pumped out, as it rises only to the level of a shallow outlet drain. The pumping is done by hand.

122. *Marshall's Pit.*—(10/11/93): This pit joins McDonald's on the low-lying side of the flat. I could only see the top of the wire fence above the flood-water at the time of my visit. The coal removed is for private use only.

123. *Munro's Pit*, Wyndham.—(13/11/93): The stripping is generally about 7ft., and not likely to get any deeper. About 9 square chains have been worked during the past few years, and there is enough of the coal reserve to keep Munro going for some years yet. The seam is generally 3ft. thick. The pit is situated in the low Mataura Flat, and subject to inundations by the river-floods. It was all under water on the 11th instant. When the river is at its ordinary level the drainage stands about 2ft. deep in the pit.

124. *Gange's Pit.*—(13/11/93): This pit joins Munro's, and is on about the same level. The coal is 3ft. thick in places, and the drainage has to be baled out by hand.

125. *Trotter's Pit.*—(11/11/93): Following the coal up the bed of the gully is discontinued, although the stripping there is next to nothing. The seam is now being worked on the southern side of the gully, where the stripping is from 3ft. to 4ft. From 8ft. to 10ft. of coal is being taken out, but this does not touch the floor of the seam. There was no one at the pit.

126. *Mrs. Monagan's Pit.*—(11/11/93): Mrs. Monagan gets a little coal from time to time, as required for her own use only. No stripping appears to have been done since my previous visit twelve months ago. The ground is very hard, and the stripping is from 5ft. to 15ft. The coal is a poor quality.

127. *Hokonui Coal-mine; J. Hayes, Manager.*—(11/3/93): This mine is being gradually opened out from the dip-drive in a body of very good coal, and there is every reason to believe that coal of equal thickness will continue to a great depth. The little engine and winding-plant is capable of doing all required of it till the trade is more fully developed. At about 90ft. from the bottom of the engine-plane a double-cylinder pumping-engine is fixed, said to be capable of pumping 8,000gal. per hour. The steam is conveyed in pipes from the boiler of the winding-engine, and an exhaust-tank is fixed by the side of the pump to prevent the steam heating the air-current through the mine. The principal workings (on 20/1/94) are on the north side of the engine-plane, and the old workings on the west side of the dip are being robbed backward. There are about fourteen working-places in the mine just now, with plenty of room to increase the number if required. All the working-places are in good order, and the air is good.

The extension of the railway-line (about a mile) to the site of the proposed shaft is now nearly completed, and the locomotive is already hauling on the extension. Temporary coal-shoots have been fixed over the line to load the wagons, where the mine-boxes for the time are being hauled by horses from the pit mouth. The proposed shaft site is about 30 chains to the westward of the outcrop and present pit mouth, and on the line of dip of the seam, where it is estimated the coal will be found at 400ft. deep. It is intended to start sinking the shaft at an early date. The length of railway-line from the new pit to Winton is about eleven miles.

128. *Fairfax Mine, Fairfax.*—(17/4/93): The underground mining started a short time ago is a great success; the roof, with the present timbering, is as smooth as the day the coal was removed. There are only two men employed in the mine, and the output, though steady, is small. The working-places are now 5 chains in from the open face. The air was very bad at the time of my visit, but Mr. Graham said it was owing to a shot a few minutes earlier having been fired. The mine was full of smoke, and its movement was very sluggish, notwithstanding that there are two drives into the mine from the open face, and two airways from one to the other in the 5 chains driven. The men did not intend to go into the mine till the air was good.

129. *Isla Bank, Fairfax.*—(17/4/93): An open face, with from 12ft. to 15ft. of stripping, which is getting deeper every few yards of headway made up the flat, while the thickness of coal—6ft.—remains the same. Tunnelling might be tried with advantage, and with as good a chance of success as at Graham and Todd's mine, close by. The open face is solid and safe for the workmen.

130. *Nightcaps Coal Company's Mine.*—(18/4/93): The open face of coal stripped by sluicing operations some years ago is again being hewn out by four or five men. The face of coal is 11ft. thick, and of first-class quality, and the area stripped is about equal to 2 chains long by 1 wide, and of even depth. The top seam in the mine, which was being taken out at the time of my visit, is 17ft. thick, lying on from 3ft. to 4ft. of shale, which is resting on 9ft. of good coal, making 26ft. of coal which is being worked in one face. It is estimated there are 15 acres of ground carrying this body of coal. The roof in places is not very good, consequently from 2ft. to 3ft. of

coal is being left for a roof. Preparations are being made to open a new seam lately discovered near the surface in a flat gully to the eastward of the present workings. The extent of this seam is not yet known, but there is a considerable body of coal in sight.

131. *W. Reid's Wallace Mine.*—(18/4/93): This is an open pit with 11ft. of stripping, consisting of hard-packed gravel and layers of clay, which is hewn out in narrow strips, leaving the walls nearly vertical. There are 3ft. 6in. of good coal immediately under the gravel, then 1ft. or more of shale, under which there are 9ft. of good coal. Although this pit is some little distance from the Nightcaps Company's mine, it is probably the same seam as the 9ft. and 17ft. now being worked there, showing that 13ft. 6in. of coal has been scoured away by the stream which deposited the gravel now lying on it. The dip of the seam is to the south-east. The little engine keeps the pit dry by pumping two hours every second day.

134. *Orepuki Mine.*—(23/11/93): The engine-plane has not been extended since my last visit. A bore has been started to the south at about 400ft. down from the pit mouth. The depth of coal taken out here is 8ft. from the floor. At 10ft. from the floor there is a 6in. band of kerosene shale, then 5ft. of good coal, then from 7ft. to 8ft. of coal with odd small bands, and on top of this rests the 4ft. of very good kerosene shale. The roof is soft laminated rock. The bottom of the engine-plane is from 90ft. to 100ft. below the surface, and the seam dips east about 1 in 3. An opening has been made in the coal on the north side of the dip, which shows a good floor and roof. Good firewood is so plentiful in this place that there is very little sale for coal, hence the small yearly output from this mine.

140. *Hills Pit, Waikaia.*—(21/10/93): This pit is now well opened, showing 17ft. of coal. The stripping is from 30ft. to 90ft., and similar in every particular to that at the other pits on the same terrace, and the distance the *débris* is sluiced to the river is only 2 chains. The high gravel face appears to be safely sloped back from the bottom. A water-wheel, 6ft. in diameter, drives a pump and lifts the drainage 14ft. from the coal floor. The roof-parting so noticeable in Northcote's mine is remarkably well defined here at 4ft. from the top of the coal, and is, to my mind, a strong inducement to mine it out instead of continuing the very heavy stripping, even though some try that useful agent water, of which there is a scant supply to this face at any time during the year.

141. *Hugh Smith's Pit.*—(8/11/93): This is an old pit, where only a few tons in the year are taken out for home use. There appears to be about 4ft. stripping and the same depth of coal. There is a gold-bearing wash lying on top of the coal, which is carefully collected and washed. There was no one about the pit at the time of my visit.

Matau Mine, Kaitangata.—(5/10/93): This property is situated a short distance below the Kaitangata Township, where, at a level 12ft. or 15ft. above the Clutha River, a tunnel is being driven in an easterly direction, and is now constructed 400ft., which is about half the distance calculated to reach the 5ft. coal seam intended to be operated on. Two small seams of 2ft. each, with a parting of 3ft., have been passed through, standing at a considerable angle, but they are not considered of any value. There are two shifts of two men each doing the work, and they expect to reach the coal in four or five months. The formation passed through is mostly strong conglomerate, somewhat wet in places. Where timber is necessarily used, it is neatly fitted, and evenly placed in position. An air-shaft is now being constructed near the end of the tunnel.

W. Johnston's Pit, Gore.—(14/10/93): This pit is situated on the low flat on East Gore Reserve. A drain of 3 chains in length has been cut into Kirk's pit, to which there is an open drain of considerable length from down the flat. Johnston's pit, however, is not drained to the bottom of the coal. When coal is being taken out to the floor a hand-pump is used. The bottom of the pit could not be seen, but they informed me there were from 10ft. to 12ft. of coal, and a stone band in it. I did not find Johnston, but sent him a form to fill in his output for the year, which form has not been returned.

Springburn Mine, Mount Somers.—(12/1/93): The outcrop of coal is on the hillside, about two miles above Sharpling's sawmill. I saw a tunnel and other indications of some prospecting having been done some time ago. As far as can be judged from surface indications the seam dips into the hill at a steep angle, north-west. Some samples lying on the surface are similar in quality to most of the brown coals found in other districts. There was not enough of the outcrop visible to warrant me in giving an opinion as to whether there is likely to be a fairly payable seam of coal there or not. Although I have not a high opinion of the surface prospects, it is worth a short tunnel that would cut the seam some little distance below the surface, where it might be found solid, and then followed a few yards in order to examine the country it is in. Mining timber is plentiful all round the spot. There is a large body of what appears to be good limestone close to the coal outcrop, where Sharpling and others are thinking of starting lime-burning, if a good seam of coal can be found there. The limestone is laminated similar to that quarried for lime-making at Millburn, in Otago.

Accidents in the Otago Coalfields.

I have to report as follows on the several accidents which have occurred during the year ending 31st December, 1893:—

1. *Kaitangata Mine* (23rd March).—William Thompson allowed his box to go too far forward before spragging it, was overpowered and got jammed; not serious.

2. *Phillips's Mine, Kurow* (11th April).—Charles Irvine fell down the mine-shaft, and died three days after. The trap-door had worked loose on its frame, and this had not been noticed by Irvine. The door slipped off the frame while Irvine was standing on it.

3. *Kaitangata Mine* (12th July).—William McCoughern got his leg broken while leaving his working-place with his box unspragged. He slipped against a prop, and the box jammed his leg.

4. *Fern Hill Mine* (14th July).—Daniel Knox went into the mine after all the men had left their working-places, and in attempting to come out again he turned a little to the left and got into some old workings where the air was bad. His body was found in a sitting position with a box of matches in his left hand and a match in his right, as if in the act of striking it.

5. *Shag Point Mine* (7th September).—J. McNair was injured slightly by a fall of stone from the roof of the mine.

6. *Shag Point Mine* (18th September).—Charles Clausen, while working in the shaft, was struck with a piece of timber falling from the surface. It broke a rib, and injured his back and shoulder.

7. *Walton Park Mine* (13th December).—Thomas Parker was slightly injured by a small fall of coal.

METHODS OF WORKING.

Worked by shafts—		
Steam-power used	4	
Horse-power used	5	
	—	9
Worked by adit—		
Engine-plane	9	
Horse-plane	20	
Horse-power	9	
Adit	27	
Hand-power	20	
	—	85
Open		67
		161

I have, &c.,
J. Gow,
Inspector of Mines.

The Under-Secretary, Mines Department, Wellington.

APPENDIX I.

ACCIDENTS in COAL-MINES during the Year ending 31st December, 1893.

No. and Date.	Name of Mine	Locality.	Cause of Accident.	Above Ground.	Below Ground.	Fatal.	Non-fatal.	Name of Sufferer.	Remarks.
1893.			*North Island.*						
1. Jan. 28	Taupiri Reserve	Huntly	Scalding	1	..	..	1	Jos. Yuracka	Scalded by hot water from Tangye pump.
2. Feb. 9	Ralph's, Taupiri	"	Jammed between buffer and truck	..	1	..	1	James Harris	Injured by being jammed between buffer and truck.
3. " 8	"	"	Struck by stick	..	1	..	1	Jno. Guilliford	Slightly injured by being struck on the back of leg by a piece of stick.
4. Mar. 1	Kawakawa	Kawakawa	Finger hurt	..	1	..	1	David Taylor	Injury to finger.
5. " 18	Ralph's, Taupiri	Huntly	Finger broken	..	1	..	1	A. Schlinker	Forefinger broken.
6. April 21	Taupiri Reserve	"	Injury to eye	..	1	..	1	J. H. Evans	Injury to eye.
7. July 6	Kiripaki	Ngunguru	Knocked down by wagon	..	1	..	1	Richard Pedro	Slightly injured by being knocked down by wagon.
8. Sept. 29	"	"	Fall of stone	..	1	..	1	Joseph Gomez	Piece of stone fell from the drive, breaking his collar-bone and fracturing three ribs.
9. Nov. 3	Taupiri Extended	Huntly	Injury to eye	..	1	..	1	T. Callaghan	Eye was injured by a blow from a piece of coal.
10. " 29	"	"	Injury to thumb	..	1	..	1	Thomas Bell	Injury to thumb.
			Middle Island.						
11. Feb. 15	Coalbrookdale	Coalbrookdale	Leg broken by truck	..	1	..	1	Thomas Clark	Taking out truck it ran over and broke his leg.
12. May 1	"	"	Fall of stone	..	1	1	..	John Pollock	Killed by fall of stone.
13. " 18	"	"	Fall of prop and stone	..	1	1	..	Mark Dixon	Seriously injured by fall of prop and stone. Died on 20th May.
14. July 3	"	"	Runaway truck	..	1	1	..	Alex. Hunter	Fatally injured by runaway truck.
15. Sept. 18	Brunner	Brunner	Explosion of fire-damp	..	1	..	1	Wm. Maddox	Burned by slight explosion of fire-damp.
16. Mar. 23	Kaitangata	Otago	Jammed by box	..	1	..	1	W. Thompson	Box was allowed to go too far forward before spragging. Thompson was overpowered and got jammed. Not serious.
17. April 11	Phillips's	Kurow	Fall down shaft	..	1	1	..	Charles Irvine	Fell down shaft and died on 14th April. The trap-door had worked loose on its frame and was not noticed by Irvine. The door slipped off the frame while Irvine was standing on it.
18. July 12	Kaitangata	Otago	Jammed by box	..	1	..	1	William McCoughlan	Leg was broken while leaving his working-place with his box unspragged. He slipped against a prop and the box jammed his leg.
19. " 14	Fern Hill	"	Suffocation	..	1	1	..	Daniel Knox	Mr. Knox went into the mine after all the men had left their working-places, and in returning he went to the left and got into some old workings, where the air was bad. His body was found in a sitting position, with a box of matches in his left hand, a match in his hand as if in the act of striking it.
20. Sept. 7	Shag Point	"	Fall of stone	..	1	..	1	J. McNair	Slightly injured by fall of stone from roof of mine.
21. " 18	"	"	Fall of timber down the shaft	..	1	..	1	Chas. Clausen	Was working in shaft, when a piece of timber fell from the surface, breaking his rib and injuring his back and shoulder.
22. Dec. 13	Walton Park	"	Fall of coal	..	1	..	1	Thos. Parker	Slightly injured by small fall of coal.

APPENDIX II.

Statistics of Workings in Coal-mines, 1893.

NORTH ISLAND.

Name of Mine and Locality.	Name of Manager.	Number of Years worked.	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 1893.			Approximate Total Output to 31st December, 1892.	Approximate Total Output to 31st December, 1893.	Number of Men ordinarily employed.			Power used for drawing Mineral.	Pumps.			Means of Ventilation.	Date of Inspector's Last Visit.
										Size of Shaft or Adit.	Depth of Shaft or Length of Adit.		Coal.	Slack.	Total.			Above.	Below.	Total.		Stroke.	Size of Barrel.	Height of Column.		
KAWAKAWA DISTRICT.													Tons.	Tons.	Tons.	Tons.	Tons.									
Kawakawa	Moody, T. P. ..	27	semi-bitum.	1	3′ to 9′	the whole	1 in 6	bord and pillar	1	5′ x 3′	198′	engine-incline and adit	10,950	..	10,950	780,929	791,879	13	8	21	horse	..	..	..	natural	8/11/93
HIKURANGI DISTRICT.																										
West Bryans	Smith, Charles ..	5	ditto	1	6′ to 8′	ditto	1 in 9	ditto	1	6′ x 5′	adit 180′	adit	357	..	357	6,198	6,555	..	3	3	″	..	..	..	″	8/8/93
Walton and Graham's ..	..	..	″	..	7′	″	..	open-cast	..	..	..	..	..	..	..	1,210	1,210	..	..	..	..	..	..	..	..	..
WHANGAREI DISTRICT.																										
Kamo	Redshaw, William	17	brown	2	4′ to 14′	4′ to 10′	varies	bord and pillar	2	15′ x 6′ and 9′ x 6′	240′	engine-shaft	20,059	623	20,682	204,355	225,037	12	37	49	steam	3′ to 7′	10″	264′	natural	10/8/93
Whauwhau	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	70,853	70,853	..	..	..	..	..	..	..	..	..
NGUNGURU DISTRICT.																										
Kiripaka	Armitage, Fredk.	1	semi-bitum.	1	4′ to 8′	the whole	varies	bord and pillar	..	5′ 6″ x 5′ 6″	adit 446′	adit	2,677	20	2,697	..	2,697	15	13	28	horse	..	..	..	natural	7/8/93
WAIKATO DISTRICT.																										
Taupiri Extended	Tattley, William	18	brown	1	21′ to 50′	7′ to 22′	″	ditto	2	10′ diam.	170′ and 204′	engine-shaft	25,078	947	26,025	407,059	433,084	10	50	60	steam	24″ and 18″	10″ 5″	170′ 204′	exh'st-fan	14/10/93
Taupiri Reserve	Harrison, Jonath'n	7	″	1	18′ to 24′	10′ to 14′	1 in 4½	″	2	9′ x 6′ adit-incline	1,188′	engine-incline	20,107	..	20,107	71,813	91,920	13	32	45	″	2′	5″	140′	exh'st, steam	13/10/93
Waikato	Wallace, William	6	″	1	11′	the whole	varies	″	1	6′ 3″ x 6′ 5″ adit	660′	adit	7,568	119	7,687	135,296	142,983	6	15	21	horse	..	..	..	natural	10/11/93
Ralph's Taupiri	Ord, John ..	2½	″	1	65′	20′	″	″	2	10′ x 5′ 5″ and 5′ x 5′	180′ and 164′	engine-shaft	3,382	50	3,432	19,587	23,019	6	19	25	steam	2′, 2′, and 1½′	8″,5″ and 5″	170′ 170′ 47′	exh'st, steam	3/4/93
Miranda, Bridgewater ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	20,668	20,668	..	..	..	..	..	..	..	..	..
MOKAU DISTRICT.																										
Mokau Mine	Lobb, Joseph ..	9	brown	1	6′ 6″	the whole	1 in 24	bord and pillar	..	8′ x 8′	1,050′	adit	781	..	781	5,784	6,565	..	3	3	horse	..	..	..	furnace	10/6/93
Co-operative Mine ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	940	940	..	..	..	..	..	..	..	..	..

COLLINGWOOD.																									
Wallsend, Collingwood ..	Walker, James ..	25	bitum.	1	2′ 10″	all	N. 60° W. 1 in 6	longwall	..	..	..	adit	2,094	307	2,401	41,665	44,066	4	10	14	hand	si	ph	ons	natural	..
Takaka, Takaka	Bartlett, R. ..	1	brown	1	2′ 8″	″	1 in 10	driving	..	..	..	″	70	..	70	..	70	1	1	2	″	..	..	..	″	..
Motupipi, Takaka	Harley, Thomas..	3	″	1	3′	″	..	opencast	..	..	..	″	..	..	..	..	..	..	..	..	″	..	..	..	..	..
Brownville, Takaka ..	Bartlett, R. ..	2	″	1	4′ 6″	″	..	..	..	..	..	″	..	..	..	70	70	..	..	..	..	..	..	..	natural	..
WESTPORT.																									
Mokihinui	Straw, M. ..	13	bitum.	1	32′	15′	varies	bord and pillar	..	9′ x 6′	..	″	2,076	..	2,076	15,093	17,169	6	18	24	horse	No. 9 pulsom	50″ eter	..	furnace	24/10/93
Westport-Cardiff	Elliott, Robert ..	1	″	1	17′	7′	N. 20° E.	ditto	..	..	..	″	..	500	500	..	500	60	..	60	″	..	..	..	natural	23/12/93
Westport-Wallsend, Ngakawau	Broome, G. H. ..	4	″	1	16′	all	W. 35°	″	..	9′ x 6′	180′	″	..	..	..	..	..	..	..	..	engine	..	..	..	..	17/5/92
Granity Creek	Murray, Thomas	2	″	1	4′ to 40′	7′	varies	″	..	9′ x 6′	22 and 37chains	″	..	..	..	..	..	46	18	64	hand	..	..	..	water-blast	7/6/93
Coalbrookdale	Cameron, John ..	13	″	2	4′ to 20′	all	″	″	4	6′ x 8′ and 5′ x 9′	148′, 48′, 146′, and 90′ 236 ch.	engine-plane	191,137	32,564	223,701	1,272,930	1,496,631	102	383	485	engine	12″, 12″, 12″, and No. 7	4½″ 4½″ 6″ puls	120′ 100′ 100′ ometer	furnace	11/10/93
Waitakere, Charleston ..	Flynn, R. ..	9	brown	1	10′	″	″	opencast	..	..	..	..	208	..	208	..	208	1	..	1	horse	..	..	..	..	7/11/93
Whitecliffs, Buller Road ..	Crowell, Charles	2	glance	1	8′	8′	W.	driving	..	..	..	adit	101	..	101	173	274	2	1	3	″	..	..	..	natural	4/12/93
Waimangaroa	Elliott, Robert ..	4	bitum.	1	7′ to 20′	6′	W. 1 in 3	bord and pillar	..	..	..	adits	..	..	..	..	..	2	4	6	hand	..	..	..	″	30/5/92
Wellington	″ ..	4	″	1	7′ to 20′	6′	W. 1 in 3	ditto	..	..	..	″	..	..	..	..	..	1	3	4	″	..	..	..	″	..
LONGFORD.																									
Alexander	Rear, Robert ..	2	glance	1	2′ 8″	all	45° E.N.E.	longwall	..	6′ 6″ x 4′	..	″	282	..	282	..	282	1	1	2	″	..	..	..	″	22/4/93
BOATMAN'S.																									
Coghlan's	Coghlan, Patrick	5	″	1	12′	8′	W. 1 in 3	bord and pillar	..	..	..	″	70	..	70	300	370	..	1	1	″	..	..	..	″	9/3/93
Archer's	Archer, D. ..	2	″	1	10′	8′	N.N.W. 1 in 3	ditto	..	..	..	dip-drive	240	..	240	140	380	..	1	1	horse	..	..	..	″	9/3/93
REEFTON.																									
Murray Creek	Bolitho, William	10	″	1	12′	7′	W. 1 in 3	″	1	6′ x 2′ 6″	20′	adit	199	..	199	7,261	7,460	1	1	2	hand	..	..	..	″	20/11/93
Golden Treasure	Davidson, John G.	22	″	1	12′	8′	varies	″	..	..	..	″	70	..	70	4,370	4,440	..	1	1	″	..	..	..	″	20/11/93
Inkermann	McCallum, James	7	″	1	8′	all	45°	stoping	..	6′ x 4′ 6″	350′	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3/10/92
Phœnix	McMurtrie, D. ..	9	″	1	20′	10′	45°	bord and pillar	..	..	..	adit	1,159	..	1,159	5,178	6,337	1	2	3	hand	..	..	..	natural	20/11/93
Lankey's Gully	Lamberton, W. ..	16	″	1	7′	6′	level	ditto	..	..	..	″	166	..	166	5,324	5,490	..	2	2	″	..	..	..	″	15/11/93
Reefton	Joice, George ..	3	″	1	2′	2′	N.W. 1 in 5	″	..	6′ x 4′	800′	″	10	30	40	..	40	..	2	2	″	..	..	..	″	10/7/93
Cochrane's	Cochrane, D. L...	1	″	1	9′	7′	N.W. 1 in 4	″	..	6′ x 5′	100′	″	70	300	370	..	370	1	1	2	horse	..	..	..	″	9/3/93
Progress	Halley, William..	13	″	1	6′	6′	S.W. 1 in 12	″	..	6′ x 4′	200′	″	1,020	..	1,020	3,687	4,707	..	2	2	hand	..	..	..	″	27/9/93
Brun's	Brun, Patrick ..	1	″	1	4′ 6″	all	S.S.E. 1 in 3	″	..	..	..	″	80	20	100	..	100	2	1	3	″	..	..	..	″	14/11/93
Sir Francis Drake	Cashy, George ..	6	″	1	6′	″	W. 1 in 4	opencast	..	..	..	..	300	..	300	1,046	1,346	1	..	1	horse	..	..	..	″	14/11/99
Cumberland	″ ..	2	″	1	8′	″	E. 1 in 5	driving	..	..	..	adit	480	..	480	300	780	..	1	1	hand	..	..	..	″	15/11/93

Statistics of Workings in Coal-mines, 1893—*continued.*

MIDDLE ISLAND—*continued.*

Name of Mine and Locality.	Name of Manager.	Number of Years worked.	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 1893.			Approximate Total Output to 31st December, 1892.	Approximate Total Output to 31st December, 1893.	Number of Men ordinarily employed.			Power used for drawing Mineral.	Pumps.			Means of Ventilation.	Date of Inspector's Last Visit.
										Size of Shaft or Adit.	Depth of Shaft or Length of Adit.		Coal.	Slack.	Total.			Above.	Below.	Total.		Stroke.	Size of Barrel.	Height of Column.		
													Tons.	Tons.	Tons.	Tons.	Tons.									
GREYMOUTH.																										
Brunner	Bishop, James ..	29	bitum.	1	7′	all	S.W. 1 in 4	bord and pillar	..	10′ x 7′	3,000′	engine-plane	58,048	26,486	84,534	948,687	1,033,221	41	163	204	engine	16″	8″	..	Schiele fan	25/9/93
Coal-pit Heath	Bishop, James ..	17	″	1	16′	″	S.W. 1 in 4	ditto	..	16′ x 7′	2,700′	ditto	41,325	8,245	49,570	527,620	577,190	..	..	..	..	..	..	..	..	24/6/93
Blackball	Lindop, A. B. ..	4	″	1	12′	″	S.W. 1 in 5	″	..	9′ x 6′	1,232′	adit	4,075	..	4,075	30	4,105	17	39	56	horse	..	..	..	furnace	18/12/93
Wallsend	Bishop, James ..	..	″	1	16′	..	S.W. 1 in 4	″	2	11′ and 14′	670′	shaft	..	..	..	205,539	205,539	..	..	..	..	..	..	..	..	..
Tyneside	Bishop, James ..	..	″	1	16′	..	S.W. 1 in 4	″	2	10′ and 6′ x 6′	116′ and 25′ x 12′	″	..	..	..	18,398	18,398	..	..	..	..	..	..	..	..	..
CANTERBURY.																										
Springfield, Springfield ..	Clarke, John ..	17	brown	1	2′	all	S.E. 1 in 6	..	..	..	..	dip-drive	537	240	777	70,983	71,760	1	2	3	horse	..	..	..	natural	23/6/93
Kowai Pass, Springfield ..	Smith and Taylor	2	″	1	3′ 6″	″	..	..	..	..	..	″	..	..	..	559	559	..	..	..	hand	..	..	..	″	23/6/93
Sheffield, Sheffield ..	Austin Brothers	31	″	2	2′ 3″	″	S.70° E. 21°	narrow bord and pillar	1	5′ 7″	160′	shaft	1,040	..	1,040	39,174	40,214	2	5	7	horse	1′	6″	140′	″	23/6/93
Snowdon, Rakaia ..	Gerard, W. (owner)	..	″	1	14″	8′	N. 80° E.	narrow	1	4′ x 4′	90′	″	140	..	140	440	580	..	1	1	″	..	..	..	″	19/6/93
Acheron, Lake Coleridge ..	Murchison, J. ″	24	anthracite	1	4′	8′	S.W. 18°	″	..	..	..	adit	40	..	40	257	297	..	..	..	hand	..	..	..	″	20/6/93
Mount Hutt, Rakaia ..	Murray-Aynsley, C. P.	..	brown	2	2′	8′	..	open	..	..	..	..	92	..	92	..	92	1	..	1	″	..	..	..	..	21/6/93
Rockwood, Malvern ..	Levick, H. ..	7	″	1	7′ to 10′	8′	S. 12°	narrow	1	3′ diam.	12′	adit	..	..	..	1,143	1,143	..	..	..	″	..	..	..	..	..
Malvern	Febbes, W. ..	1	″	1	..	..	..	..	..	..	..	..	115	..	115	..	115	1	..	1	″	..	..	..	..	..
Homebush, South Malvern ..	McIlraith, J. A. ..	21	″	1	7′	8′	E. 10° S. 1 in 3	bord and pillar	2	5′ x 6′ 3′ 6″ x 3′	40 ch'ns 60′ & 20′	adit	3,938	..	3,938	92,955	96,893	2	6	8	horse	..	..	..	natural	17/6/93
Whitecliffs, South Malvern ..	Leeming, W. ..	13	″	1	6′	8′	E. 5° S. 30°	narrow	1	incline	..	incline	3,265	..	3,265	23,211	26,476	1	6	7	″	..	..	..	″	16/6/93
South Brockley, South Malvern	Smart, W. ..	..	″	..	..	..	..	..	..	..	..	adit	..	..	..	..	..	..	..	..	..	..	..	..	″	10/3/92
Mount Somers, Ashburton ..	Park, G. ..	29	″	1	40′	12′ to 20′	S. 60° E. 10°	bord and pillar	..	5′ 6″	..	″	499	..	499	18,108	18,607	1	4	5	..	..	..	..	..	5/12/93
Duke's, Kakahu	Duke, James ..	..	″	1	30′	10′	..	ditto	..	9′ x 8′	..	″	..	..	..	900	900	..	..	..	..	..	..	..	..	9/6/93
Albury, Albury	Rutherford, J. ..	2	″	1	..	10′	..	..	..	6′ x 5′	..	incline	620	..	620	68	688	1	2	3	horse	..	..	..	..	8/6/93
Waihao Forks, Waimate ..	McPherson, D. ..	..	″	1	..	..	..	open	..	..	..	..	90	..	90	..	90	1	..	1	..	..	..	..	..	28/6/93
Studholme's, Waimate ..	Cameron, G. H. ..	..	″	1	..	..	..	narrow	..	..	..	adit	84	..	84	..	84	..	1	1	..	..	..	..	..	28/6/93
NORTH OTAGO.																										
Awakino, Kurow	Wade, J. E. ..	14	″	1	..	..	..	″	1	6′ x 2′ 6″	53′	″	100	..	100	4,205	4,305	1	2	3	..	..	..	..	..	27/4/93
Phillips's, Kurow	Phillips, J. ..	5	″	1	indefinite		N.E. 45°	pillar & stall	1	8′ x 6′	50′	shaft	277	..	277	683	960	..	1	1	horse	6″	3″	50′	natural	27/4/93

Wharekuri, Kurow.. ..	Cairns, W. B. ..	27	brown	1	18′	8′	S. 60° W. 60°	narrow	1	4′ x 3′	80′	adit	418	..	418	8,915	9,333	1	2	3	hand	..	..	..	natural	26/4/93
Collins's, Kurow	Collins, John ..	2	〃	1	18′	8′	S. 60° W. 60°	〃	1	6′ x 5′	75′	〃	320	105	425	534	959	1	1	2	〃	..	..	..	〃	26/4/93
St. Andrew's, Papakaio ..	Nimmo, Thomas..	15	〃	1	8′	7′	E. 15° N. 50° E. 12°	bord and pillar	1	4′ x 2′ 6″	60′	〃	1,335	..	1,335	16,688	18,023	1	5	6	horse	..	..	..	〃	30/6/93
Prince Alfred No. 1, Papakaio	Willetts, J. M. ..	24	〃	2	7′	6′	E. 10° S. 1 in 5	ditto	1	4′ x 4′	50′	〃	1,343	..	1,343	34,102	35,445	2	4	6	hand	..	..	..	〃	30/6/93
Prince Alfred No. 2, Papakaio	〃 ..	17																							
Ngapara, Ngapara	Nimmo, G. S. ..	15	〃	1	18′ to 25′	7′ to 8	N. 5° E. 1 in 4	〃	1	6½′ x 4½′	15ch.	〃	682	..	682	11,784	12,466	1	2	3	〃	..	..	..	〃	14/7/93
Rosebury, Otepopo	Love, Alex. ..	10	〃	1	5′	all	..	〃	1	..	..	〃	246	..	246	622	868	1	1	2	〃	..	..	..	〃	14/8/93
Early Bank, Otepopo ..	Willetts, John ..	3	〃	1	3′ 9″	〃	E. 1 in 9	〃	1	4′ x 2′	50yds.	incline	81	..	81	200	281	1	2	3	horse	..	..	..	〃	14/8/93
SHAG POINT.																									
Shag Point, Shag Point ..	Irvine, James ..	30	pitch	2	2′ x 5′	〃	E. 1 in 4	〃	3	16′6″ x 6′ 6′8″ x 5′	200′ going to 450′	shaft	7,852	2,713	10,565	231,228	241,793	25	50	75	engine	2′	6″	450′	steam	2/8/93
Allendale, Shag Point ..	McIntosh, A. ..	6½	〃	1	7′	6′	..	〃	1	5′ 6″ x 5′	350′	engine-plane	10,815	3,719	14,534	33,831	48,365	10	32	42	〃	2′	5″	..	natural	3/8/93
CENTRAL OTAGO.																									
Kyeburn, Kyeburn	McCready, D. ..	20	brown	1	10′	10′	S. 45° W. 40°	narrow	1	3′ x 2′	60′ & 45′ 500′	adit	111	..	111	14,718	14,829	..	2	2	hand	..	..	..	〃	19/12/93
Commercial No. 2, Kyeburn	Archer, C. ..	9	〃	1	14′	8′	S. 45° W. 70°	〃	1	6″ x 4′	25′	shaft													
Perseverance, Kyeburn ..	〃 ..	14	〃	1	8′	all	S. 45° W. 40°	〃	1	..	500′	adit	780	..	780	8,352	9,132	2	2	4	〃	..	..	..	〃	19/12/93
Hill's Creek, Hill's Creek ..	McKnight, J. ..	29	lignite	1	10′	〃	E. 25°	open	..	..	..	..	..	..	..	804	804	..	..	..	..	..	..	..	..	19/12/93
Gimmerburn, Gimmerburn ..	McKnight, J. ..	..	brown	1	..	..	..	〃	..	..	..	..	154	..	154	..	154	1	..	1	..	..	..	..	..	18/12/93
Idaburn, Rough Ridge ..	Beck and McLean	7	lignite	1	30′	25′	N. 5°	〃	..	..	..	..	1,324	..	1,324	6,048	7,372	2	..	2	..	..	..	..	..	18/12/93
White's, Rough Ridge ..	White, John ..	23	〃	1	23′	all	N. 30°	〃	..	..	..	..	1,360	..	1,360	25,076	26,436	2	..	2	..	..	..	..	..	18/12/93
Border Colliery, Idaburn ..	Turnbull, G. ..	23	〃	1	20′	〃	N.W. 20°	〃	..	..	..	..	471	..	471	2,175	2,646	1	..	1	..	6″	3″	15′	..	18/12/93
Blackstone Hill	Dunsmuir, A. ..	27	〃	1	8′	〃	N. 70°	〃	..	..	..	..	230	..	230	738	968	1	..	1	..	..	..	..	..	16/12/93
Welshman's Gully, Cambrian's	Jones, J. H. ..	32	brown	1	30′	28′	W. 10°	〃	..	..	..	..	1,634	..	1,634	15,840	17,474	3	..	3	..	..	..	..	..	15/12/93
Cambrian, Cambrian's ..	Dunge, C. ..	9	〃	1	15′	all	N.W. 5°	〃	..	..	..	..	1,007	..	1,007	6,932	7,939	3	..	3	..	..	..	..	..	15/12/93
Alexandra, Alexandra ..	Thomson, W. ..	14	〃	1	14′	5′ 6″	N. 20° E. 1 in 7½	bord and pillar	2	5′ x 2½′	60′	shaft	2,147	..	2,147	14,168	16,315	1	3	4	horse	..	..	..	natural	25/5/93
Macqueenville, Alexandra ..	Lett, R. ..	7	〃	1	14′	5′	S. 75° W. slight	ditto	2	3′ x 4′ 9″	62′	〃	1,379	..	1,379	6,770	8,149	2	2	4	〃	..	..	..	〃	25/5/93
Waikerikeri, Clyde ..	Holt, W. J. ..	12	〃	3	20′	..	S. 1 in 1	stoping	2	6′ x 3	160′	〃	77	..	77	19,292	19,369	1	1	2	〃	..	..	..	〃	25/5/93
Dairy Creek, Clyde ..	Marie, T. C. ..	22	〃	1	unknown	..	S. 45°	bord and pillar	1	4′ x3 ′ 6″	60′	adit	1	..	1	3,730	3,731	1	..	1	〃	..	..	..	〃	25/5/93
Excelsior, Cromwell ..	McNulty, E. ..	12	〃	1	17′ to 18″	12′	E. 6° S. 60°	stoping	1	4′ x 6′	40′	〃	557	..	557	3,933	4,490	..	1	1	〃	..	..	..	〃	15/3/93
Cairnmuir, Cromwell ..	Ridland, A. F. ..	1	〃	1	..	..	..	..	..	..	..	..	297	..	297	..	297	1	1	2	〃	..	..	..	〃	15/3/93
Nulli Secundus, Cromwell ..	Parcell, W. ..	3½	〃	1	10′	6′	S. 40° W. 5°	bord and pillar	1	6′ x 4′	50′	adit	..	..	..	632	632	..	..	..	..	..	..	..	〃	15/3/93
Kawarau, Cromwell ..	Pryde, J. ..	16	〃	1	8′	all	N. 1 in 4½	ditto	1	6′ x 6′	34′	incline	1,271	..	1,271	14,674	15,945	1	4	5	horse	..	..	..	〃	15/3/93
Bannockburn, Cromwell ..	Wilson, T. ..	4	〃	1	6′ to 7′	〃	..	〃	1	6′ x 4′	20′	shaft	..	..	..	195	195	..	..	..	..	..	..	..	〃	15/4/92
Gibston, Gibston	Cowan, J. ..	26	pitch	4	5′ each	〃	W. 22½	narrow	1	6′ x 5′	80′	adit	952	..	952	16,835	17,787	..	3	3	hand	..	..	..	〃	14/3/93
Saddle Hill, Gibston ..	Macale, M. ..	7	〃	1	7′	..	..	open	..	..	..	..	187	..	187	1,477	1,664	1	..	1	horse	..	..	..	..	14/3/93
Cardrona, Cardrona ..	McDougal and Son	9	〃	1	20′	20′	..	〃	..	..	..	..	987	..	987	3,994	4,981	3	..	3	..	..	..	..	..	18/4/92
Cole Creek, Roxburgh ..	Jones, John ..	23	lignite	1	unknown	20′	W. 1 in 7	〃	..	..	..	..	1,140	..	1,140	8,331	9,471	2	..	2	..	..	..	..	..	12/9/93

Statistics of Workings in Coal-mines, 1893—*continued.*

Middle Island—*continued.*

Name of Mine and Locality.	Name of Manager.	Number of Years worked.	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 1893.			Approximate Total Output to 31st December, 1892.	Approximate Total Output to 31st December, 1893.	Number of Men ordinarily employed.			Power used for drawing Mineral.	Pumps.			Means of Ventilation.	Date of Inspector's Last Visit.
										Size of Shaft or Adit.	Depth of Shaft or Length of Adit.		Coal.	Slack.	Total.			Above.	Below.	Total.		Stroke.	Size of Barrel.	Height of Column.		
Central Otago—*continued.*													Tons.	Tons.	Tons.	Tons.	Tons.									
Perseverance, Roxburgh ..	Craig, James ..	6	lignite	1	unkn'wn	10′	..	open	..	..	..	..	1,238	..	1,238	3,553	4,791	2	..	2	..	..	..	..	..	12/9/93
McPherson's, Roxburgh ..	McPherson, M. ..	23	"	1	"	18′	..	"	..	..	..	..	2,186	..	2,186	2,895	5,081	4	..	4	..	..	..	..	..	12/9/93
South Otago.																										
Saddle Hill	Christie, J. ..	19	brown	1	19′ 6″	10′	E. 1 in 10	bord and pillar	3	5′ x 2′	50′	adit	1,085	844	1,929	78,927	80,856	1	3	4	horse	..	..	..	natural	24/8/93
Glenochiel, Saddle Hill ..	Bryce, D. ..	12½	"	1	16′	7′	varies	ditto	1	8½ x 4′	43′	incline	1,188	..	1,188	8,940	10,128	2	3	5	"	..	..	..	"	19/8/93
Walton Park, Green Island ..	Shore, Thomas, Mine-manager, Lowden, General Manager	23	"	1	15′ to 17′	8′	E. 1 in 9	"	3	11′ x 4′ 12′ x 4½′ 6′ x 4½′	175′ 173′ 25′	shaft	15,043	5,691	20,734	425,851	446,585	9	44	53	steam-engine	4′	9¾″	170′	furnace	25/8/93
Fairfield, Green Island ..	Harris, A. ..	2	"	1	4′	all	..	"	1	5′ x 4′	..	adit	285	..	285	698	983	1	2	3	hand	..	..	..	natural	26/8/93
Abbotsford, Abbotsford ..	Green, E. R. ..	12½	"	1	6′ to 8′	6′ to 8′	E. 10° N.	"	5	4′ x 4′ 4′ x 4′ 5′ x 3½′ 6′ x 4′ 10′ x 4′ engine-plane 15 chains	45′ 80′ 120′ 140′ 140′	engine-plane	6,999	3,458	10,451	177,175	187,626	8	31	39	hand engine & horse	12″	5″	161′	natural steam	26/8/93
Chain Hills, Abbotsford ..	Allen, A. C. ..	1	"	1	6′ to 8′	6′ to 8′	..	"	1	6′ x 5′	100′	incline	..	..	..	842	842	..	..	..	..	..	..	..	..	..
Fernhill, Chain Hills ..	Gray, James ..	16	"	1	19′	7′	N. 10° E. 1 in 10	"	1	4′9″x4′6″	..	adit	2,554	946	3,500	91,218	94,718	2	13	15	horse	..	..	..	furnace	18/7/93
Brighton, Brighton	Walker, James ..	7	"	1	4′	4′	..	"	..	..	..	incline	290	10	300	2,520	2,820	1	2	3	"	..	..	..	natural	22/8/93
McColl's, Brighton	McColl, Donald ..	5	"	2	4′ to 5′	4′	E. 12°	"	..	..	..	"	215	..	215	298	513	1	1	2	"	..	..	..	"	22/8/93
Mosgiel, Mosgiel	Sneddon, James ..	10	"	1	15′	7′	S. 1 in 10	"	2	4′ x 4′ 6′ x 4′	27½′ 32′	engine-plane	2,719	2,777	5,496	36,227	41,723	3	7	10	engine	siphon and pump		..	"	24/8/93
Salisbury, Mosgiel	Reid, David ..	3	"	1	8′	5′	..	"	1	5′ x 6′	264′	adit	1,242	600	1,842	2,591	4,433	1	3	4	hand	..	..	..	"	23/8/93
Bruce No. 2, Milton ..	Hardwick, N. ..	19½	"	1	16′	6′ to 7′	N. 30° E 10°	"	1	4½′ x 4½′	25′	"	761	260	1,021	21,500	22,521	1	3	4	horse	..	..	..	"	1/9/93
.. ..	.. ..	18½	"	1	12′ 6″	6′	varies	"	1	4′ x 3′	20′															
Real McKay, Milton ..	Young, A. ..	25½	"	1	20′	10′	N.E. to E. 1 in 8	"	1	4½′ x 3′	34′	"	731	..	731	17,000	17,731	..	2	2	hand	..	..	..	"	1/9/93
Wallsend, Lovell's Flat ..	Hewitson, R. ..	23	lignite	1	20′	all	S. 20° W. 1 in 4	open	..	..	..	..	630	..	630	6,790	7,420	1	..	1	..	..	..	..	..	2/9/93
Gibson's, Lovell's Flat ..	Gibson, James ..	1	pitch	1	20′	6′	..	..	2	11′ x 4′ 8′ x 4′	320′ 250′	shaft	..	..	..	89	89	..	..	..	..	..	..	..	..	..

Elliott Hill, Lovell's Flat ..	McDougal, M. ..	4	brown	1	20′	6′	E. 15° to N. 5°	bord and pillar	..	..	90′	adit	261	..	261	1,428	1,689	..	2	2	hand	..	..	..	natural	2/9/93
Paskell's, Adam's Flat ..	Paskell, John ..	29	lignite	1	8′	all	N.E. 1 in 6	open	..	..	..	..	4	..	4	335	339	..	..	..	..	..	..	..	..	3/10/93
Adam's Flat, Adam's Flat ..	Reid, John ..	11	"	1	14′	10′	S. 45°	"	..	..	..	..	150	..	150	1,387	1,537	1	..	1	..	..	..	..	..	3/10/93
Benhar, Benhar	Nelson, John ..	30	brown	1	30′	8′	S. 17°	bord and pillar	1	4′ x 4′ 8′ x 6′	48′ 462′	engine-plane	2,751	480	3,231	69,749	72,980	1	4	5	engine	..	..	..	natural	7/10/93
Rigfoot, Benhar	Aitkin, Thomas ..	7	"	1	18′	12′	S. 12°	ditto	1	6′ x 8′	240′	incline	669	165	834	3,226	4,060	1	1	2	horse	6″	2″	60′	"	7/10/93
Kaitangata No. 1, Kaitangata	Watson, W. P., Gen. Manager	17	pitch	1	30′	10′ to 25′	W. 45°	"	1	13′ x 5′ 6″	..	shaft	47,263	21,121	68,384	680,066	748,450	21	152	173	engine	2′	6″	700′	furnace	4/10/93
Kaitangata No. 2, Kaitangata	Shore, W., Mine-manager	9	"	1	10′ to 30′	6′ to 25′	..	"	1	6′ diam.	210′	engine-plane														
Castle Hill No. 1, Kaitangata	Carson, M. ..	6½	"	1	12′ to 14′	8′	N. 20° E. 14°	"	1	3′ 9″ x 2′ 6″	54′	adit	1,365	257	1,622	6,794	8,416	1	3	4	horse	..	..	..	natural	6/10/93
Wangaroa, Kaitangata ..	Smith, Joseph ..	13	"	1	10′ 6″	8″	E. 1 in 6	"	..	8′ x 6′	..	"	7	..	7	938	945	..	..	..	hand	..	..	..	"	6/10/93
Lismahagow, Kaitangata ..	Sewell, R. M. ..	12	"	1	4′	4′	N. slightly	"	..	..	..	"	51	..	51	1,382	1,433	1	..	1	"	..	..	..	"	6/10/93
Crofthead, Kaitangata ..	Mackie, E. ..	7	"	1	12′	8′	N. 20° E. 10°	"	..	6′ x 5′	396′	"	1,241	..	1,241	5,472	6,713	2	2	4	horse	..	..	..	"	6/10/93
Mainholm, Waipahi ..	Lischmer, F. ..	7½	lignite	1	15′	all	E. 30°	open	..	..	..	..	1,853	..	1,853	7,778	9,631	3	..	3	..	8″	3″	20′	..	10/10/93
SOUTHLAND.																										
Waikoikoi, Pukerau ..	Cullen, J. ..	6	"	1	4′	"	..	"	..	..	..	..	90	..	90	62	152	1	..	1	..	..	..	..	..	11/10/93
Valley Road, Pukerau ..	Orchard, E. C. ..	4	"	1	..	"	..	"	..	..	..	..	182	..	182	504	686	3	..	3	..	..	..	..	..	11/10/93
O'Hagan's, Pukerau ..	O'Hagan, C. ..	13	"	1	16′	10′	W. 1 in 10	bord and pillar	..	6′ x 7′	496′	adit	1,172	..	1,172	19,195	20,367	..	2	2	horse	..	..	..	natural	10/10/93
Perseverance, Pukerau ..	McKenzie, J. ..	7	"	1	16′	..	N. 20°	ditto	..	8′ x 4′	330′	"	..	..	..	2,052	2,052	..	..	..	..	..	..	..		10/10/93
Dudley's, Pukerau	Dudley, J. D. ..	4	"	1	16′	7′	..	"	..	..	..	"	250	..	250	380	630	1	..	1	hand	..	..	..	"	10/10/93
Frank's, Pukerau	Mapp, R. ..	3	"	1	6′	4′	level	..	..	..	..	"	12	..	12	33	45	..	..	..	"	..	..	..	"	..
McKinnon's, Gore	McKinnon & Gray	12	"	1	5′ to 8′	all	"	open	..	..	..	..	525	..	525	2,551	3,076	2	..	2	..	..	..	..	..	12/10/93
Heffernan's, Gore	Heffernan, P. ..	15	"	1	12′	"	N. 15°	"	..	..	..	..	160	..	160	932	1,092	1	..	1	..	..	..	..	..	14/10/93
Sarginson's, Gore	Sarginson, J. H. ..	7½	"	1	9′	8′	N. 20°	"	..	..	..	..	..	..	..	856	856	..	..	..	..	..	..	..	..	14/10/93
Excelsior, Gore	Fryer, H. ..	2	"	1	8′	all	..	"	..	..	..	..	308	..	308	499	807	1	..	1	..	..	..	..	..	14/10/93
Dryden's, Gore	Dryden, W. ..	1	"	1	10′	"	..	"	..	..	..	..	..	..	..	438	438	..	..	..	..	..	..	..	..	14/10/93
Hoffman's, Gore	Hoffman, J. ..	10	"	1	10′	"	N. 12°	"	..	..	..	..	250	..	250	2,455	2,705	1	..	1	..	..	..	..	..	14/10/93
Regefsky's, Gore	Regefsky, A. ..	2	"	1	3′	"	..	"	..	..	..	..	30	..	30	18	48	..	..	..	..	..	..	..	..	14/10/93
Kirk and Sheddow's, Gore ..	Kirk, J. ..	2	"	1	6′	"	..	"	..	..	..	..	90	..	90	50	140	1	..	1	..	..	..	..	..	14/10/93
Clukorski's, Gore	Clukorski, J. ..	2	"	1	3′	"	..	"	..	..	..	..	14	..	14	8	22	..	..	..	..	..	..	..	..	14/10/93
Leitze's, Gore	Leitze, M. ..	14	"	1	6′ to 7′	"	S.E. 5°	"	..	..	..	..	43	..	43	1,058	1,101	1	..	1	..	..	..	..	..	14/10/93
Green's, Gore	Stark, J. ..	5	"	1	19′	12′	..	bord and pillar	..	7′ x 9′	100′	incline	1,162	..	1,162	4,691	5,853	1	4	5	horse	6″	2″	20′	natural	12/10/93
Smith's, Gore	Smith, John ..	4½	"	1	12′	8′	S. 60°	ditto	..	..	..	adit	562	..	562	698	1,260	..	1	1	"	..	..	..	"	12/10/93
Smyth's, Gore	Smyth, Richard ..	2	"	1	..	..	..	open	..	..	..	..	127	..	127	..	127	..	1	1	..	..	..	..	..	12/10/93
Pacey's, Chatton	Pacey, W. R. ..	17	"	1	30′	20′	S.E. 1 in 6	"	..	..	..	..	550	..	550	6,703	7,253	2	..	2	engine	..	..	..	..	19/10/93
Pemble's, Chatton	Harvey, James ..	16	"	1	16′ to 26′	16′ to 18′	90° strike	"	..	..	..	..	43	..	43	11,009	11,052	1	..	1	..	..	..	..	..	13/10/93
Hunter's, Chatton	Hunter, Thomas	8½	"	2	2′ 18″	..	..	"	..	..	..	..	88	..	88	938	1,026	1	..	1	..	..	..	..	..	13/10/93
Irvine's, Knapdale	Irvine, J. F. ..	8	"	1	35′	25′	vertical	partly open	1	..	..	adit	686	..	686	906	1,592	..	1	1	hand	..	..	..	natural	13/10/93
Edge's, Wendon	Evans, G. H. ..	15	"	1	8′ to 12′	all	N. 60° E.	open	..	..	..	..	440	..	440	1,627	2,067	1	..	1	..	..	..	..	..	18/10/93
No. 14, Waikaka	Edge, W. H. ..	6½	"	1	8′ to 7′	4′	W. 35°	"	..	..	..	..	90	..	90	368	458	1	..	1	..	..	..	..	..	18/10/93
McDonald's, Wendon ..	McDonald, R. ..	1	"	1	..	all	..	"	..	..	..	..	10	..	10	..	10	..	..	..	..	..	..	..	..	18/10/93
South Brook, Waikaka ..	Ayson, William ..	1	"	1	..	"	..	"	..	..	..	..	55	..	55	..	55	1	..	1	..	..	..	..	..	19/10/93
Mandeville, Riversdale ..	McAlister, E. ..	2	"	1	3′ to 8′	"	..	"	..	..	..	..	14	..	14	10	24	..	..	..	..	..	..	..	..	31/10/92
Waimea, Riversdale ..	Smith, John ..	3	"	1	5′	"	..	"	..	..	..	..	430	..	430	724	1,154	2	..	2	..	..	..	..	..	19/10/93
Maslin's, Wendon ..	Maslin, Thomas ..	2	"	1	20′	18′	..	"	..	..	..	..	283	..	283	103	386	1	..	1	..	..	..	..	..	21/10/93

Statistics of Workings in Coal-mines, 1893—*continued.*

Middle Island—*continued.*

Name of Mine and Locality.	Name of Manager.	Number of Years worked.	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 1893.			Approximate Total Output to 31st December, 1892.	Approximate Total Output to 31st December, 1893.	Number of Men ordinarily employed.			Power used for drawing Mineral.	Pumps.			Means of Ventilation.	Date of Inspector's Last Visit.
										Size of Shaft or Adit.	Depth of Shaft or Length of Adit.		Coal.	Slack.	Total.			Above.	Below.	Total.		Stroke.	Size of Barrel.	Height of Column.		
Southland—*continued.*													Tons.	Tons.	Tons.	Tons.	Tons.									
Perseverance, Waikaia ..	Vial, Edward ..	2	lignite	1	6′ to 7′	all	E. 1 in 6	open	..	..	..	..	221	..	221	40	261	3	..	3	..	..	..	..	..	21/10/93
Cambrian, Waikaia ..	McIvor, Walter ..	2	,,	1	5′ to 8′	,,	E. 1 in 6	,,	..	..	..	..	51	..	51	48	99	1	..	1	..	..	..	..	..	21/10/93
Northcote's, Waikaia ..	Northcote, T. ..	2	,,	1	10′ to 15′	8′	E. 1 in 5	adit	..	..	..	..	132	..	132	193	325	..	1	1	..	..	..	..	..	21/10/93
Argyle, Waikaia	Cosgrove, J. B. ..	2	,,	1	6′ to 7′	all	..	open	..	..	..	..	30	..	30	64	94	1	..	1	..	..	..	..	..	29/10/92
Mataura, Mataura ..	Sleeman, C. P. ..	17	,,	1	16′	,,	N.W. 4°	,,	..	..	..	..	2,250	..	2,250	7,745	9,995	4	..	4	water-wheel	5″	6″	26′	..	7/11/93
Beattie's, Mataura	Coster and Beattie	17	,,	1	..	,,	..	,,	..	..	..	..	34	..	34	17,612	17,646	1	..	1	..	..	..	..	..	7/11/93
Town's, Mataura	Town, C. ..	6	,,	1	16′	,,	N. 70° W. 5°	,,	..	..	..	..	873	..	873	6,710	7,583	1	..	1	water-wheel	..	..	..	..	7/11/93
McGowan's, Mataura ..	McGowan, F. ..	4	,,	1	4′	..	N. 70° W.	,,	..	..	..	..	..	..	..	125	125	..	..	..	..	..	..	..	..	8/11/93
Townshend's, Mataura ..	Townshend, E. ..	10	,,	1	12′	8′	level	,,	..	..	..	..	30	..	30	283	313	1	..	1	..	..	..	..	..	8/11/93
Mutch's, Mataura	Mutch, J. C. ..	3	,,	1	4′	all	,,	,,	..	..	..	..	30	..	30	66	96	..	..	..	..	..	..	..	..	8/11/93
River View, Mataura ..	Nicol, L. D. ..	2	,,	1	..	..	..	,,	..	..	..	..	100	..	100	120	220	1	..	1	..	..	..	..	..	8/11/93
Edendale, Wyndham ..	McDonell, A. ..	3	,,	1	5′	all	..	,,	..	..	..	..	360	..	360	859	1,219	1	..	1	..	..	..	..	..	10/11/93
Shields's, Wyndham ..	Shields, William	13	,,	1	6′	,,	..	,,	..	..	..	..	440	..	440	5,039	5,479	1	..	1	..	..	..	..	..	10/11/93
Marshall's, Wyndham ..	Marshall, H. ..	2	,,	1	3′	,,	..	,,	..	..	..	..	60	..	60	30	90	..	..	..	..	..	..	..	..	10/11/93
Munro's, Wyndham ..	Munro, E. ..	6	,,	1	5′	,,	..	,,	..	..	..	..	1,456	..	1,456	3,181	4,637	2	..	2	..	..	..	..	..	13/11/93
Genge's, Wyndham ..	Genge, Thomas ..	16	,,	1	2′ to 3′	,,	..	,,	..	..	..	..	170	..	170	2,139	2,309	2	..	2	..	..	..	..	..	13/11/93
Robin Hood, Pine Bush ..	Trotter, R. A. ..	12	,,	1	15′	,,	..	,,	..	..	..	..	124	..	124	324	448	1	..	1	..	..	..	..	..	11/11/93
Monagan's, Pine Bush ..	Monagan, A. ..	2	,,	1	8′	6′	..	..	..	..	..	..	3	..	3	8	11	..	..	..	..	..	..	..	..	11/11/93
Hokonui, Winton	Hayes, John ..	6	pitch	1	8′	all	W. 14°	bord and pillar	1	4′ x 4′	..	engine-plane	7,660	2,700	10,360	12,642	23,002	6	21	27	engine & tank	..	..	..	..	20/1/94
Fairfax, Fairfax	Graham, P. S. ..	15	lignite	1	5′ 6″	,,	N. 60° W. 4°	ditto	..	5′ 6″ x 7′	..	adit	521	..	521	8,634	9,155	..	2	2	..	..	..	..	..	17/4/93
Isla Bank, Fairfax	Slattery, M. ..	13	,,	1	8′	..	N.W. 5°	open	..	..	..	..	138	..	138	2,410	2,548	1	..	1	..	..	..	..	..	17/4/93
Nightcaps No. 1, Nightcaps	Handyside, W., Gen. Manager Lloyd, J., Mine-manager	12	pitch	1	15′	all	N.E. 1 in 7 to 1 in 2½	bord and pillar	1	6′ x 4′	130′	adit	13,397	564	13,961	115,743	129,704	14	13	27	horse & engine	..	..	..	furnace	18/4/93
Nightcaps No. 2, Nightcaps		11	,,	1	8′	,,	N.E. to E. 1 in 4 to 1 in 6	ditto	1	5′ x 4′	5′	engine-plane														
Nightcaps No. 3, Nightcaps		5	,,	1	12′	,,	S. 80° E. 50°	,,	1	5′ diam.	60′	..														
Wallace Pit, Nightcaps ..	Reid, William ..	8	,,	1	..	,,	S. 80° E. 5°	open	..	..	..	..	1,409	..	1,409	3,913	5,322	3	..	3	..	8″	5″	18′	..	18/4/93
No. 1, Morley Village, Nightcaps	Brazier, J. ..	5½	,,	1	10′	,,	S. 80° E. 5°	,,	..	..	..	..	..	..	..	2,096	2,096	..	..	..	..	..	..	..	..	18/4/93
No. 2, Morley Village, Nightcaps	Brazier, J. ..	3	,,	1	4′	,,	N. 60° E. 5°	,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Annandale, Annandale ..	Chalmers, N. D.	3	,,	1	10′	,,	N.W.	,,	..	..	..	..	80	..	80	122	202	1	..	1	..	..	..	..	..	9/10/91
Orepuki, Orepuki	Love, A. ..	8	,,	1	22′	9′	S.E.	stoop & room	1	7′ x 8′	120′	engine-plane	131	6	137	5,346	5,483	1	3	4	engine	16″	3″	..	..	23/11/93
Cluny, Orepuki	Popham, J. ..	4	,,	1	10′	5′	S. 12½° W. 80°	open	..	..	..	..	..	..	..	156	156	..	..	..	..	..	..	..	..	19/9/92
Riversdale, Waimea ..	Carmichael, J. ..	6½	brown	1	12′	all	N. 10°	,,	..	..	..	..	..	..	..	3,711	3,711	..	..	..	..	..	..	..	..	19/10/93

Owaka, Catlin's	Copan, W. ..	1	pitch	..	..	..	..	..	..	..	..	..	..	..	..	..	95	95	..	..	..	..	..	..	..	..	..	..
Alley's, Nightcaps	Alley, Jesse ..	3	"	1	4′	all	..	open	..	..	..	..	..	144	..	144	49	193	1	..	1	..	..	..	..	..	..	18/4/93
Morrison's, Benhar ..	Morrison, J. ..	4	brown	1	15′	7′	S. 12°	bord and pillar	..	8′ x 8′	100′	adit	..	..	..	646	646	..	..	..	..	..	..	..	..	..	7/10/93
Hill's, Waikaia	Hill, J. P. ..	1	"	1	17′	17′	E.	open	..	..	..	..	153	..	153	..	153	1	..	1	..	..	..	..	..	..	..	21/10/93
Smith's, Mataura	Smith, Hugh ..	1	"	1	4′	all	..	"	..	..	..	..	9	..	9	..	9	..	..	..	..	..	..	..	..	..	..	8/11/93
Wario, Nightcaps	Lloyd, John ..	11	pitch	1	9′	"	N.E. 50° E. 10°	bord and pillar	..	6′ x 6′	3 hains	adit	..	..	..	3,452	,452	..	..	..	..	..	..	..	..	..	..	..
													574,681	116,867	691,548	7,465,945	8,157,493											
Add output of following twelve mines, included in last year's statement but since abandoned: Motupipi, 360 tons; Westport Wallsend, 3,441 tons; Waimangaroa, 17,307 tons; Wellington, 2,299 tons; Inkermann, 2,665 tons; Inglewood, 314 tons; Devil's Creek, 343 tons; Inangahua, 71 tons; Murray's Creek No. 2, 450 tons; Burke's Creek, 300 tons; Reefton, 36 tons: total																27,586	27,586											
																7,493,531	8,185,079											
Add output of Waikaka, Adam's Flat, and Waimea Mines, inserted twice in statement for 1891																..	6,518											
Output of mines included in statement for 1890, but whose operations were suspended prior to 1890, less three which are again included in body of statement, namely—Hill's Creek, 779 tons; Lovell's Flat, 323 tons; and Wyndham, 1988 tons: total, 3,090 tons																..	132,723											
Output from mines included in former statements, but whose operations were suspended prior to 1889																..	172,529											
																	8,496,849											

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Approximate Cost of Paper—Preparation, not given; printing (2,375 copies), £28.

Price, 9d.

By Authority: SAMUEL COSTALL, Government Printer, Wellington.—1894.