1875.

NEW ZEALAND.

THE GOLD FIELDS OF NEW ZEALAND,

(REPORT ON).

(*Return to an Order of the House of Representatives, dated 3rd August*, 1869.)

"That it is desirable that the Government should cause to be laid upon the Table of this House, during each Session, a Report embodying a general account of the present condition of the Gold Fields of the colony, their advancement or otherwise during the preceding year, and their probable prospects; together with particulars showing the average price of provisions during the year on each Gold Field, the rate of wages, estimated population, and such other information as would afford a comprehensive idea of the general condition of the mining interest in the colony; and that His Excellency be requested to forward a copy of such Report to Her Majesty's Secretary of State for the Colonies." (*Mr. W. H. Harrison.*)

Mr. C. E. HAUGHTON to the Hon. the MINISTER for PUBLIC WORKS.

SIR,— Wellington, 24th July, 1875.

I have the honor, in accordance with your instructions, to forward a General Report upon the state and prospects of the Gold Fields; with Appendix containing Reports by the Wardens upon the districts under their charge, and Statistical Tables.

I have, &c.,

The Hon. the Minister for Public Works, Wellington. C. E. HAUGHTON.

REPORT.

NOT having had an opportunity of visiting the several gold fields since the date of my last Report, I am necessarily obliged to rely entirely upon the information afforded to me by the Wardens and other officers for the subject-matter submitted herewith, for the purpose of being laid before Parliament, in accordance with the Resolution of August 3rd, 1869. The tables showing Gold Fields Revenue, under its several classifications, and the Export of Gold and Silver, have been furnished by the Secretary to the Treasury and the Acting Secretary of Customs, and will be found to afford every possible information upon these subjects, compiled in a most clear and comprehensive manner; and I desire to take this opportunity of acknowledging the courtesy of Mr. Batkin and Mr. McKellar in affording me such valuable assistance in preparing the Appendix to this Report.

I think it advisable to let the Gold Fields Wardens speak for themselves. Their reports, in most cases very ably written, will be found in the Appendix, printed *verbatim* as they were received; and I have to thank these officers not only for the Reports, but for the voluminous and carefully prepared returns which accompanied them, and which have enabled me to compile the Tables in the Appendix, which will, I think, be found reliable and exceedingly useful in aiding the judgment of those interested, with regard to the condition of our gold fields population.

It seems useless to expect to obtain information from mine owners and managers which might be some guide as to the economies of gold mining; not 5 per cent. of the circulars issued for this purpose have ever been answered, and, consequently, no results of any practical value can be arrived at. Tables 23 and 24 embody the few returns which have been received.

GOLD.

The data collected as to gold are as follows:—In the year 1873 the colony exported 505,337 oz., of the value of £1,987,425; in the year 1874, 376,388 oz., of the value of £1,505,331. During the quarter ending March, 1874, 108,747 oz.; whilst in the corresponding quarter of the year, 97,681 oz. have been returned as the export. The yield of gold in the various provinces during the fifteen months ending 31st March, 1875 was as follows:—Auckland, 95,537 oz., valued at £379,059; Marlborough, 1,889 oz., valued at £7,514; Nelson, 110,855 oz., valued at £443,081; Westland, 97,225 oz., valued at £389,864; and Otago, 168,563 oz., valued at £676,989. Full particulars of the quantity and value of the gold exported will be found in Tables Nos. 5, 6, 8, and 9, and, at the end of the Appendix, the Returns for the Quarter ending 30th June, have been reprinted from the *New Zealand Gazette*. In Tables Nos. 23 and 24 will be found the yield of gold from various parcels of quartz crushed, and the yield from some alluvial mines during the last year. I regret that the returns received from the mining managers, &c., upon this subject have been so meagre as to be practically useless for purposes of generalization.

Silver.

The quantity of silver exported during the year ended 31st December, 1874, was 40,566 oz., valued at £10,380. There does not appear to have been any silver exported from the colony during the quarter ended 31st March, 1875. The total quantity of silver exported since the year 1870, up to the present time, has been 231,212 oz., valued at £64,655.

Revenue.

The amount of revenue and gold duty from the 1st January, 1874, to the 31st December, 1874, was £84,992 19s. 1d., and for the quarter ending 31st March, 1875, £19,174 7s. 9d., making a total of £104,167 6s. 10d., as against £117,307 16s. 3d. for the year 1873 and the first quarter of 1874, showing a falling off upon the fifteen months of £13,140 9s 5d. Tables 1, 2, 3, and 4, appended hereto, give the fullest possible information upon this subject.

Water Races.

On the 31st March, 1875, there were 4,365 water-races, of a length of 5,823½ miles, carrying 7,541 sluice-heads of water, the approximate cost of which is estimated at £658,555. The number of tail-races is 3,610, constructed at a cost of £173,361; dams, 2,892, constructed at a cost of £86,053; reservoirs, 406, constructed at a cost of £14,360; and ground sluices, 1,603, constructed at a cost of £26,329. Detailed particulars under this head will be found in Table 17, appended hereto.

Water Supply upon the Gold Fields.

I have not thought it necessary to compile any information upon the subject of the construction of and expenditure upon works for supply of water upon the gold fields, being aware that these returns will form part of the Public Works Statement delivered annually in Parliament.

Machinery.

The returns of the machinery employed in quartz and alluvial mining will be found in Tables 15 and 16.

Mining Leases and Licenses.

The number of mining leases in force on the 31st March, 1875, was 491, the gross acreage 3,207 acres 2 roods 16 perches, and the annual rental £7,322 13s. 1d. Under the Gold Mining Districts Act, in force only upon the Hauraki Gold Fields, there were, upon 31st March, 1875, 137 licenses, covering a gross acreage of 1,078 acres 2 roods 4 perches, with a rental of £3,138.

Mining Companies.

The returns of the gold mining companies received are very incomplete, but from such information as has been at my disposal I have compiled the following particulars:—Under "The Mining Companies Limited Liability Act, 1865," and Amending Acts, there are 230 registered companies, with a nominal capital of £3,622,216, and a paid-up capital of £2,720,640 12s. 2d. Under "The Joint Stock Act," 32 companies, nominal capital £557,625, paid-up capital £300,153. Under "The Mining Companies Act, 1872," 51 companies, nominal capital £726,920, paid-up capital £254,699 1s. 11d.

Agricultural Leases.

The number of agricultural leases, and, consequently, the area of ground held under them, is increasing every year. During the year ending 31st March, 1874, the number nearly doubled that of the previous year; and it will be seen by reference to Table No. 19, that the number and acreage stands as follows in March, 1875, in comparison with the same date in 1874:—31st March, 1874: 1,443 leases; acreage, 88,296 acres 2 roods 14 perches. 31st March, 1875: 1,527 leases; acreage, 104,023 acres 2 roods 5 perches. The area held at present under agricultural leases does not represent the whole amount of land which has been acquired and settled under this system of deferred payments. A considerable area upon the gold fields of the Middle Island is now held in fee-simple by former leaseholders who have paid up in full and received their Crown grants, and are, in the majority of cases, prosperous freeholders farming their own land. The experience of years has now proved the wisdom of the Legislature in providing for the attachment of the miners to the country by affording them special advantages for the acquirement of freehold property.

Mining Population.

The return of the number of persons engaged in gold mining shows a marked diminution for the year. Upon 31st March, 1874, there were 18,142, and upon 31st March, 1875, 16,424. This includes Chinese, of whom there were at the latter date 4,693, as against 4,103 in the former year. Considering the very large increase to the population of the colony during the year ending March, 1875, it is undoubtedly a fact that other pursuits have been found to pay better than gold mining, and that the attraction of making money easily upon our gold fields no longer exists. Wages still, as may be seen by the returns appended, continue very high, but the work is hard, and some actual knowledge of mining operations is now in many instances required. This appears to shut out the greater number of the new arrivals, who, brought up to other pursuits, might have done very well upon a new rush, but are useless for the regular work of a gold mine. I do not suppose that the mining population has received any perceptible accession from the 55,000 immigrants introduced under the Immigration and Public Works policy, whilst one result of that policy has been to withdraw from the gold fields hundreds of men who find more regular employment in connection with the public works of the colony and the provinces, and in the private enterprises of various characters which the present state of the country tends to create and foster.

Rate of Wages and Prices of Provisions.

Returns showing the rates of wages and prices of provisions in the several mining districts will be found in Tables 10 and 11. There is no important difference from last year.

Prospects of the Gold Fields.

The resolution of the House of Representatives, in August 1869, expressly asks for a report upon the "probable prospects of the gold fields." This is a matter upon which, from the same data, very different opinions may be formed, and I am afraid it is one very difficult to deal with, unless the political element, from entering into which my position debars me, is introduced. I, however, take it for proven that undeveloped wealth to great amount exists in our present gold fields, and that the mineral resources of the colony outside the present proclaimed gold fields have not yet been prospected. That there exist undeveloped mines of wealth in the gold fields of New Zealand there is not the shadow of a doubt; and I have appended hereto the very able and exhaustive report of Mr. G. H. F. Ulrich, F.G.S., Consulting Mining Geologist and Engineer, of Melbourne, a gentleman well known for his scientific attainments, upon the Gold Fields of Otago, as proving beyond question the immensity of the auriferous resources of that portion of the colony. As I write, day by day most encouraging reports reach me of the newly-developed gold fields in the North; and the perusal of Mr. Warden Fraser's supplementary report, which will be found at the end of the Appendix, enforces the conviction that the rich returns of the Thames in past years will sink into insignificance before the realization of the future.* It must however be admitted that gold mining, under existing circumstances, is not an attractive pursuit; that many leave it for other industries; and that the mining population is not recruited from outside, with the exception of the Chinese. It is a matter of consideration whether gold mining, when it ceases to be a mere lottery, as in rich newly-opened diggings it undoubtedly is, pays as a steady industry—whether, in fact, to raise an ounce of gold does not cost, in ordinary cases, very close upon its value. If this is the case—and the public opinion upon the gold fields seems very much to tend this way—it results that if the raising and export of gold is admitted to be beneficial to the colony, encouragement should be given to this industry, and some of the special burthens with which it is now weighted removed.

C. E. Haughton,
Under Secretary for Public Works,
(Gold Fields Branch).

26th July, 1875.

* The last official return received by me from Tairoa, dated July 19th ult., gives a yield of 86 oz. 15 dwts. melted gold from 2 tons 5 cwts. of quartz.

APPENDIX TO REPORT ON THE GOLD FIELDS OF NEW ZEALAND.

WARDENS' REPORTS.

AUCKLAND.

No. 1.

The Provincial Secretary, Auckland, to the Under Secretary for Gold Fields.

Sir,— Superintendent's Office, Auckland, 12th May, 1875.

Adverting to my letter of the 8th ultimo, I have now the honor to forward the Warden's report upon the northern portion of the Hauraki Gold Mining District up to the 31st March, 1875.

Mr. Warden Fraser has been instructed, in compliance with your letter No. 26, of the 21st April, to forward supplementary report up to the 30th June next.

I have, &c.,
Vincent E. Rice,
(for the Provincial Secretary).

The Under Secretary, Public Works Office,
(Gold Fields Branch,) Wellington.

Enclosure in No. 1.

Mr. Warden Keddell to the Under Secretary for Gold Fields.

Sir,— Warden's Office, Coromandel, 4th May, 1875.

I have the honor to forward, under cover to His Honor the Superintendent of the Province of Auckland, the general report and the several returns called for in your circular of January last, having relation to the statistics of the northern portion of the Hauraki Gold Mining District.

I have further the honor to inform you that these documents would have been earlier prepared and forwarded had I not been absent from my district on special duty the greater part of the month of April.

I have, &c.,
Jackson Keddell,
Warden.

The Under Secretary for Gold Fields,
Public Works Department, Wellington.

General Report on the Northern Portion of the Hauraki Gold Mining District, Province of Auckland, for the Year ending 31st March, 1875.

In compiling my report for the year ending 31st ultimo, I find there is very little new enterprise to chronicle as having been initiated during that period, but the progress effected will, I think, be considered satisfactory. At the commencement of the departmental year the Queensland Gold Fields were the great attraction for our enterprising miners who were free to leave the colony; and following this, during the last quarter of the year 1874, the near approach of the opening of the long-looked-for Ohinemuri District prevented, or at least retarded, any prospecting in this portion of the district. Ohinemuri has been looked upon for the last six years as the birthright of the miners on this peninsula, and all who were able were determined to go to that field as soon as open. It was, moreover, expected that alluvial gold would be found there; and I am satisfied that it is in a great measure attributable to this that so few "new finds" have been made since my last report in this portion of the district. My report will, therefore, be confined to progress on the older claims, and recording what has been done towards developing those commenced during the year 1873-74.

Of the older claims I will begin with the New Zealand Kapanga Company's property, known as "The Kapanga," which it will be seen by former reports is identical with one of the best known and most successful of the older claims worked under the "Gold Fields Act, 1858." I last reported that the engine shaft had been sunk 150 feet, and that it was expected that in about ten months the lode would have been reached, but owing to circumstances which I will presently state, the company has not made the advance anticipated. The depth of shaft at present is 249 feet, or about 100 feet during twelve months. It must be remembered that the shaft is very large, since it must be through it all the mine will have to be worked, is very strongly timbered, and has been sunk through a hard country, and had to contend throughout with a strong stream of water from the old workings; it has also been found necessary to provide cisterns at intervals to raise the water to the surface. This is done by three 15-in. pumps, one supplying the other in sections, and set in motion by the powerful beam steam engine imported for the purpose. The fixing of this pumping arrangement, which is very complete, and the other details in connection, occupied considerable time, as in this, and in all works on the mine, due consideration has been paid to the requirements of the future; and all

the machinery, the plant, and the shaft are on a scale commensurate with the extension and permanent works the company look forward to. But these difficulties were of course foreseen; the chief cause of the delay is not of this nature, but is attributable to the short-sightedness of the proprietors, who, it seems, remit monthly about sufficient money to carry on for one month; and as it is evident that in undertakings of this kind, and on such an extensive scale, unforeseen accidents may necessitate an increased expenditure, so in the case of the Kapanga it will be seen that such cases have to be provided for out of the current supply, and ordinary work suspended in consequence, because the funds are insufficient. For some mail or two no remittances arrived at all, and the works were entirely suspended. I am satisfied the directors have confidence in their manager; and it is a great hindrance to the success of their undertaking that they do not place at his disposal a reserve fund to meet contingencies, such as accidents, or the delay in arrival of mails, or the omission to make remittances in season. During the cessation of ordinary work, the energetic manager employed the permanent hands in making all ready for renewed and continued work, ballasting the tramways leading to the forests for wood supplies, building a coal depôt, and stocking the same with Bay of Islands coal for a winter supply, to be brought to the engine-house in all weather by tramway, so that now, work being resumed, it is to be hoped no further delays will take place. In the adjoining ground, owned by the Golden Point Gold Mining Company, some very auriferous stone has been found in that portion of the old Kapanga leader in their ground, at about 60 feet distant, on the underlie, from the Kapanga Company's boundary. This stone was broken out just before the Kapanga ceased pumping, and remained below the water level until the pumps were at work again. I trust that the company will see the necessity and their advantage in allowing no cessation of the work during the coming year, in which case, unforeseen accidents excepted, my next report should record the cutting of the reef, and the result of some crushings. As reported before, the shaft is to be sunk 300 feet, and the drive to intersect the reef opened out at this depth, the length of which is estimated to be 300 feet. There are adjacent claims anxiously watching the Kapanga, upon which they will be dependent for drainage, and from whose researches they look for more certain intelligence for direction and value of the lodes.

The Tokatea Company's mine bears in a greater degree a relative position to the different holdings at the Tokatea Saddle. The first discovered in this locality, it has maintained its character as being the most important. Its position on the Tokatea range, affording such remarkable facilities for working the reef at great depths, has been before described. The workings now consist of six levels in the face of the steep range. During the past year the manager has taken out the ground between the third and fourth levels, and has done a great deal of work in prospecting the other portions of the claim, for as the reef from which all the proceeds of the mine have been derived is nearly vertical, having but a scarcely perceptible underlie, the remaining portion of the company's lease has been, until the past year, comparatively unprospected. During this year, however, four or five men have been employed on the original leader—known as the tribute leader—and with payable results. The company has also acquired the Excelsior Company's ground, a claim up to last year held by the latter company in the centre of the Tokatea lease, title to which was acquired in the Warden's Court in some of the early disputes which the prospectors had to defend. On this ground considerable work is in progress. A drive 600 feet in length is being made to intersect, in a northerly direction, several known lodes. On the "Peep-o'-Day" leader, which traverses their ground, the company are also employing four men, and again the same number on the "Swedish Crown" leader, which runs through it. The company employed during the year an average of forty men. In the months of November and December last, stone was taken out yielding to the shareholders two handsome dividends of 2s. 6d. and 5s. respectively on 20,000 shares, besides contributing a large sum to the reserve fund of the company. The sixth level, through the Van Company's ground, is in more than 1,000 feet in length, or about 140 feet from the Tokatea boundary. Gold has been seen in the reef through the Bismarck ground, which it—the drive—intersects after passing through the Van. This level is about 663 feet below the crown of the range. No quartz, to any extent, from the lower levels has been crushed, owing to the closing of the only battery (Bennett's) on that watershed; but this will soon be at work again, when the rains give a sufficient supply in the creeks for working the turbine.

The Tokatea Company resort to an ingenious contrivance for raising the quartz from one of their lower levels (No. 4), using for the purpose the water flowing in the bottom of the drive in the level above. This water fills a tank running on an inclined tramway; when full it is released, and by its weight brings up another empty tank and truck attached, full of quartz; the first tank is emptied below, and the process repeated.

Of the surrounding claims, the most important this year has been the Royal Oak, which has since Christmas yielded three dividends of 2s. 6d., 10s., and 5s., on 6,000 shares, and also added a considerable sum to the reserve fund.

In the Pride of Tokatea, which is a very large holding, all the work has been of the kind characterised as "dead work." A drive they are putting in through the Tokatea ground, to cut the lode successfully worked in the Royal Oak ground, promises to reward the company for their enterprise, since the Royal Oak left gold at their boundary.

The Bismarck and Van Companies have made some progress, but nothing worthy of note which has not been referred to in the Tokatea report.

The Harbour View is still fighting on, though barely paying expenses.

At Paul's Creek a claim known as the "Three Brothers" has come prominently forward. I alluded to its discovery last year. They have crushed some quantity of quartz for an average of three ounces to the ton; but, owing to the then almost impassable state of the track, they did not send any more to the mill. Since this the Government have formed a horse tramway, just completed. The owners have about 200 tons of quartz from the same lode, and believed of the same character, ready to forward. Other claims surround this, in like manner as at Kapanga and Tokatea, with good prospects.

At the Waikoromiko, the pioneer claim, owned by the Plutus Company, has erected a fine crushing plant, completed and opened just before Christmas. Owing to circumstances not yet sufficiently explained, this battery has not worked satisfactorily. Two or three changes have taken place in the management, and it is now being put in thorough order, when the company's reef will be thoroughly

tested. It is not anticipated that the stone will prove very rich, but the reef is large, the facilities for getting it out are great, and the battery below the levels, so that the stone can be put into the hoppers without being too often handled, and thus a small percentage of gold will make a greater profit, put through in large quantities, than in cases where the reef though rich is small, and the stone requiring to be constantly handled into and out of trucks. Several claims have been taken up in the district known as Waikoromiko. Great want was felt last winter for a practicable road, and a tramway, 216 chains in length, is now in course of construction, thereby giving the access (from claims above its level) to all the crushing mills in the district.

The City of Auckland is still progressing, and its owners are now forming a company. Quinlon and Nicholls still obtain good dividends from their small and easily-worked claim, the "Who'd have Thought it?" "The New Green Harp," an adjoining claim, also pays well. Main's claim has been working during the year, and its owners confident.

On the shore at Coromandel Harbour (on the ground formerly held by the Green Harp), the Union Beach is the only mine working in that locality. It is surrounded by country which has been again and again occupied by owners waiting the success of the pioneer claim, and therefore deserves a notice in this report. The mine has been energetically and skilfully worked under the supervision of very able managers during the past year. The shaft has been sunk upwards of 100 feet to permit of another level, and nearly 1,500 feet of driving has been completed, in addition to upwards of 200 feet of winzes. Five hundred tons of quartz taken out crushed for an average of 2 oz. to the ton. The lodes average about one foot in thickness; and with a battery standing on the company's property, a stone's throw from the mouth of their shaft, as soon as their lower levels are made and connected the prospects of the company are bright enough. This opinion seems indorsed by the public. It will be found necessary before long to increase their pumping power, and possibly the size of the present shaft, if it is intended to work the company's large claim through it. They contemplate opening out from the present shaft a lower level and chamber about 175 feet from surface, and from thence to drive to the "Black Reef," the name given to a lode cut during the year, 250 feet from the shaft on the 80-feet level; it runs east and west. From this reef, the general stuff ran as detailed above, and some of the richest specimen stone seen in the district was found in it.

At the Tiki nothing calling for attention has been done. I am sorry the discoveries made there from time to time have not been followed up by persons able to spend both money and patience. I feel sure that it will one day deserve the good opinion many practical miners of experience entertain about it.

The Coromandel Tunnel Company's work has languished, and for some time now has given no sign of revival. They have only driven 122 feet, in addition to the 1,498 feet draft shown in last report; these (122 feet) have been put in on the western or Coromandel side of the range, and have been driven through country as hard as it is possible to conceive anything short of wrought iron. As I have stated, the work is at present, and has for some time been, at a stand-still.

Of the district as a whole, I think that, with respect to the established mines, the progress has been tolerably satisfactory. I attribute the little done in the way of prospecting to the counter attractions of the Queensland and Ohinemuri Gold Fields; for it is in the class most easily moved to seek fresh fields, the most adventurous and experienced, that we must look for prospectors.

Population.—At the present date I cannot report that there is any serious diminution in the number of miners on the field. I would approximately estimate them at between 300 and 350, for the year, of miners.

In the Warden's Court there have been very few cases: this is attributable to the large extent of country over which the claims are spread. No serious case of encroachment has occurred, or is likely to be frequent. Again, the holdings are mostly more than twelve months old, held under lease or license, their rights and boundaries easily ascertainable, the Act and its Regulations some time in operation, the action for forfeiture nearly altogether in the hands of the Inspector; and when any valuable find takes place, it is generally on old-established claims whose title no one could hope to find a flaw in.

In the Resident Magistrate's Court the following is a summary of the business transacted:—

			£	s.	d.
Criminal cases	80	Fees and fines	69	3	0
Civil suits	188	Fees	119	15	9
Totals	268		£188	18	9

The total yield of gold I have supplied in the returns accompanying this report. I here supply, in detail, the amounts as obtained monthly:—

		Oz.	dwts.	grs.
1874.	April	365	16	1
„	May	754	12	10
„	June	813	3	4
„	July	927	7	0
„	August	1,116	18	3
„	September	1,640	0	0
„	October	586	6	0
„	November	1,361	6	8
„	December	845	17	6
1875.	January	3,037	19	11
„	February	722	5	9
„	March	2,439	6	9

making a total of 14,710 oz. 17 dwts. 13 grs., the produce of 4,174 tons of quartz crushed, giving an average of 3½ oz. to the ton.

JACKSON KEDDELL,
Warden.

Warden's Office, Coromandel, 1st May, 1875.

No. 2.

The Provincial Secretary, Auckland, to the Under Secretary for Gold Fields.

Sir,— Superintendent's Office, Auckland, 8th April, 1875.

In reference to your letter, dated the 15th February last, I am directed by His Honor the Superintendent to transmit to you herewith the accompanying report by the Warden of the Hauraki South Gold Mining District, for the year ending 31st March, together with a report on the Ohinemuri Gold Field.

I have, &c.,
Vincent E. Rice,
(*pro* Provincial Secretary).

The Under Secretary, Public Works Office,
(Gold Fields Branch,) Wellington.

Enclosure in No. 2.

General Report on the Southern Portion of the Hauraki Gold Mining District, Province of Auckland, for the Year ending 31st March, 1875.

During the past year the event of the greatest importance has been the opening of Ohinemuri for gold mining. After some seven years of negotiations, the consent of the Natives was at length obtained to the opening of the district as a gold field under an agreement. It does not lie within the scope of this report to make any statement respecting the proceedings which led to the opening up of this large and important district, but I may be allowed to say that I consider it a fortunate thing that it has been done with the consent even of those of the Native owners who have most steadfastly resisted throughout. An incursion of the diggers into Ohinemuri against the will of the Native owners would probably have resulted in events which would have caused disturbance and disquietude throughout the colony. With respect to the prospects of Ohinemuri as a gold field, I shall refer to them more particularly in my separate report on that field. The opening up of the district, however, whether payable mines are discovered and worked upon it or not, cannot fail to have an important effect in extending settlement in that portion of the North Island where it has hitherto made but little progress, and so will be of inestimable importance to the whole colony.

In regard to the southern portion of the Hauraki Gold Mining District, I have not this year to notice any very important event, any extraordinary discovery, or any great falling off. It has been thought throughout the year that the confident expectation that the Ohinemuri would soon be opened operated injuriously on this field, and I have no doubt that that was the case. Almost all the prospectors, who are a class by themselves, had made up their minds to give Ohinemuri a trial when it was opened, and so they refrained from engaging in any work on the ranges around Shortland and Grahamstown. The uncertainty as to how the opening of the upper country might affect this place, also affected business people and the owners of property. The conviction is now, however, gaining ground that Ohinemuri will not take away suddenly a large proportion of the mining population, and that those who are in profitable work there will benefit these townships, through which their supplies must be chiefly drawn. I expect that now, when the uncertainty respecting Ohinemuri is past, prospecting will be resumed in this district—not only prospecting by parties of men on the hills, but by mining claims and companies on areas of ground held by them.

I should like to have been able to state that some discovery had been made of importance in consequence of the operations of the Pumping Association. In my last report I stated the details connected with the formation and operations of this Association, and will now only briefly recapitulate. It originally comprised the Golden Crown, the Imperial Crown, the Caledonian, and the Tookey Companies. The Golden Crown has subsequently withdrawn, under an arrangement. The pumping plant was erected on the Imperial Crown Claim, for the purpose, in the first place, of draining the mines of the companies associated and the surrounding country; and secondly, of obtaining access to the lodes at the deep level. The first object has been completely attained, all these mines and others having been adequately drained. But the quality of the lodes on the lower levels has disappointed expectations. The shaft is now being continued, with the view of getting through the comparatively barren ground on which it is now. Drives are being put in, to reach the neighbouring mines at lower levels. In the month of April last the shaft had been sunk a depth of 400 feet, and the Association had expended, up to the 1st of March, 1874, £61,000. Representations were made to the Premier on the occasion of a visit paid by him to the field in the early part of last year, and in the beginning of April an arrangement was made by which the Government agreed to assist by an advance of money, upon certain conditions. It was provided that the money should be repaid, with interest not exceeding six per cent., within seven years from the 1st day of March, 1874. Security was given over the properties of the companies and otherwise, and it was provided that all incomes arising from contributions by adjacent mines for drainage should be applied in reduction of the debt. The amount agreed to be advanced was £50,000, to be expended in sinking the shaft. The agreement was ratified by the Assembly. The position of the works is now as follows:—The shaft is down 500 feet, a depth of 100 feet having been sunk since operations were resumed. The shaft had been sunk with pumps 25 inches in diameter, but, as there was a great amount of labour attached to the attachment and arrangement of the joints of this pump, the company, after fixing a new plunger at the 400-feet level, resolved to try the experiment of sinking farther with a 12-inch pump. To effect this, the water which flowed in above the 400-feet level was turned into the plunger cistern without being allowed to flow into the bottom of the shaft, and the experiment was successful; but after that the inflow of water proved too great, and the larger pumps had to be substituted. A great deal of difficulty was felt in consequence of the carbonic acid gas, which in this and the adjoining mines generates with great rapidity. Owing to its density, considerable difficulty is experienced in dispersing it from the lower levels. The

Association shaft was connected with the Tookey shaft at the 400-feet level, the latter having been sunk a depth of 100 feet for the purpose of this communication, in order to create a current of air; but even this did not prove sufficient, and further arrangements of furnaces, &c., were requisite. The shaft, as before stated, is now 500 feet deep. For some time past the sinking has been through quartz, a small quantity of which has just been treated by the ordinary battery process, with a result of 4 dwts. gold from 16 cwt. of stone, or an average of a quarter of an ounce to the ton. This affords good encouragement, for many of the best reefs on the Thames Gold Field were as poor as this, except within certain limits, known as the runs of gold. The width of such runs varies from 40 feet to 6 feet, and outside those limits the best reefs are generally poor. As a substitute for blasting powder, the contractors are now using lithofracteur with very great success.

It may be as well here to allude to the position of some of the companies owning mines in the neighbourhood of the Pumping Association. The Tookey Quartz Mining Company, incorporated in Victoria, have not for some time past carried on separate operations on their own account. In conjunction with the Albion, Golden Crown, and other companies, drives have been carried on to a very considerable extent at the 400-feet level, but no important results have accrued. Several reefs have been intersected, but none proved payable. The Caledonian and Albion Companies prospected a large extent of country from the 300-feet level, the former company completing over 1,600 feet of driving; but the level has so far been barren. Recently the Caledonian Company determined to sink their shaft another hundred feet and drive again. They have sunk the shaft the required depth, or nearly so, but have not yet commenced the drives, as the drainage is not perfect. It is certain, however, that some channel of country will be cut in the Pumping Association shaft shortly, which will draw off the water from this mine, and allow operations te be carried on as originally planned.

Amongst those important works which on this gold field have proved so highly beneficial, I may here refer to the Kurunui Hill Tunnel. It was originally driven at the joint expense of the Long Drive, All Nations, Junction, Inverness, and Moanataiari Companies, for the purpose of opening an outlet and affording deep levels on all these mines; and it was hoped by the projectors that other companies would join in, and that eventually the tunnel would be carried on to Punga Flat, a distance of about a mile from the beach. It was driven 1,200 feet or thereabouts, and the mines referred to were worked from it. An attempt was made to obtain a Government subsidy towards carrying the tunnel on past the Moanataiari Company's ground, but the subsidy was refused. Recently this tunnel fell into the hands of the Moanataiari Gold Mining Company, by whom it is now being extended. A communication has been opened between this tunnel and the Moanataiari Creek tramway, by means of which quartz shot down a shaft from the tramway can be conveyed through the tunnel to the batteries on the flat. In many instances a considerable amount of expense has been saved by this means. A remarkable instance of the advantage of systematic work, combined with judicious outlay, is apparent in the recent history of the Moanataiari Company. They erected a new powerful battery of 40 head of stampers, the machinery being of the most approved construction. When this was completed the company was heavily involved, so much so indeed that it was feared the company would have to be wound up and the property sold. This became the more likely from the fact that the ore was poor, not yielding more than from 5 to 10 dwts. to the ton. But by means of the powerful plant and the economic system of working adapted, ore of such a poor grade that it would be worthless elsewhere is made to yield a handsome profit; and although the company's debt is not yet quite extinguished, the aspect of the company's affairs is now very satisfactory. I expect that the example of this company will be generally followed. It is the only chance of success where the quartz is poor.

In the case of the Golden Calf, operations have been carried to an apparently successful issue at a deep level, 350 feet below the surface, where a reef (presumed to be the continuation of the once famous Caledonian reef) has been recently intersected. It carries gold in good payable quantities, as has been proved by the results of some crushings, as well as by the rich appearance of some specimens from it.

Perhaps the most important discovery made during the year has been that in the Manukau mine. This mine was generally considered exhausted, and work had been suspended in it for nearly eighteen months, but a cross-cut drive which had been commenced before work was stopped was resumed, and a distance of only two feet was driven when a strong reef was met with. It proved to be eighteen feet thick, and throughout the year it has yielded magnificently. The Manukau mine was one of the first on the field in which gold was struck, and a reef, which afterwards became famous as the Caledonian reef, was first opened in it. Operations have been carried on from the Golden Crown workings, and a force of eighteen head of stampers is kept constantly working, and about £12,000 have been paid in dividends since the new reef was opened.

The Waio-Karaka District.—This district is now the most important on the gold field as regards the production of gold, and mining operations are now carried on there on a most extensive scale. The deepest shaft in this district is that of the Bright Smile Company, which is now down a depth of 350 feet. At this level the main reef is twelve feet through. The quartz, however, is not so rich as that obtained at the upper levels; and as the cost of cartage was very considerable, the directors of the company came to the resolution to erect a large crushing machine on a situation near the claim, to which the quartz could be conveyed direct from the shaft. This plant will have forty stampers, and all the machinery connected with it will be of a first-class character. It is expected that it will be working in about a month or six weeks from the present date. Operations in the City of London mine have been interrupted during a considerable portion of the past year, by the necessity of sinking to a deeper level the company's own shaft, and of erecting hoisting machinery. This was completed about two months ago, and since then the crushings have been splendid, the stuff averaging about two ounces per ton. The operations of the Queen of Beauty Company have been carried on with remarkable success, and the profits have been immense. In the instances of the Exchange and Bird-in-Hand mines, which have been opened at considerable cost, expectations have not been reached; but in the Queen of the May mine, which is now being worked from the City of London shaft and at the same level, the lode is proving payable.

Contributions for Drainage.—During the last year there has been a considerable amount of litigation respecting contributions for drainage to those mines which were using pumping machinery. The Pumping Association claimed to drain the mines around them, and also, to a certain extent, the ground at the Waio-Karaka flat, where the Bright Smile was engaged pumping. The Bright Smile on the other hand, denied that the Waio-Karaka flat was at present drained, and claimed to be entitled to the whole of the drainage contributions for that district. After a large amount of costly litigation, a number of mines in the Waio-Karaka district agreed to pay drainage contributions, and an agreement was made between the Pumping Association and the Bright Smile Company that, of these contributions, 30 per cent. should go to the Pumping Association, which claims to drain the Waio-Karaka ground down to a certain depth, and the remainder to the Bright Smile Company. It is to be hoped that this exceedingly difficult subject of drainage will be settled in future by agreement amongst the companies.

The Water Supply Scheme.—The great scheme for a copious supply of water to the field from the Kauwaeranga Stream is now being carried out under the superintendence of Mr. A. Aitken. A long delay took place owing to the non-arrival of the iron troughs from England, but the whole of the iron work is now on the ground and is being put in position. The first contract is nearly finished; the second, which extends over about fifteen miles of trenching and trestle work, will not be finished till about the end of the present year. The third contract, extending from Parawai to the Waio-Karaka, has just been let.

The following are the gold returns published in summaries of the *Thames Advertiser* since last report. These are the only statistics on this point obtainable, and are, I believe, approximately accurate:—

		Oz.	dwts.	grs.
1874.	Apr. 10	11,626	5	3
„	May 9	8,715	19	19
„	June 5	7,408	11	12
„	July 6	10,632	1	0
„	Aug. 1	8,336	11	0
„	Aug. 22	7,901	18	12
„	Sept. 23	7,819	4	12
„	Oct. 28	9,676	5	12
„	Nov. 23	8,970	5	2
„	Dec. 24	10,153	10	23
1875.	Jan. 20	3,213	17	21
„	Feb. 17	7,853	19	6
„	Mar. 17	7,915	19	0
		110,224	9	2

In my report last year, the number of ounces, in a return compiled in the same manner as the above, was 143,036; so that this year there is a deficiency of 32,811 oz. 10 dwts. 22 grs.

I think there is every prospect that during the coming twelve months this portion of the gold field will considerably increase its yield, independent of what may be produced by the newly-opened ground.

Thames, 1st April, 1875.

W. Fraser,
Warden.

General Report on the Ohinemuri Gold Field, Province of Auckland, to 31st March, 1875.

After years of resistance to every influence, the Native chiefs, Te Hira te Tuiri and Te Moananui, consented, about the 23rd December, 1874, to give up the Ohinemuri Block for gold-mining purposes. They however stipulated for some delay before completing the arrangement. In January and the beginning of February, Mr. Mackay was busily engaged in settling boundaries, defining Native reserves, and other matters; and on the 15th February, 1875, the Hon. Dr. Pollen and the Hon. Sir Donald McLean proceeded to Ohinemuri, in the "Luna," with their staff, to complete the necessary preliminaries for the opening. The deed was signed by the principal Native chiefs on the 25th February; and a few days' delay took place, in order to afford time for preparation of the necessary Regulations, Proclamations, &c.

The Ohinemuri Block extends from the southern boundary of the Hikutaia Block on the Thames River to the Mangaiti Stream, which forms the southern boundary of the Te Aroha Block; thence by the boundary of the Tauranga Block to East Coast; thence to the southern boundary of the Whangamata Block, excluding Native reserves at Mataora and Waihi; thence to point of commencement by the southern boundary line of the Hauraki Gold Mining District. The western boundary of the gold field runs at the foot of the ranges, leaving the flat lands between the hills and the River Thames as Native reserves; the estimated area of the block is 132,175 acres. By the opening of this block the Government secure the power of connecting the Thames district by main lines of roads with Tauranga and Waikato, and within the last few days Mr. Mackay and Captain Turner have laid off the most practicable lines of road.

On the 3rd of March, 1875, the Ohinemuri Block was opened as a gold field, under "The Gold Fields Act, 1866," by Proclamation issued at Auckland, at 10 o'clock a.m. that day, in the Provincial Government *Gazette* No. 11. Extracts from the Proclamation and *Gazette* were at the same hour read by me in front of the temporary Warden's Office at Ohinemuri. The *Gazette* referred to contains also the following —

1. Proclamation exempting from occupation for mining purposes, &c., a piece of land, described as Reserve B, at Ohinemuri, and known as Mackaytown.

2. Proclamation exempting from occupation for mining purposes, &c., a piece of land at Ohinemuri, measuring 500 feet in length and 300 feet in width, and described as Reserve A.
3. Proclamation reserving from occupation for mining purposes certain lands adjacent to the East Coast, with the said block now occupied by the Natives for residence or cultivation.
4. Proclamation making regulations for the Ohinemuri Gold Field.
5. Proclamation opening Mackaytown or Reserve B for occupation for residence or business, under certain regulations therein set forth.

The issue of 770 miners' rights commenced at about nine minutes past 10; and though great excitement prevailed, accompanied by much struggling to be the first recipients, that operation was completed without any disturbance in about seven minutes. As the circumstances under which it became necessary to distribute so large a number of miners' rights as nearly as possible at the same time are somewhat peculiar, I will briefly describe the *modus operandi*.

Applications for miners' rights had been received for two days previously, and up to 10 o'clock on the night of the 2nd clerks were at the same time engaged in making out the rights and counterparts. Each applicant, on paying his money, received a ticket with a consecutive number thereon, denoting the number of his application. The applicant had the option of applying for himself only, or might include, by payment of the necessary amount, the names of any number of miners. To expedite the issue of these rights, they were torn from the books when all were filled up, and a piece of paper pinned thereto having a number thereon corresponding with the number on the application ticket. It only remained to arrange the front of the building suitably, to obtain a sufficient number of clerks for distributing the rights almost simultaneously, and to place in their hands the miners' rights, with the pieces of paper numbered consecutively thereto attached. The front of the building was divided into seven compartments. At six of these compartments clerks were stationed, and outside large notices were placed, numbered from 1 to 35 for compartment No. 1, 36 to 70 for compartment No. 2, and so on, thus enabling the men at once to perceive at which compartment their rights would be issued. The seventh compartment was devoted to the issue by Mr. Mackay, in a similar manner, of rights for which he had personally received applications during the previous week, and for which no check-tickets had been issued. At the close of business on the 3rd March additional rights had been issued, and the total number issued to date is 1,069.

Population.—It is difficult to form any other than an approximate idea of the population. Including those settled at the lower landing-place on the Waihou—which is variously designated "Creagh's," "Belmont," or the "Puke"—also the township of Paeroa at the head of the navigation of the Ohinemuri, and the inhabitants of Mackaytown, I am of opinion that the total number may be estimated at about 1,200.

Other Statistics.—Miners' rights, 1,069; business licenses, 6; publicans' licenses issued in special licensing district, 15; number of claims registered at Karangahake, 36; at Waitekauri, 8; at Rotokahu, 2; elsewhere, 6; total number of men's ground therein, 373. Warden's Court: Number of cases disposed of, 10; ditto not disposed of, 5. Revenue: Miners' rights, £1,069; business licenses outside township, £21; business and residence allotments Mackaytown, £303; survey fees do., £35; registration mining claims and transfers, £34; Warden's Court fees, £21; kauri trees, £20.

Township of Mackaytown.—This township, called Reserve B in the Proclamation, is entirely under the superintendence of James Mackay, jun., Esq., the Agent for the General Government at Ohinemuri; to whom I am indebted for the following information:—

Number of business allotments taken up, each at £5 per annum, 52; number of residence ditto, each at £1 per annum, 43.

Reserve A.—Under a Proclamation published in the Provincial Government *Gazette* of the 8th March, the occupation of this reserve was authorized for mining purposes by "such person or persons as should, after due investigation, and the hearing of all persons desiring to be heard therein, by the Warden of the said gold field, be found by him to be the first or original discoverer or discoverers of gold in the said exempted land." The investigation referred to was held by me at Ohinemuri on Friday, 12th March, and after hearing the various claimants I decided on the following morning in favour of John Thorpe and party.

Other Minerals discovered.—Several seams of coal have been discovered, of apparently good quality, and of easy access. Active arrangements are being made for working the same. Reports have been made of the discovering of iron, copper, silver, and cinnabar ores, but at present I can give no authentic information relative thereto.

Prospects of the Field.—At this early stage it is difficult to express an opinion as to what may be the future of this field. Many who had expected to find alluvial gold were disappointed, and this, together with the uncertainty that existed as to who would become possessed of Reserve A, miscalled the prospectors' claim, threw a very perceptible gloom over the field for the first fortnight. Hundreds of men who had been present at the opening, some of them perhaps unwilling to go through the labour of prospecting for themselves, others probably unprepared with funds for remaining here, were to be seen returning with or without swags to the Thames. I am of opinion that few of these men of any experience in gold mining, if questioned, would have pronounced the field a duffer. Those who remained, however, have set to work in earnest. Few are to be seen lounging about the township, and some have already fair hopes of success: $\frac{5}{16}$ths of a share in the Karangahake Claim—or Reserve A—of ten men's ground, has been sold by a Native for £45. Gold has been struck in that claim and in the Banyan Claim on the opposite side of the Ohinemuri River, and at Rotokahu district about three miles, where very encouraging prospects have been obtained. Rumours of fresh discoveries of gold, or likely reefs, come in daily. On the whole, I am of opinion that Ohinemuri presents very favourable indications of becoming a good payable quartz-mining district.

I have, &c.,
W. Fraser,
Warden.

Ohinemuri, 31st March, 1875.

MARLBOROUGH.

No. 3.

Mr. Warden WHITEHORN to the UNDER SECRETARY for GOLD FIELDS.

Report on the Gold Fields of the Province of Marlborough, for the Year ended 31st March, 1875.

Pelorus.—I have very little change to report in this district; the number of miners has very slightly decreased during the year, the present number being forty men, all of whom have found remunerative employment. The chief feature of interest is the persevering efforts of the prospecting party mentioned in my last report. They have devoted themselves very steadily to the work, and constructed a tunnel in a gully where a considerable quantity of quartz gold had been obtained, and it was thought a reef existed; but, after driving into the hill a distance of about 180 feet, they abandoned that part, and have been since December prospecting near Deep Creek, the chief centre of population, and, I ám happy to say, their perseverance has been rewarded by the discovery of a reef which is gold-bearing; but whether it contains the precious metal in payable quantities, has yet to be determined. The men are sanguine as to its value; and from the large quantity of gold which has been obtained in its immediate vicinity, there is every reason to believe it will be good.

No new works have been undertaken in alluvial mining, the small population finding sufficient to occupy them in and about the old workings; and the terraces still remain for the most part unworked, and in many cases untouched.

Wairau.—Mining at Onamalutu, in this district, has been resumed, with favourable results; about forty men are now employed here, but chiefly on private land. A reef has also been found which is gold-bearing, but which has not been tested as yet. The prospects obtained by the finders are sufficient to induce them to apply for a prospecting claim, and they are of opinion it will yield not less than 10 dwts. per ton. This reef is on private land. A large proportion of the Onamalutu being private property militates greatly against its being properly worked.

I have not been able to ascertain the earnings of the miners here, but I have reason to believe they are a high average.

Queen Charlotte Sound.—During the past year nothing has been done in this district. I am credibly informed that a considerable number of reefs are known to exist in the district, but nothing will be done to test them probably until the result of the working of the Turner and Port Gore Companies' Claims, at Ravenscliff, is more thoroughly known.

Ravenscliff.—The workings on this small gold field are now confined to the two companies (the Turner and Port Gore Companies), who have amalgamated their claims, and are going on steadily crushing, but have, during the year, suffered from a rather large share of the vicissitudes ordinarily attending mining; but, notwithstanding that, about 1,130 tons of stone have been crushed, yielding 700 oz. of gold. An average of about 17 dwts. is the result per ton at the close of the year—value, £3 17s. 10½d. per ounce.

A continuance of these results, which there appears every reason to anticipate, cannot fail eventually to be very profitable, and be a means of inducing others to develop the reefs now known to exist elsewhere. One other company (the Queen Charlotte) have made considerable preparatory works, but at present nothing is being done.

I think it is fair to conclude that the mining interests in this province have, on the whole, somewhat improved during the past year—certainly not in any great degree, but an improvement, however slight, is encouraging; and I trust I shall not be considered too sanguine in saying that, from the general indications, I believe that in the future there will be large numbers of miners again employed remuneratively on the gold fields of this province.

W. WHITEHORN,
Warden.

The Under Secretary for Gold Fields, Wellington.

NELSON.

No. 4.

Mr. Warden GUINNESS to the UNDER SECRETARY for GOLD FIELDS.

SIR,— Warden's Office, Collingwood, 20th April, 1875.

I have the honor to forward you herewith the returns required by you, filled in as accurately as circumstances permit. I have but little matter to report upon for the past twelve months, so far as gold mining in this district is concerned. Fewer persons are mining now than at the beginning of the year; still I am of opinion that very little, if any, decrease has taken place in the amount of gold produced. There are still some good claims being worked, which have for some time been the principal sources whence the gold of this district has come. Many men have ceased prospecting, or, in diggers' parlance, "fossicking," and are now more profitably employed at work with the Parapara Iron and Coal Company. The commencement of this company's operations is perhaps the most important event which has occurred in this district for years, and should the works contemplated by them be successfully carried out, I feel sure that a great alteration will soon be seen in the prospects of this comparatively unknown, though not unimportant place.

The natural resources of Collingwood are many and varied, and for one industry, *i.e.* the production of iron, the district possesses extraordinary capabilities, having practically inexhaustible deposits of hematite, one of the most valuable iron ores, besides coal and limestone, necessary for the reduction of the ore, close at hand—indeed, one may say, alongside the ore itself. When to these resources are

added the geographical position of the place, the great facilities for shipping arrangements which the splendid harbour of Golden Bay affords warrant the assertion that eventually Collingwood must become one of the most important places, I venture to say, not only in New Zealand, but even in the whole of the Australasian colonies. I am satisfied that at this time I have no more important duty to perform than to press on His Excellency's Ministers the great colonial advantages which would accrue from timely and judicious assistance in fostering the iron industry of Collingwood. So much depends on this opening up of the ironworks here, that it is almost superfluous to allude even to the other mineral wealth of this district; still I may say that there are immense deposits of a kind of limestone fit for making hydraulic cement, equal to the finest Portland cement, which could be, at no great expense, converted into a marketable article, likely to command a large trade.

There are, too, extensive deposits of clays suitable for making the finest kinds of potteryware, and in many places beautiful specimens of coloured marbles have been found. Should once the iron trade be opened up on a satisfactory basis, I have little doubt but that several other very valuable branches of industry would quickly be started, which would all tend towards making New Zealand one of the greatest producing countries in the Southern Hemisphere.

The progress of this district (*inter alia*) is much retarded for want of roads, especially up the Aorere Valley, where a considerable extent, estimated at about 25,000 acres, of excellent land, covered with most valuable timber, exists: this, too, is the only available land near suitable for agricultural settlement, and it is not more than twenty miles from the port of Collingwood.

I have heard that the Provincial Government are considering about forming a special settlement at this place, and I can say that it presents great advantages for carrying out such a plan. No difficulties to making roads present themselves, as the country is not hilly where a road would be required, and already a partially formed road exists, which at a moderate outlay could be made into an excellent dray-road. Settlers once established would have ready access to a sure market for all kinds of produce; therefore this presents a rare opening for the industrious immigrant, and, to such, success in the Aorere special settlement would undoubtedly follow.

I have, &c.,
FRANK GUINNESS,
Warden.

The Under Secretary for Public Works.

WESTPORT.

No. 5.

Mr. Warden GILES to the UNDER SECRETARY for GOLD FIELDS.

SIR,— Westport, 28th April, 1875.

In addition to the usual statistical returns which I have forwarded, there is little for me to report concerning the condition and progress of gold mining in my district for the past twelve months.

Lyell.—At the request of the Provincial Government I have lately taken charge of the sub-district of Lyell, which was previously visited by Mr. Broad, of Reefton. I have not yet been able to become sufficiently acquainted with the reef workings at the Lyell to enable me to furnish the Government with any very detailed information. It is evident that the place has made great progress since the end of the year 1871, at which time it was in my district, and was occasionally visited by me. It then consisted of a few huts, stores, &c., presenting no resemblance to anything that could fairly be called a township. It is now a decent-looking and convenient if not a large township, and its progress shows considerable development of the reefing industry, under circumstances of great difficulty. No doubt the expectations that were formed at that time have been to a great extent disappointed. The richness and permanence of the stone found has not realized the hopes that were entertained, and it is not easy to say at present what are the true prospects of the Lyell reefs. Good accounts have lately been given of some of the claims, and notably of the United Alpine. I think there is good reason to expect that the reefs will turn out permanent and valuable, and that great extensions of them will be found, so as to form connections with the reef at the Mokihinui River and other places. A rough track has already been explored between the Lyell and Mokihinui, and the country will doubtless be gradually opened up to prospectors.

Mokihinui.—This is the third annual report in which I have had to mention the prospects of a valuable reefing district up the Mokihinui River, a fact which shows how very slow is the work of establishing quartz-reefing as a permanent industry in a country so difficult of access. I can still only report that the preliminary operations are in progress. The machinery of the Halcyon Company is now in process of erection, some very valuable stone has been found, and there is every reason to think that steady work on the claim will soon be commenced. The future alone can determine the true value of this reef, but the indications hitherto found seem to warrant the expectation that it will prove rich and permanent.

Buller, Charleston, and Brighton.—The old diggings in these places, including Addison's Flat and the Northern Terraces, afford little material for remark. The nature of the workings remains much the same as before; the quantity of them has experienced a diminution. This has been principally felt in Charleston, where population and business of all sorts have sensibly declined.

Westport.—The town of Westport shows unmistakeable signs of improvement and renewed prosperity. This of course is very much due to the expenditure of money in the construction of public works. The railway is now making rapid progress, and the benefit which its construction has conferred upon the district during the progress of the work will doubtless be continued and increased by the

coal trade which its completion will be the means of establishing. The vexed question of the town lands and the tenure by which they may be held appears now in a fair way to be set at rest by being placed upon some intelligible footing. Mr. Mackay is now engaged by the authority of the Government in investigating and adjusting the claims. The commencement of the works intended for the protection of the town against the river encroachments is another cause of renewed hope and confidence in the future prosperity of the place.

General Condition of District.—The expenditure of money in road making is effecting a rapid improvement in the general state of the district. The road from Westport up the Buller, which I believe it is intended shall be carried through to Nelson, is a great and important work, and can hardly fail to prove reproductive in many ways. There are some places however that have been much overlooked in the matter of road-making. I allude to the sub-district of Charleston and Brighton. This sub-district has been left to the care of a local Board constituted under the Provincial Ordinance. It is difficult to find any traces of the care of the Board in that district. The roads are steadily getting worse, and seem likely in some parts to be altogether obliterated in process of time. I presume the fault lies in the constitution of these Boards, and not in any neglect or defect of will on the part of their members. I believe that the roads in the vicinity of Westport are not much indebted to the local Board, and I have not heard of any place where the operation of the ordinance by which these bodies are constituted can be regarded as very successful. In speaking of road-making in the Charleston sub-district, mention ought to be made of the new suspension bridge over the Nile, which is now in progress, and when completed will be a valuable and important work.

Water.—The scheme for supplying Charleston with water from the Four-Mile River is still in progress. From the fact that the Provincial Government has been induced to assist the promoters with money, I should suppose the scheme must have fair prospects of success. There can be little doubt of its utility if successful.

The statistics appended at the foot will complete the information which I have to give of the state of my district.

I have, &c.,
JOSEPH GILES,
Warden.

The Under Secretary for Gold Fields, Wellington.

DISTRICT OF BULLER.—Statistics of Resident Magistrate's and Warden's Offices, for the year ending 31st March, 1875.

	Westport.	Charleston and Brighton.	Total.
Miners' Rights issued	283	372	655
Business Licenses „	12	9	21
Summonses in Warden's Court	16	37	53
Applications for Registered Rights ...	146	474	620
„ Gold Mining Leases ...	7	19	26
„ Agricultural Leases ...	22	9	31

RESIDENT MAGISTRATE'S COURT.

	Westport.	Charleston and Brighton.	Total.
No. of Criminal Cases	155	22	177
„ Civil Cases	277	218	495

REVENUE.

	Westport.	Charleston and Brighton.	Total.
	£ s. d.	£ s. d.	£ s. d.
Fees and Fines of Resident Magistrate's Court	358 0 7	228 16 10	586 17 5
Provincial Account ...	2,372 11 0	1,562 17 9	3,935 8 9

GOLD EXPORTED FROM WESTPORT.

	Gold.	Value.	Duty.
Year ending 31st March, 1875...	29,620 oz. 13 dwts. 1 gr.	£118,482 12s.	£2,962 1s. 4d.

The Under Secretary for Gold Fields, Wellington.

No. 6.

Mr. Warden BROAD to the UNDER SECRETARY for GOLD FIELDS.

SIR,— Reefton, 30th April, 1875.

I have the honor to forward you herewith my annual report on the district under my charge for the information of the Provincial Council, first premising that, since the 1st October last, the Grey

Valley District, formerly under the charge of Mr. Warden Whitefoord, has been placed under my supervision, whilst the Lyell, which for the last three years had been in my district, has since the 5th February last been handed over to Mr. Warden Giles. Consequent upon these arrangements, the following Courts are held during the month:—Reefton, four Courts; Ahaura, two Courts; Granville, two Courts; No Town, two Courts; Cobden, two Courts; Nelson Creek, one Court. I have hitherto been well able to do this work, by giving one week to the Inangahua District, and the alternate week to the Grey Valley District.

Statistics.

The population I estimate as follows:—

Reefton (proper)	424	
Black's Point, and Murray Creek	453	
Boatman's	161	
Italian and Burke's	16	
Redman's and Due North	61	
Larry's Creek	93	
Buller Road and Inangahua Valley	149	
Total Inangahua		1,357
Ahaura	242	
Nelson Creek	361	
Half-Ounce Creek	200	
Noble's, Napoleon, &c.	140	
Blackwater and vicinity	223	
Totara Flat	120	
Orwell Creek	35	
No Town Creek and vicinity	738	
Mossy Creek and Sundries	299	
Total Grey Valley		2,358
Cobden and Noble's to Razorback		589
Total population		4,304

Of this number, 474 are Chinese, principally located at No Town, Mossy Creek, and Redman's Gully. This includes women and children, who may be put down at fully one-third of the entire population.

Revenue.

The amounts received in the various districts under my charge during the past year are as under:—

	£	s.	d.
Reefton	6,381	15	10
Ahaura and Grey Valley	6,268	7	3
Cobden	259	0	5
	£12,909	3	6

Of this sum about £1,500 has been received for miners' rights, and some £1,600 for business licenses, about £3,000 for rents on gold mining and agricultural leases, and upwards of £5,000 for publicans' licenses; whilst the Resident Magistrate's fees and fines are upwards of £1,000, the balance being for fees for registrations and sundry receipts.

Cases Heard.

Reefton—Number of applications under rules, 153; Warden's Court cases, 19; gold mining leases, 21; agricultural leases, 23, with an area of 1,280 acres. Resident Magistrate's cases—Civil 318, and 34 criminal. Ahaura and Grey Valley—Number applications under rules, 809; gold mining leases, 11; agricultural leases, 26, with an area of 1,750 acres; Warden's Court cases, 75. Resident Magistrate's cases—Civil, 379; criminal, 42. Cobden—Applications under rules, 74; civil cases, 35; criminal, 8.

Reefton Reefs.

During the past twelve months additional facilities for crushing the quartz have been furnished, noticeably the Inangahua Public Crushing Company, who have erected a large battery with fifteen head of stampers. The Ajax Company have also increased their machinery, whilst the Larry's Creek Company have also erected machinery. Although no wonderful yields have resulted, yet the annexed return will show how surely though gradually the reefs are going ahead. The return speaks for itself, and when it is considered what immense bodies of stone have been discovered precisely of a similar nature to that already crushed, no possible doubt can exist as to the future of Reefton. Fortunately the fever of undue speculation has died out, and in lieu thereof the place presents a healthy and vigorous appearance.

RETURN of Quartz Crushed and Yield of Gold in the Inangahua District during the Year ending 31st March, 1875.

Name of Company.	Tons Crushed.	Yield of Gold.	Dividends.	Remarks.
			£ s. d.	
Ajax	643	745	...	Erection of machinery for deep sinking.
Golden Fleece ...	2,632	2,517	3,600 0 0	
Anderson's	2,421	1,142	...	
Wealth of Nations ...	5,585	4,067	5,561 0 0	Delayed two months by break in race.
Just in Time	491	691	...	
Fiery Cross	1,917	2,611	2,700 0 0	
Inglewood	605	271	...	
Phœnix	585	497	533 6 8	Only commenced work in October.
Energetic	4,453	2,902	...	Paid off £5,000 debt on machinery.
Harris No. 2	2,460	1,844	...	Paid off £3,500 debt on machinery.
Caledonian	130	463	750 0 0	
El Dorado	311	486	...	
Victoria	104	104	...	
	22,310	18,340	12,944 6 8	

In some cases the gold is retorted, in majority melted. The tons are not in all cases exact, but very nearly so. The value of this gold would be £60,150 at £3 16s. 6d. per ounce.

In addition to the quartz reefs being worked at Reefton, large alluvial workings are going on in scattered portions of the district, especially at Soldier's Creek, where a race has been brought in six miles long to ground-sluice the terraces, and with very payable results. The township has now commenced to put on a settled appearance, the streets being much improved. There are a steam saw mill and coal mines in close contiguity to the town, and certainly the Local Revenue Board, with the limited means at their command, have done wonders in the way of connecting Reefton with the outlying centres of population. In this way they have been well seconded by the Provincial Government, and the present dray track to Boatman's Creek reefs is one of the results.

It would be most desirable during the present year to extend the track up the Inangahua River to Rainy Creek, where payable reefs are known to exist, where antimony and coal are in profusion, and where only a track is necessary in order to develop a large tract of country.

GREY VALLEY DISTRICT.

Leaving the reefing districts and coming into the Grey Valley, an almost entire change of country and working is met with, a population more or less scattered over a country seventy or eighty miles in length, the principal description of working ground-sluicing, and the nature of the gold for the most part alluvial. Most of the creeks and gullies in which workings are being carried on are blocked up with tailings to a very serious extent,—noticeably, Nelson Creek, No Town Creek, and Half-Ounce Creek,—and it will be with extreme difficulty that parties will be enabled to overcome this serious obstacle. The large Government water-race from Lake Hochstetter to Nelson Creek is gradually progressing towards completion, though whether when finished it will be of the use expected is, I think, a moot point, on account of the accumulation of tailings I have before alluded to. It is very satisfactory, therefore, to find that a new lead has been struck at Orwell Creek, below the bed of the creek, which can be worked by a shaft and drive, without the accumulation of tailings in the creek being of any inconvenience whatever. It will be necessary, however, to put in a tunnel tail race, probably 4,000 feet long, to drain the claims, and this leads me to point out how very much better it would be for all parties if there could be some co-operation: the putting in of a tunnel of this kind would do good to several claims, and it appears to me that it would be much better for these several claims to join in the work than saddle each claim with the expense of a separate tunnel. This co-operative system should also be extended to leases; it seems absurd that each claim should have to go to the expense of separate machinery, separate tunnels, and separate water supply, when, by mutual agreement, labour and expenses might be largely saved. I think every encouragement should be given to any companies anxious to amalgamate for the purpose of working their claims more economically.

HOSPITAL AND GAOLS.

The Hospital at Reefton has sustained a considerable addition during the past year, and is now really worth the name, the appliances being all that could be desired, whilst the medical man, Dr. James, gives general satisfaction. From the Grey Valley, patients still continue to be sent to the Grey River Hospital, the Provincial Government still contributing about one-third of the entire cost of maintenance. The building at Ahaura, originally built as a hospital, is rapidly falling into decay, and in fact is not habitable now.

With reference to gaols, there is no place within my district that is worthy of the name. It would be both economical and useful were the Government to put up a gaol in some central place in the district, so that the prison labour might be utilised in the place where the crime was committed.

Conclusion.

In conclusion, I have to regret that my connection with the Grey Valley has been of so comparatively short duration as to preclude me making a more extended report; but of this I am assured,

that the days of gold mining, both in the Grey Valley and Reefton districts, are yet in their infancy, and population, with facilities for settlement and inducements to settle, are all that is required to develop the wonderful resources of the country. So far as I have seen of the Chinese, I have not found them bad citizens; they seem honest and industrious, and I hear the European storekeepers speak highly of them. An European population will always hold its own and keep them in check.

I hope the district will continue to thrive has it has hitherto done, and (that as in my last two annual reports I have had no retrogression to report) that the motto for the district is still "Onward."

I have, &c.,
LOWTHER BROAD,
Warden.

The Provincial Secretary, Nelson.

No. 7.

Mr. Warden FITZGERALD to the UNDER SECRETARY for GOLD FIELDS.

SIR,— Warden's Office, Stafford, 1st May, 1875.

I have the honor to report as follows upon the state of the Waimea District for the twelve months ended 31st March, 1875.

There is but little change in the number of the population, as will be seen by reference to my last return, dated 20th April, 1874.

The Chinese continue to prosper, and to live in peace with their neighbours. Their industry is proverbial, and they still maintain the confidence of the storekeepers, who consider them to be very desirable customers. There is but one Chinese store here, and I understand it does a good business. This storekeeper in many instances negotiates the bargains, and frequently large sums of money pass through his hands on account of the investments of his countrymen.

The Waimea water-race is still in process of construction, the large pipes for the siphon being now gradually delivered on the ground by the contractors. Many parties are sanguine as to the ultimate success of this great undertaking, and very many remain on "tucker ground" in expectation of an ample supply of the necessary fluid. For myself, I may say, I entertain no doubt that on the completion of the works a very large population will be absorbed along the entire line and vicinity of the race.

A new company is being formed at Callaghan's, with a view of working some twenty acres of ground through which a good lead is supposed to run. A similar undertaking there some time since appears to have fallen through, but the new company have appointed an experienced manager to superintend the works, and are I believe registering their claim under the Joint Stock Companies Act, with, I should consider, a very fair prospect of success.

The quartz reefs at the Taipo have again attracted some attention, and a mining lease has been applied for, but I have not as yet heard of anything to justify me in reporting favourably on the prospects of this locality, more especially in view of the approaching winter, when works will probably have to be temporarily suspended.

At Red Jack's, works of considerable magnitude are being prosecuted by two miners from Woodstock who have obtained leases to the extent of twenty acres, and who are now engaged in constructing an enormous reservoir, consisting of 640 acres. The estimated outlay is £3,000.

The main road from Hokitika, which now runs through Stafford and Goldsborough, has of late been widened, and most of the Greymouth traffic consequently comes this way, and the line of telegraph is being placed alongside.

There is but little alteration in the price of provisions since the date of my last return; ninety-five cases have been disposed of in the Warden's Court, and the large number of 1,204 registration certificates issued. The latter figures will show what a complete network of water-races and dams (mainly insignificant undertakings) are constructed by the miners, who almost invariably seek immediate registration. The transfers of shares are as a consequence very numerous.

In conclusion I beg to state that in my opinion this district at least continues to hold its own, and that its prospects are very satisfactory.

All other information will be found in the copious returns forwarded, and I do not think there is anything else calling for special mention.

I have, &c.,
G. G. FITZGERALD,
Warden.

The Under Secretary for Gold Fields, Wellington.

No. 8.

Mr. Warden FITZGERALD to the UNDER SECRETARY for GOLD FIELDS.

SIR,— Warden's Office, Kanieri, Westland, 19th April, 1875.

I have the honor to forward herewith the returns required by your circular dated the 26th January, 1875, and to report that the Kanieri Warden's District still maintains a steady mining population, likely to be permanent, notwithstanding the many public works at present in operation in the province, and the high rates of wages ruling thereon, varying from 11s. to 14s. per diem.

The population of the district remains much the same as at the date of my report for the year ending the 31st March, 1874, namely, 2,050. Of these, I estimate the number of miners at 500, which appears a small percentage for the whole population. It must, however, be considered that this district contains the principal farming centres in the province, and that a large part of the population are permanently engaged in that industry. I should estimate the earnings of these 500 miners during the past year at an average of half an ounce of gold per man per week, which would give a yield of 13,000 oz. for the year, or an average yearly earning per man of £98 16s.

I am pleased to be able to report the completion of the Kanieri Lake Water Race. The works have been constructed in a substantial manner. The race is registered to carry 60 Government sluice-heads, but has been constructed to carry 75 heads, which supply will be available night and day even in the driest summer. It is difficult at present to speak certainly as to the full effects which the cutting of this race may be expected to have on the district, but it will be the means of settling a mining population in the locality far in excess of that which it at present carries. Already applications are coming in freely for extended and special claims along the line of race, and before the end of another year a large number of miners will be located and earning good wages, where before but an odd man here and there was to be met with, and making but a very precarious living. During the past year there were granted of new registrations 38 head-races, 46 dams, 42 tail-races, 9 extended claims, and 7 tunnels. Appended I give a return showing the gold fields revenue received in the district by the Receiver of Gold Revenue for the year ended 31st March, 1875.

I have, &c.,
G. G. FitzGerald,
Warden.

The Under Secretary Public Works, Wellington.

KANIERI.

		£ s. d.	£ s. d.
Total amount received for the year ending 31st March, 1875 ...			754 10 6
Miners' Rights at £1 each	472*		472 0 0
Registrations at 5s. each	152	38 0 0	
Registrations at 2s. 6d. each...	19	2 7 6	
Registrations at 1s. each	529	26 9 0	
	700		66 16 6
Business Licenses at £5 each	11	55 0 0	
Business Licenses at £3 each	6	18 0 0	
Business Licenses at £2 each	1	2 0 0	
	18		75 0 0
Spirit Licenses at £30	1	30 0 0	
Spirit Licenses at £20	4	80 0 0	
	5		110 0 0
Fees and Fines in Warden's Court		23 9 0	
Rents from Agricultural and Mining Leases		6 8 0	
Sale of Gold Fields Regulations		0 8 0	
Examination of Books		0 6 0	
Copies of Miners' Rights		0 3 0	
			30 14 0
			754 10 6

* Exclusive of miners' rights issued by Receiver of Gold Revenue at Hokitika, belonging to Kanieri district, about 65.

G. G. FitzGerald,
Warden.

No. 9.

Mr. Warden FitzGerald to the Under Secretary for Gold Fields.

Sir,— Warden's Office, Ross, 26th April, 1875.

I have the honor to make the following report on the state of the Totara District for the year ending the 31st of March last.

In my last report I had to speak, with regret, of the quietness of matters in the district, and must say there has been little change for the better since then. There is matter for congratulation, however, in the fact that the mining population is very slightly diminished, notwithstanding the many inducements held out to working men by the high rate of wages and constant employment on public works in this and the neighbouring provinces. This district will compare favourably with any other in the province, when it is borne in mind that in times of dulness, such as happen occasionally on all gold fields, the miners here have nothing to fall back upon.

With the exception of the Ross end of the Bowen and Okarita Road there are no public works of any kind going on; while in every other district there is constant employment on water-races, roads, railways, and other works.

Notwithstanding the dull state of affairs, it is evident that the miners who have stuck to their claims received fair remuneration, as the yield of gold for the past twelve months amounts to nearly £30 per head of the whole population.

The abandonment of the large steam claims was in their favour, as the best of the ground adapted for sluicing, and commanded by the Totara and Jones's Creek Water-race, was taken up and worked upon a much larger scale than hitherto.

Though there is nothing fresh to report from the Totara, it is satisfactory that the population in that locality has not decreased. The old hands are still at work, and seem satisfied with their earnings.

Between Lagoontown and the Mahinapua Lake, a party have, at considerable expense, finished a drainage-tunnel 1,000 feet long. They must be certain as to the richness of the ground, or they would not have gone to the expense of such a work.

At Aylmer lead there is nothing fresh to report.

Up the right and left hand branches of Donnelly's Creek the sluicing parties continue at work.

At Redman's the large deep-sinking claims are being worked with satisfactory returns, and there is every probability that they will find payable ground for a long time to come.

At Donohue's, where the claims are worked by deep sinking, and drained by water power, the claims have been idle for some time. Owing to the decayed state of the old drainage wheel erected some seven years since, it was found necessary to pull it down and erect a new one, which is now finished, with recent improvements. The water is now being rapidly drained out of the claims, and the miners hope to be at work in a few days. The ground to a considerable extent has been taken up round the existing claims, in anticipation of having it drained by the more powerful wheel.

At Clearwater Creek a large claim has been taken up, which the party are working on the incline system. For this purpose they have just completed the erection of a large water wheel.

At Sailor's, Swiper's, Blockade, and German Gullies, and all along the terraces between Ross and Donohue's, the old horse and whim system is abandoned, and sluicing is carried on vigorously. The ground being commanded by the Totara and Jones's Creek water-race, enables the men to work constantly, the only drawback being the high price charged for water.

On Jones's Flat the claims are steadily worked, principally on the incline system, by parties holding extensive areas of old or abandoned ground, formerly worked by means of shafts. By this system all the stuff is put through from the surface to depths varying from 20 to 50 feet, with satisfactory results.

The rich nature of the ground on which Ross itself is built is so well proved, that attempts have been often made to get at the gold in the upper levels. One party in particular may be mentioned who lately sunk a shaft. When they reached the gold-bearing level they were obliged to give it up, after a protracted struggle with the water. Such cases as the foregoing, while no doubt disheartening to the individuals concerned, are additional proofs of the richness of the flats, which it is to be hoped will, at a date not far distant, be rendered accessible to the miner.

The Totara and Jones's Creek Water-race is in good working order, and paying the shareholders handsome dividends.

The Greenland Water-race is now almost completed. This work proved to be a more arduous one than was at first anticipated, owing principally to the large amount of rock-cutting which had to be done towards the head of the race. They have now, however, water in the race, which is eagerly bought.

There have been no fresh discoveries of auriferous ground during the year. A prospecting party, headed by an old settler at Redman's, whose energy deserves all praise, went up the Mikonui Gorge during the Christmas holidays, and remained there some weeks. Although no important discoveries were made by them, they do not seem to be daunted as yet, as I am informed they intend going out again.

None of the benefits hoped for from the construction of the Bowen and Okarito Road have been felt as yet, although the road is finished for some distance at both ends. It is to be hoped that no difficulty will arise in the construction of this road, as it will be of very little use till made right through.

The difficulty of getting men, even at good wages, to work on this road is evidence that, so far as the willingly industrious are concerned, none need be idle who are able to work.

It is matter for extreme satisfaction that the Government surveyors are at length making a re-survey of the line of the proposed Mikonui Water-races. Should this re-survey enable those engaged on it to give a favourable report, it is to be hoped the General Government will at once commence the construction of the race, on which the hopes of those well acquainted with the requirements of the district have been for so many years centred, as the only and certain means of its permanent prosperity.

The amount of gold forwarded from Ross to Hokitika during the year has been 12,662 oz. 11 dwts. 18 grs., which, at £3 16s. per ounce, is £48,117 16s. 7d.

Gold Fields Revenue	£703	5	0
Warden's Court Fees and Fines	25	8	0
Resident Magistrate's Court Fees and Fines	190	2	6
Export Duty on Gold	1,266	0	0
	£2,184	15	6

The population may be estimated as follows:—

Europeans—Male	1,000
„ Female	600
Chinese	70
Grand Total	1,670

Resident Magistrate's Court—

Number of Cases, Civil	215
Number of Cases, Criminal	79
Total	294

Amount sued for in the Resident Magistrate's Court, £1,645.

The following number of rights, licenses, registrations, &c., have been issued during the year:—

	Number.
Miners' Rights, at £1	302
Business Licenses, at £5	18
Business Licenses, at £3	50
Business Licenses, at £2	18
Registrations, at 5s.	106
Registrations, at 2s. 6d.	1
Registrations, at 1s.	236
Extended Claims	26
Water Race Licenses	2

I have, &c.,
G. G. FitzGerald,
Warden.

Charles E. Haughton, Esq., Under Secretary for Gold Fields, Wellington.

No. 10.

Mr. Warden Price to the Provincial Secretary, Hokitika.

Sir,— Warden's Office, Okarito, 11th January, 1875.

In compliance with your instructions I have the honor to submit the following observations on the state of the Okarito district.

The population consists of 543 souls, and it is an interesting fact to observe that, taking the population returns year by year, since December, 1866, from the records in the office, as below shown, how little the fluctuation has been:—

Date.	Population.
31st December, 1866	655
" " 1867	400
" " 1868	322
" " 1869	461
" " 1870	541
" " 1871	560
" " 1872	571
" " 1873	492
" " 1874	543

During the past year nothing whatever has occurred in mining operations which calls for any particular comment, the diggings having been confined to the same sea beaches as they were in 1866. I regret to say that the hope I entertained of inland workings being developed has not been realized, arising from the same difficulty which has always existed in conveying provisions through almost inaccessible country, nothing having been done in the way of forming tracks to induce men to remain and face hardships at times amounting almost to starvation. It, however, establishes the fact of the inexhaustible nature of the sea beaches in this district, many of which would give a greater yield of gold were the supply of water more abundant. For instance, Gillespie's Beach, having an extended water-race with a good supply of water, supports a small population very comfortably indeed. The Saltwater Beach, on the other hand, which used to give profitable employment to some forty miners when the large extended head-race was in order, the moment it broke down has reduced the number to about eight. At the Haast a party of four men have been employed for a whole year in bringing an extended head-race from the Maori River into the North Beach, five miles in length, at a cost of £600, capable of supplying upwards of seventy heads of water. One of the party, who was with me on New Year's Day to obtain the grant for it, mentioned that for the few days they had been washing on the beach the yield had been an ounce per day per man; and knowing myself the auriferous nature of the beach in question, I believe, with the supply of water named, it can support sixty or seventy miners.

The gold fields revenue for the year, including publicans' licenses, and deducting refund made or overpayments, is £793 16s., as against £749 7s. for the year 1873.

The port having been closed I cannot ascertain the amount of gold sent away, or the gold duty; but there is no doubt in my own mind that the yield of gold has been considerably less this year than in 1873, and it cannot be otherwise, because all the miners who were making only small wages, when the Government road was commenced, left their claims to work on it. This, therefore, may be looked on as a temporary decline only.

I believe the road now being constructed to Lake Mahouriki and from the forks of the Okarito River to Bowen, running about ten miles inland, will lead the miners to prospect country which holds out every indication of proving auriferous, and although I do not anticipate that anything new will be struck, sufficiently rich to attract a population from outside, yet I think it will be the means of retaining those who are here.

Throwing open Special Block No. III. will also, I believe, have a beneficial influence in gradually making permanent settlers of those who have been in the district for many years. Nothing, since I have been here, appears to have given such general satisfaction as the terms on which land can be taken up under this system; and in my humble opinion it is to be regretted that the advantage is limited to the area within the block, as I am sure, if it was extended over all the land in this district, it would induce many more people to become attached to the soil; and what possible objection there can be to this, I am at a loss to comprehend.

I am pleased to find Government propose forming a settlement in the southern portion of this district, at Jackson's Bay, because, on my first visit to this part of the province in 1867, during the

first rush to the Haast, where I resided four months, it struck me forcibly that great advantages would be derived by opening up this part of the country. And in my first report after separation from Canterbury took place, dated 28th December, 1868, No. 108, and in every succeeding report, viz., 31st December, 1869, No. 150, 1st July, 1870, No. 122, and in the last one, before my removal to the Waimea, dated 5th January, 1871, I pointed out to the Government the benefits that would arise from it, and urged them to take some action in the matter. It is therefore satisfactory to me to find that, however visionary my views were then considered, the time has now arrived when they are about to be tried. Consequently, taking more than ordinary interest in the movement, I sincerely wish the scheme may be such as to lead to its entire success, which must conduce to the advancement of the province.

There can be no doubt whatever something beyond mining must be held out to the people to remain here (I confine my remarks to this district). It is vain to attempt to conceal the fact, that the yield of gold from the alluvial diggings has been yearly falling off, and I see nothing, in the ordinary course of things, to expect any material improvement, unless new workings are opened, or payable quartz reefs discovered; of the latter there are hopeful indications in many parts of the districts. Therefore, its ultimate prosperity must depend, in a great measure, on the settlement of the people on the soil, and this can only be done by opening up the country by a main trunk line of road down south to Jackson's Bay, and ultimately to the boundary of the province. Without this it is hopeless to expect a general settlement throughout a district having upwards of 140 miles of coast line. This appears to me to be the cardinal point to be kept in view, without which, I believe, all that may be expended in attempting to force a settlement in one particular locality will be money thrown away. The progress of the place after this may, I think, be safely left in the hands of the settlers and to private enterprise to develop its resources.

I have, &c.,
M. Price,
Warden.

To the Provincial Secretary, Hokitika.

No. 11.

Mr. Warden Carew to the Under Secretary for Gold Fields.

Sir,— Warden's Office, Lawrence, 1st May, 1875.

I have the honor to forward herewith the annual returns of the Tuapeka Gold Field, for the year ending 31st March, 1875, and to report as follows.

The past year has been singularly uneventful in mining matters, and no new discoveries of any importance have been made. This is no doubt principally attributable to the district being underpopulated, and, as a consequence, miners have not been under the necessity of seeking for new ground, but could confine their efforts to the more certain profitable occupation of working ground already known to be remunerative.

Alluvial Mining.—In my last report I stated that Gabriel's Gully, into which tailings from the eastern side of the Blue Spur were discharged, was fast becoming choked up; and the same remark applied to Munroe's Gully, which received the *débris* from the other side of the Spur. At that time all the claims were worked in the one way, that is, by sluicing away with a face from the surface to the rock bottom (or as near to it as the fall would permit). Since then, the difficulty of getting rid of tailings and the loss of fall has induced three of the large companies to change the mode of working their claims. For this purpose each company has erected a crushing battery, and now, instead of the whole depth of ground being operated upon as heretofore, only a few feet from the bed rock upwards is removed, and the gold extracted from it as it passes through the machine. I understand that under the new system the returns from these claims are considered satisfactory by the shareholders, but I cannot myself look upon the change as a favourable one in any respect, but simply a means of obtaining a present benefit at the cost of a large future loss. The Blue Spur contains about forty acres of land, of an average depth of over 100 feet, the whole of which, it is considered, judging by the experience of the past, would pay handsomely for sluicing, provided a sufficient fall be secured for carrying away tailings. This fall could be obtained by the construction of a channel through Gabriel's Gully, a proposition to effect which has already been brought under the notice of Government; but the necessity is great that, if this work is to be carried out, it should be commenced as early as possible, for every day is adding to the accumulation of tailings, and consequently to the cost of constructing a channel. If there be no channel formed, and the ground be worked by tunnelling and crushing, it is only selected strata that would pay for working, and probably not more than a twentieth part of the ground, if so much, would be remunerative by those means of extracting the gold; and it is unlikely that, after the best had been picked out, the construction of a channel will be thought advisable.

Although not a new discovery, it has lately come prominently to notice that a similar formation of country to that of the Blue Spur extends for many miles in a south-easterly direction, and passes through Wetherstone's and Waitahuna. In both of those places a conglomerate, like that in the Spur, is to be found, and is known to be auriferous. At Wetherstone's it is at a low level, and consequently could only be worked there at great disadvantage; but at Waitahuna its position is more favourable, and it is known to be payable. Some claims being brought into work there I regard with much interest, as bearing considerably upon the future prospects of this gold field.

The drainage channel at Waipori, constructed under the Public Works Act, is now completed. Some few paddocks have been bottomed on the flat along the course of the channel, but it is yet too early to form any decided opinion of the remunerative prospects of this large undertaking. So far, it has been ascertained that gold is distributed in patches over the flat, some of which will be profitable to work.

Munroe's Gully is being again reworked; and as everything from side to side of the gully is passed through the sluice, what gold it contains will be thoroughly removed.

Quartz Mining.—In this branch of the mining industry I have little to say that is favourable of the past. The Gabriel's Gully Company, after a short term of prosperity and subsequent unremunerative working, sold their crushing machinery, and it has been removed to one of the claims on the Blue Spur. The reef they worked at one time with the promise of long success should not yet be condemned. It will no doubt some day be further prospected, and I believe with better results. A claim at the Canada Reef is the only one in the district which has been yielding gold during the year, but I have no definite information how far successfully it has been worked. The claims in the Waipori Reef promises to give an impetus to quartz mining in the future. The Waipori Company have just completed extensive preliminary works and operations in putting their claims into order for systematic working on a large scale. The machinery for crushing purposes is erected, and a water supply brought on to the ground to be used as a motive power, and all is now ready to start crushing.

Thompson and party, who hold claims in the same line of reef, have also just completed similar operations, and as the stone raised by both parties shows a good deal of gold, satisfactory returns should shortly be looked for.

Water-races.—The construction of three large water-races has been completed, and also some others of less importance. The Beaumont and Tuapeka Water-race Company, Registered, have entirely suspended all labour on their works for several months past. This company, which has been assisted by a loan under the Public Works Act, appears to have been started without proper consideration of its merits, and the management from the commencement has been the reverse of businesslike. I regret to state that there appears to be very little prospect of their proposed undertaking to construct a water race from the Beaumont to Tuapeka ever being completed.

Gold.—The quantity of gold remitted by escort during the year amounted to 19,744 oz., and this shows the large decrease of 8,639 oz. as compared with the preceding year. I find that I cannot satisfactorily explain how this has been occasioned. A decrease of population is one cause, a loss of time in those claims at the Blue Spur while erecting machinery is another, and a further cause is to be found in a temporary withdrawal of men from gold-producing while engaged in constructing the Waipori Channel. But with all this taken into consideration, the average earnings appear to be reduced from that of last year to a greater extent than I was prepared to discover. It must, however, be borne in mind that the majority of the miners in the district cultivate either large or small patches of land, and keep cattle, which occupations employ a considerable portion of time, and either add to their incomes or decrease their expenditure.

Population.—The number of miners has during the past year again decreased. On careful estimation, I do not think the number in the district is more than 900 miners, one-half of whom are Chinese. This shows a decrease upon last year's estimate of 150. Of this number, about fifty left at the time of the Palmer rush. None of the new arrivals in the colony now find their way to the gold fields, except perhaps an occasional one, who may be engaged in Dunedin for hired service. The total population of the district is about 5,000.

Land Settlement and Agriculture.—During the past year a considerable quantity of land has been thrown open for settlement in the Lawrence land district, but which extends somewhat beyond the gold field. Within the gold field an area of 27,000 acres was added during that period to the 40,000 acres which was available at the commencement of the year for application to purchase or lease. The manner in which the new blocks of land have been apportioned by breaking the continuity of the sections open for sale, by a judicious selection through the blocks of sections to be dealt with under the Deferred Payment system and the Agricultural Lease Regulations respectively, has effectually prevented the land falling into the hands of speculators. There is, however, an almost universal desire that the area of 200 acres, which is the full extent which may be taken up by any one person under lease or deferred payments, should be increased to from 400 to 500 acres, and I feel strongly convinced that where land is only in part fitted for agriculture, as is the rule in this district, any provision made to meet this general desire would be a wise one, and that with rough land, to be selected and classed for the purpose, the area could be safely increased to 800 or 1,000 acres. As the law stands at present, there are many who, by hook or by crook, will exceed the present limit of 200 acres, and as a consequence, to some extent, dummyism is not unknown, and is impossible to entirely prevent.

The following particulars respecting transactions in land will be interesting, and show the satisfactory manner in which people are settling down:—The land sold in the Lawrence land district, from 1st April, 1874, to 31st March, 1875, was 20,206 acres to 145 applicants. Certificates issued under the deferred payment system, thirty-one for 3,892 acres 1 rood 11 perches. Certificates issued under the Agricultural Lease Regulations, 102 for 9,022 acres 1 rood 17 perches. Under the three systems of disposing of waste lands, 33,121 acres have been alienated from the Crown during the past year. During the same period forty-three applications to purchase land held under agricultural leases for over three years, thirty applications to exchange for leases under deferred payments, and thirty-one applications to transfer leases have been recorded and assented to. That the eagerness to acquire land has not abated, is shown by the fact that applications to hold over 11,866 acres under the Agricultural Lease Regulations are now pending, and only waiting survey to be dealt with and occupied; and for twelve sections of land, 1,580 acres in all, lately advertised open on deferred payments, there are exactly 200 applicants, and whose claims will, therefore, have to be decided by ballot. I should, however, further explain that much of this land is of good quality.

The year has been a very favourable one both for agricultural pursuits and grazing. The crop of cereals is said to be quite equal to any before obtained here, and the consumers are reaping a benefit by a reduction in prices of from 30 to 50 per cent. upon those ruling a short time before harvest.

The amount of gold fields revenue received during the year was £6,075 19s. Fees and fines in the Resident Magistrate's Court, £405 2s. 3d.

The number of cases decided in the Resident Magistrate's Court is 355, and in the Warden's Court thirty-four cases.

I have, &c.,

E. H. Carew,

Warden.

The Under Secretary for Gold Fields, Wellington.

No. 12.

Mr. Warden Robinson to the Under Secretary for Gold Fields.

Sir,— Warden's Office, Naseby, 31st March, 1875.

I have the honor to report as follows upon the Mount Ida district for the past twelvemonth.

1. Mining industry may be said to have been rather languishing in this district during the past year. In this respect the Mount Ida district has not been singular. The depression in mining affairs has apparently been pretty general throughout the colony. The causes of this depression are not far to seek. One of these causes is necessarily inherent in the nature of gold mining. I refer to the fact that, as gold mining is a destructive process, the time must arrive when any particular claim must become worked out, and what happens to particular claims will in the course of years occur to entire localities, that is to say, they will be exhausted of their treasures, and finally deserted. But the falling off in mining in this district, and, I may say, in Otago generally, is not so much due to the auriferous ground being exhausted as to the mining population having been induced for a time to leave gold mining for other work. The numerous public works going on in various parts of the country have drawn men from mining, as well as from other branches of labour, by the prospect of high wages and constant employment. This has caused a very noticeable reduction in the number of men engaged in mining, and a consequent falling off in the production of gold. But although the falling off both in population and yield of gold has been decided, and has been severely felt by the mercantile community, I do not think there is any cause for alarm. The escorts show over 17,000 oz. from this district as against 19,000 oz. for last year, and it is fair to estimate that at least one thousand ounces have been procured which have not gone to swell any escort returns. For example, there is no escort from Maerewhenua—all the gold from that field finds its way to the Oamaru banks by private hands. Thus, although the yield of gold is on the whole less, it may be fairly assumed that the earnings of individual miners have undergone no diminution. Moreover, if the gold is not taken now, it is left to be obtained in future years; and perhaps a season of slackness in mining may promote in an indirect way the permanent settlement of the country, by inducing people who would otherwise be making an easy living by supplying the wants of the miners to seek other roads to wealth, by developing resources which in brisker times were not regarded.

2. In the Maerewhenua division of the district the construction of water-races has slowly proceeded, and the claims opened have been wrought when water was available. But the yield of gold has been but small, and the population has rather diminished than increased. Of course the water-races are valuable properties. The quantity of auriferous ground commanded by them is practically unlimited, and the only possible change in mining affairs will be for the better. But the Maerewhenua must always be a very quiet sluicing district, giving indeed steady and continuous returns from ground once fairly opened, but where few new claims will be opened from year to year.

3. Some of the Maerewhenua miners have petitioned the Provincial Government to repurchase about 1,000 acres of land on the west side of the Maerewhenua River, which was sold long before the discovery of gold in the neighbourhood. This land, with frontage to the river, intervenes between some of the best sluicing ground and the Maerewhenua River. Thus the claims can only be worked by running tailings through the private property, and in course of time the lowest lying portion of the ground must be covered up with the waste of sluicing if the workings continue. Up to the present time the owners of the land have put no great obstacles in the way of the miners, but it is felt that at any time a dead-lock may be brought about if those who own the outlets find it necessary for their own protection to forbid the sluicers to run any more tailings on to their property. It is not improbable that the difficulty may be got over by the Provincial Government giving the owners other lands in exchange.

4. The water-race of Botting and Co., from the Kakanui River, is noticeable as being the only one in this district the owners of which have availed themselves of the offer of the Government to lend money out of the sum appropriated for promoting water-supply on gold fields. This race has not afforded a very encouraging example of the working of the system of Government assistance by loan. The delays and expenses necessarily incurred in preliminary inquiries and surveys, to satisfy the Government of the *bonâ fide* character of the application for a loan, and the cost of inspection from time to time as progress payments are required, have largely detracted from the benefit of the Government assistance. It would undoubtedly have paid the race-owners better to have obtained an advance from private capitalists at a much higher rate of interest than that charged by the Government. No doubt, the smallness of the amount borrowed has in this instance caused the expenses to seem disproportionately heavy. It seems evident that so elaborate a plan can only be worked to advantage in the case of large loans, to which, no doubt, it is well adapted.

5. At St. Bathan's, the Otago Company have at last completed their large race from the Manuherikia River. This company has shown a most admirable example of pluck and self-reliance. They now reap their reward in the shape of the possession of one of the finest mining properties in the country. Another important work at St. Bathan's, known as the "Muddy Creek Channel," is advancing slowly. This is intended to provide an improved outlet for all the extensive area of golden ground for which Muddy Creek is the natural drain. The work is being done by a private company for the reward of a special grant of ground.

6. Quartz mining has never prospered in this district; yet there are many reefs known to contain gold, and companies have from time to time been formed to work them, but in no one instance with success. At present there is only one machine at work—that owned by Mr. Withers at Rough Ridge. It is remarkable that there are a number of reefs at Rough Ridge which gave splendid prospects, and for the working of which different companies have gone to great expense. One after another they have failed, the latest instance being that of the Energetic Company, the machinery of which was recently sold to Mr. Withers. Strange to say, this person, who has long been resident at Rough Ridge, seems to be able to make money by mining where companies, with all the advantages of subscribed capital and professional management, have only made losses. The natural conclusion is, that

in the case of the companies the profits were swallowed up in expenses or lavished in costly experiments, and that, in fact, the failure of quartz mining, as a rule, has been due to the want of judgment with which it has been carried on, rather than to the poverty of the reefs. So satisfied are some of the residents at Ida Valley of this, that they have formed a local association to give a fair trial to the Blackstone Hill Reef, which for many years has been deserted; while at Rough Ridge Mr. Withers is cautiously but steadily applying himself to the opening out of more than one long-abandoned reef. In like manner, at Shag Valley, I am given to understand that it is probable the mine of the Shag Valley Freehold Company will be taken in hand by a new company, who hope to make a profit from what, to the present proprietors, has only been a source of loss.

7. This slight reaction in favour of quartz mining may, in part, be attributed to the visit of Mr. Ulrich, Consulting Mining Geologist, from Victoria. This gentleman, at the request of the Provincial Government, made the tour of the gold fields of Otago, specially with the object of inspecting the quartz mines. His report has not yet been published, but the remarks he let fall, at some places where he visited, tended to convince people that the failure of some of the experiments in quartz mining had been, at least in part, due to positive loss of gold, which, with proper appliances, might have been prevented.

8. The taking up of lands for farming purposes has been going on rather briskly of late in various parts of the district. Blocks have been thrown open under the agricultural lease system in some cases, and in others upon deferred payments. It is much to be regretted that the obstacles to the occupation of land for agriculture have been so great and so enduring. It is notorious that numbers of persons, who have made money by mining and would have settled in the district if they could have got land, have, during past years, gone away disgusted, in many instances taking their capital and industry to other colonies. Until the last year or so, the only way for a man to get a piece of land to cultivate in this district was to make an arrangement with the pastoral tenant, by which he should be allowed to fence and occupy a few acres without being molested as a trespasser. But this gave him no title, and but few people were found willing to go to the expense of improving land upon such a tenure. In the meantime, the district, for want of local production, languished under the evil of high prices of the necessaries of life. The mining interest was especially a sufferer, the high cost of living making it impossible to work any but comparatively rich ground. When, at length, some small blocks of land were thrown open for settlement on the agricultural-lease system and on deferred payments, they were eagerly taken up, and already a number of small farms are being formed in various parts. One block of about 3,000 acres, near Naseby, was half taken on the first day that applications could be received. The areas of land now held on agricultural leases and deferred payments, respectively, are as follow:—

	A.	r.	p.
Agricultural Leases	9,756	1	10
Deferred Payments	2,219	3	5

A considerable portion of the land on agricultural lease is held by runholders in large blocks, but the land on deferred payments is held in sections not exceeding 200 acres; the total area held being divided among nineteen persons.

9. I have already remarked upon the high cost of living. This still continues to be felt as a serious impediment to progress; but it is to be hoped that before long the produce of the farms will be coming to market, and that more moderate prices will prevail. The benefit of the cheapening of the necessaries of life will not only be felt in mining but in every other class of industry.

10. It is with great regret that I have to notice in this report that the Mount Ida Public Works (head race and sludge channel) are yet unfinished. Two years ago I was able to report that ten miles of the head race were constructed, and it was then confidently expected that both works would be ready within another year, but so many delays have occurred that it seems likely another year yet may elapse before these works are finally taken over from the contractors. In connection with the head race a fine dam is being made in Coalpit Gully, near Naseby. This will no doubt greatly increase the usefulness of the race. The sludge channel is being brought up at a slightly lower level than that originally proposed, the object being to have it deep enough to serve for the working of a large area of known good ground in the Hogburn Gully, below Naseby, which could not have been got at with the channel at the level as first surveyed. As this will render it more expensive it is understood that the works are to be stopped at some distance below Naseby, whenever the money appropriated for the work is expended. But it is generally hoped and expected that provision will be made for continuing it up to Naseby, as if that is not done it will be comparatively useless, and the heavy expense already incurred may almost be said to be wasted.

11. Notwithstanding the hard times for the district, the revenue for the year shows a decided advance upon last year. The total amount of revenue collected at this office for the year ending March 31st, 1875, has been as follows:—

Gold Revenue, including Fees and Fines of Warden's Court ...	£2,408	14	8
Resident Magistrate's Court Fees and Fines	289	2	8
	£2,697	17	4

This does not of course include moneys received for lands on deferred payments.

I have, &c.,
H. W. Robinson.
Warden.

The Under Secretary for Gold Fields, Wellington.

No. 13.

Mr. Warden Wood to the Under Secretary for Public Works.

Sir,— Warden's Office, Switzers, 23rd April, 1875.

I have the honor to forward herewith statistical returns and annual report of the districts under my charge for the year ending 31st March, 1875.

The mining population of that portion of the district known as Switzers, and situate within the Otago Gold Fields, has considerably diminished, owing chiefly to the demand for labour on the public works that are being carried on in the locality, viz., the Mataura and Clutha line, thirty miles to the southward, and the Winton and Kingston, thirty miles to the westward; but doubtless when these works are completed, or the supply of labour now flowing in affects the rate of wages, the gold fields will not only increase their population, but find employment for a large number of men, as there is plenty of ground that will pay 30s. to 40s. per week to an industrious man.

The quantity of gold sent down by escort was about 7,900 oz., but this does not include the gold obtained from the Nokomai division, as the gold obtained at that place is disposed of either in Invercargill or Queenstown. The land occupied by agricultural leaseholders is getting into good order, and the farmers have every reason to be satisfied with the result of the harvest.

The population otherwise employed than in mining, not including persons living on stations, is as follows:—Switzers—Men, 103; women, 77; children, 139; total, 319. Nokomai—Men, 6; women, 12; children, 23; total, 41. Waikaka—Men, 10; women, 8; children, 13; total, 31—making a total of 921 souls in the district, including miners.

The Orepuki Gold Field, outside the Otago Gold Field District, in the late province of Southland, has, as regards population, increased during the past year, and I believe that as a body the miners are doing better than on any gold field in Otago; but the supply of water for sluicing is very limited, and till more water is brought in, the field may be considered as fully populated as regards mining. But as the Provincial Government intend shortly throwing open land for occupation under agricultural leases, and the land being of the best quality, I anticipate that in a short time a thriving population of settlers will be located there. The gold from this field is of a very high standard. On my last visit I was shown a return from the Melbourne Mint of 65 oz. 10 dwts., that was taken over last Christmas, which realised, exclusive of Mint charges, the sum of £262 16s. 10d. sterling, or within a fraction of £4 2s. 8½d. per oz.

I cannot supply a return of the gold obtained, as it is sold to the banks in Riverton and Invercargill.

I have, &c.,
JOHN NUGENT WOOD,
Warden.

The Under Secretary Public Works, Wellington.

No. 14.

Mr. Warden SIMPSON to the UNDER SECRETARY for GOLD FIELDS.

SIR,— Warden's Office, Clyde, 22nd April, 1875.

I have the honor to hand you the statistical returns (in duplicate) for the year ending 31st March, 1875, of the Gold Fields District of Dunstan, which comprehends Clyde, Cromwell, Alexandra, Black's, Teviot or Benger, and Nevis.

In speaking generally of the district, I would remark that the European population appears to me to have undergone very little change. A slight increase has taken place in the Cromwell Division. In the Chinese population a greater change is observable, some 200 additional having come into the district, chiefly from the Lakes. Black's Flat and along the Manuherikia River to Alexandra has been the locality chosen for settlement by them. Notwithstanding the imperceptible change in the population during the year, with the exception of the Cromwell division there has been a decline in the mining industry, evidenced by the return of gold yielded, the total of which amounts to 43,823 oz., as against 48,331 oz. for last year, showing a decrease of 4,508 oz.

Alluvial Mining.

The decrease of gold has taken place in the alluvial mining, for in Cromwell—the only quartz-reefing division—there has been an increase of 2,166 oz. in the yield for the year, and there, while but little change is observable in the alluvial mines, considerable progress has been made in the reefs. This falling off in the yield of the alluvial mines in a minor degree is attributable to the very high level the river Molyneux has maintained throughout the year, rendering dredging in most cases impossible, and almost suspending sluicing along its banks, except at the higher levels, which are far less payable. The Teviot district has been particularly affected in this way, as also by the prevalence of floods on the Wakaia and Pomahaka rivers, where most of the summer gold mining in that district is carried on. Luckily the miners there are a particularly settled class, the majority having been in the district for over ten years, and as a rule have their plots of ground, or labour on the farms, &c., in the district, to fall back upon in such circumstances. The main cause, however, of the decline of the alluvial mines is the fact that the richer ground is getting worked out, and no corresponding effort being made to adopt means to make the poorer ground pay by sluicing away larger quantities in the same time or even shorter. This can only be done by means of a wholesale system of hydraulic sluicing, and I think that is gradually being introduced, for, while Drybread was the only place in this district last year where iron piping was in use, now there are several claims in Tinker's using them, and with great advantage. Of course the supply of water requires to be considerable, and in many places combination of the water rights will have to take effect before the iron pipes are employed, but I think the miners and race-owners will soon become alive to this, and combine.

Tinker's and Neighbourhood.—It is astonishing how the yields from the alluvial workings at this place, which is situate at the foot of the southern slope of the Dunstan Range, keep up; as instance the Blue Duck Company, who with six men at work got as much as 800 oz. for four months' work; another party of three men 100 oz. in fourteen weeks; and another of six men got 140 oz. for a similar period. This is a place where mining has been carried on for the last twelve years, and out of a very few acres of ground I might almost say tons of gold have been obtained. The workings are all on

what is termed a false bottom, which if gone through, according to Mr. Ulrich, the geologist, there is every probability of much richer deposits being found. Some of the claims at this place have been a good deal hampered by a freehold which the tailings are said to affect, and unless care is taken in the survey of the Matakanui Hundreds, the sale of the land in them will still more hamper them; under any circumstances these Hundreds will cause greater care to be exercised by the miner in his workings. As settlement advances in the interior the miner must expect to be more controlled in his movements, but on the other hand great care ought to be observed to preserve outlets to all known auriferous ground when surveys are made. All along the Dunstan Range the miners show no sign of giving out; indeed, patches are frequently being struck. An extensive supply of water, if brought along the foot of that range from the Lauder to Clyde, would be a remunerative speculation.

Black's.—This place, which was almost deserted in the beginning of the year, has again somewhat revived by the discovery on the Flat of some good ground by the Chinese, about one hundred and upwards of whom are now settled there, together with a considerable number of Europeans. Some of the paddocks for a week's work yielded as much as £60 and £80 to some four or five men, and notably there is one party who has spent, within the last two months, some £400 in litigation over a trifling piece of ground.

The Waikerikeri Terraces.—These remain, comparatively speaking, still undeveloped, owing to the prolonged delay in the completion of Hastie and Co.'s race, an undertaking of too great a magnitude for such a small company; but it is fondly hoped that six months will see the finish. Should iron piping be then adopted, no doubt much time will be made up, the payable nature of the ground having been well proved.

The Bannockburn Terraces.—This place is another evidence of the error of too great an undertaking having been gone into with too small a capital. On these terraces there is said to be some of the best sluicing ground in the district, and considering the large population it so long maintained tunnelling, &c., I think it cannot be doubted. It is really pitiable to see so much of that ground waiting the completion of "The Carrick Range Water-race"—a work which should not merely have been assisted by the Government, but entirely constructed. I fear the race cannot be completed this season before the snow comes down, even although there are only three and a-half miles to finish, thirteen having been constructed out of seventeen and a-half miles—the entire length. These delays have a very bad effect, not only tiring men out from the ground, but encouraging the bad practice of taking up claims for the mere purpose of speculation by sale. Had it not been for the Bannockburn and All Nations Companies' small supply of water, together with the tunnelling still carried on, the most of this ground would have been deserted by the *bonâ fide* miner, and fallen into the hands of the speculators. When a sufficient supply of water is brought in, there is a work that ought to receive Government aid, and that is the formation of a public channel up Pipeclay Gully.

Alexandra.—Until within the last two months, mining matters here have been very dull, when the the Chinese found some good prospects on the Manuherikia River, between Low's old homestead and the Chatto Creek, most of it comparatively untried ground, and now, between Robertson's Ferry and the Chatto, there are about 200 Chinese settled, which has given an impetus to business.

Nevis.—This place, one of the best for alluvial workings in the summer months, has been the victim of floods this season, and therefore has not shown up so well in its yield of gold, which may be put down at 5,000 oz.: the greater part of this went to swell the provincial escorts.

Quartz Reefing.

This branch of mining, which is confined to the Cromwell division of the district, has made a considerable stride during the twelve months, particularly at Bendigo. Here I have granted some six new mining leases, and have as many more under application, besides a number of claims. Four of the new leases are on what is supposed to be an entirely new reef, which, so far as developed, shows signs of being very rich, particularly in Jones and Co.'s claim. This reef runs, or is supposed to run, parallel with and at no great distance from the celebrated Cromwell Company's reef, on its southern boundary. The yield is put down at five ounces to the ton; but, as no trial crushing has as yet been made, that can only be a guess. This reef has been traced for about a quarter of a mile, and claims have been taken up on the supposed line for about a mile. On the Cromwell Company's line of reef a good many new claims have been taken up; in one part there is now a continuous length of a mile taken up, and after a break of two miles more claims have been marked out on what seems to be an out-crop of the same reef. The latest discovery has been made, by one Daniels, of a reef almost on the top of the range, which, from specimens, gives great promise, and to all appearance is on the same line with the Cromwell Company's, so that it may be almost said that this reef has been traced for six miles to the east. Little work, comparatively, has however been done on these new claims, so no decided opinion can be pronounced.

There is one company that has been started which ought greatly to aid in prospecting the Bendigo reefs, viz., the Deep Level Company. This company, which has a capital of £10,000, in £40,000 shares of 5s., all of which shares were taken up the first day of issue in the locality, has some fifty-six acres of ground in a special claim, and has started to drive a tunnel, at the lowest level possible, from the Bendigo Creek, with the view of cutting, if fortunate enough, the Lucknow, Aurora, and Cromwell Companies' reefs, and several known payable leaders, such as the Guano. This tunnel will also have the most beneficial effect of draining a very large area of ground, and saving pumping in several claims. The company has made a fair start, and got its tunnel in about 60 feet. The scheme is much in favour in the locality, and the shares are now at a premium.

A great deal of work has been done on some of the reefs during the year. Particularly I would mention the Lucknow Company, who for the last eighteen months have been driving through the hard blue rock, and reached a distance of some 500 to 600 feet without any signs, when rather suddenly, although not to the mining manager unexpectedly, they came on the reef in the bottom of the tunnel, crossing it diagonally; indeed they narrowly escaped driving right over it. The reef shows gold, and as they sink on it, and drive towards their old shaft, in which they had it but were stopped by water, the reef

widens and improves. The hopes of the company are raised, and with reason; certainly their perseverance deserves success. The Aurora Company, who have the reef immediately to the south of the Lucknow, have resumed work, and it was a wonder to all why they ever suspended, seeing they never lost the reef, and that the works always paid expenses. The Cromwell Company have been raising stone during the whole year, and their good fortune has been continuous. I think I am safe in saying that by far the greater portion of 14,000 oz., returned as the year's yield from quartz, has come from this company's ground. The ground seems not only to have one good main reef in it, but a number of rich leaders, and notably one that was struck about a month ago in their No. 2 lease. The stone crushed by this company throughout the year may be said to have averaged 4 oz. to the ton.

Another company that has done a great deal of work in their claim is the Reliance. Their ground is on the Cromwell Company's reef, and adjoins that company's richest claim, and it is to the astonishment of every one, as well as to the chagrin of the shareholders, that the reef has not already been struck. All are united in opinion that it is but a matter of time, unless some unaccountable break or disturbance has taken place to the reef as it leaves the Cromwell Company's ground.

The prospects of Bendigo look at present very bright, and if the companies and claim-holders will only persevere, great results may be expected. The greatest want that will be experienced at Bendigo will be power to drive machinery; the water supply is very limited, and coal for raising steam not nearer than Cromwell, a distance of fifteen miles; none of the prospectors for coal on the Lindis have been successful, but they still persevere.

Carrick Range.—The other reefing portion of the Cromwell division has also advanced during the year; one of the principal discoveries there was by Watson and Company, of the reef known as the Crown and Cross, the crushings of which have averaged about 1 oz. to the ton. The most of the old companies have continued steadily at work during the year raising stone; others, and particularly the Heart of Oak, Caledonian, and Elizabeth, have been engaged tunnelling at low levels. A great deal of work has been done both by the public and private companies, but no yield that can be considered more than payable reported; of the private companies it is a matter of great difficulty to obtain information. On the Carrick there seems to be a general determination to test the permanency of the reefs, which up to this time have been so provokingly broken and irregular, by deep level tunnelling, and a large company has been formed to undertake a work similar to that undertaken by the Deep Level Company at Bendigo.

Settlement, or rather Land Taking-up.—During the year the following areas have been taken up under the Agricultural Lease Regulations:—In Teviot, 948 acres; in Alexandra, 808 acres; in Cromwell, 331; making a total of 2,087 acres, and there are applications waiting to be dealt with for about 1,000 acres more. I use the term "land taking-up" advisedly, for on looking over the names of those to whom the grants have been made I find, almost without exception, that they are old settlers who, having acquired their original holding in freehold, desire to extend their operations under the easy system offered by the agricultural lease when coupled with the deferred-payment system. It is evidence, no doubt, of the prosperity of these settlers; but to me, who have been told by some of those settlers that unless they could increase their holdings they must sell out, it is evidence, also, that the area allowed to be leased by one person is too small in a district like this, where the land is so inferior, or rather so light. The absence of strangers' names confirms this view, I think. The crops alone will not pay in this district, with such light land, and at such a distance from a good market cattle-growing must be combined, and this cannot be done on 200 acres, nor with profit even where there are Crown lands open for grazing in the neighbourhood, for on these lands the settlers say the cattle are so liable to be hounding about, to a mixture of breed and to stray, that very little profit can be made, and that they would far rather enclose rough ground unfit for cultivation under the agricultural lease system. In my opinion it is much to be regretted that the maximum has been fixed so low as 200 acres, which may be quite sufficient for the ends the Government have in view, viz., multitudinous settlement (if I may be allowed the expression), on the richer lands of the province; but not in districts like this, where 1,000 acres even would not be too much. Certainly it would, I think, be found far better to enlarge the areas than to pursue the system of throwing open large tracts of country for miscellaneous depasturing, for, as a rule, these tracts are monopolised by a few; at any rate the smaller herd owner is always at the mercy of the larger. I may mention that I had several applications by settlers to be allowed to enclose a few hundred acres of these commons, as they are called, around their particular homesteads, the settler to get a right for a term at a reasonable rent, no compensation to be asked at the end of the term for the fencing. It is noteworthy also that a number of the smaller farmers are selling out, when they can, to the larger holders.

Under the deferred-payment system there has been some 1,850 acres taken up during the year; of land under agricultural lease there has been purchased about 2,300 acres.

W. Laurence Simpson,
Warden.

The Under Secretary for Gold Fields.

No. 15.

Mr. Warden Beetham to the Under Secretary for Gold Fields.

Sir,— Warden's Office, Queenstown, 7th April, 1875.

I have the honor to forward you my report upon the Queenstown District, for the year ending 31st March, 1875. I have no discoveries to report in either alluvial or quartz mining; the year has been characterized by a complete absence of excitement, as far as prospecting is concerned.

Alluvial Mining.—Operations have been almost entirely confined to the development of claims bordering the terraces, on the banks of the Shotover River, and the more systematic working of the river bed. The two claims most worthy of notice belonging to the last-mentioned class are the New Channel and the Hibernian Companies' Claims. The Hibernian Company being now in course of registration, the ground held by the company as a special claim comprises a large extent of the

Shotover River, lying at the foot of those rich terraces on which are situated the Shotover Company's claim and other holdings of a similar character. The plant and arrangements for working the claim will be, when completed, of the best possible description.

Quartz Mining.—There is little new to report as to this industry. The Nugget Company has increased its capital, and the manager contemplates operations of a most extensive and complete character. The old Hercules Quartz Claim has, I believe, been taken up by this company, and I understand that it is intended to include the working of the ground in the contemplated operations of the company. The Phœnix Company's ground and battery have been let on tribute for a term of years, and the tributers are busily engaged in repairing the plant and bringing stone to grass.

Population.—The population has slightly decreased in consequence of the Palmer rush, and the progress of public works in other portions of the province.

Agriculture.—The total amount of ground held under agricultural lease in the district is 19,111 acres 2 roods 3 perches. The land acquired under deferred payments during the year is 502 acres 2 roods 27 perches. The land directly sold not having been previously held under lease is 1,084 acres. The crops throughout the district have been, during the present season, exceptionally good, both in quantity and quality, the harvest weather having been all that could be desired. It is however impossible to speculate upon the price that will rule for grain, in the absence of any practicable outlet to the coast. The completion of the Winton and Kingston line of railway will enable growers and merchants to calculate with more certainty as to price and general value of produce.

The gold fields revenue collected in the district during the twelve months amounts to £8,882 15s. 10d., inclusive of sums received from the direct purchase of land referred to. Attached are statistics as follow—approximately:—

1. Number of machines employed in alluvial and quartz mining.
2. Table showing, approximately, the number, description, and value of the water-races, tail-races, dams and reservoirs, ground-sluices, &c.
3. Return of the number of mining leases in force, the extent of ground leased, and the rental per annum.
4. Return of the number of agricultural leases in force, the extent of ground leased, and the rental per annum.
5. Return of the number of licenses under "The Gold Mining Districts Act, 1871."
6. Table showing the number of companies registered under "The Mining Companies Limited Liability Act, 1865," and amending Acts; "The Joint Stock Companies Act;" and "The Mining Companies Act, 1872."
7. General return of the mining districts for the year.
8. Table showing the average rate of wages per week.
9. Number of miners employed.
10. Return showing the average price of provisions and live stock.
11. Return of cases in the Warden's Court, and costs awarded.

During the year ending 31st March, 1875, bullion to the amount of 15,207 oz. 1 dwt. 12 grs. was exported from the district, giving a value, at £3 16s. per oz., of £37,986 17s. 7d.

I have, &c.,

RICHMOND BEETHAM,
Warden.

The Under Secretary, Public Works (Gold Fields Branch).

No. 16.

Mr. Warden STRATFORD to the UNDER SECRETARY for GOLD FIELDS.

SIR,— Warden's Office, Arrowtown, 31st March, 1875.

I have the honor to report upon the Arrow District, under my charge for the year ending the 31st March, 1875. Having been absent for nearly nine months, I have been unable to watch closely the progress of the district; my report therefore will not be as full as I would wish.

With reference to the old digging localities, at Cardrona there are about seventy-five European miners, 150 Chinese, and twenty other European adults. At the upper part of the Cardrona Creek there have been for years past about fifty miners employed, and they will have in the same locality work for many years yet. From the township down the creek towards the Wanaka the difficulties of mining increase, owing to the leads being deeper and containing more water. In recognition of these obstacles, special claims, averaging from seven to ten acres each, have been granted to men, who have expended already on each of their claims nearly £2,000. Pumps are continually kept going on all the claims that are being worked below the township.

At Branch Creek, six miles below the Cardrona, being a mining gully of eight years' standing, there are about twenty miners, who having large water rights are doing very well. These men evidently anticipate permanent employment, as they have built comfortable houses, and fenced in gardens for themselves. I have no doubt there would be a greater population in this place, if more water could be brought to bear upon the auriferous ground.

At Macetown there are about fifty Europeans and fifty Chinese engaged in mining, the method being both by tunnelling, sluicing, and diversion of the Arrow River. There are some rich tunnelling claims between Macetown and Eight-Mile, some of the parties making as much as from £8 to £10 per week per man. The Government during the past year has spent some considerable sums of money in cutting tracks between Macetown and other mining localities. These outlets have been of immense advantage to the storekeepers, and have given increased facilities for prospecting in the outer gullies during the summer months. I attribute the discovery of two valuable quartz reefs, in the mountain ranges between Macetown and the head of the Shotover River, very much to the opening up of the country at the expense of the Government.

On the banks of the Kawarau, in the neighbourhood of Gibbston, there are nine or ten parti es of miners, sluicing the terraces into the river, which is so rock-bound that the formation and extension of the tail races is quite a formidable undertaking. The average returns I believe to be about £2 10s. per week a man.

The Cambrian Water-race works, which cost nearly £6,000, are at a standstill. The shareholders, having exhausted all their means, are raising funds by working in other places before expending more money in cutting up extensive tail races to work the Cambrian ground.

The Gentle Annie Creek is beginning to gain attraction as an auriferous locality, solely through the exertions of an enterprising Welshman, who has succeeded at a cost of £600 in bringing in a water-race around some very rough and precipitous country. A special claim of ten acres has been granted to him as a reward for his enterprise, which he richly deserves, as he will give employment to ten or twelve men for years hence upon ground which is now proved to be very payable for sluicing purposes.

The Victoria Bridge, which has been erected across the Kawarau River since my last report, has proved a great boon, not only to the settlers, but also to the travelling public, and has given fresh impetus to mining in its neighbourhood. The merit of the building of this bridge belongs solely to Mr. McCormack, the proprietor, who projected and carried the work out to its final issue. It is a suspension bridge, hung on fourteen four-inch wires on each side of it, and is an ornamental as well as a useful structure. Nearly the whole of the Wakatipu district is supplied with coal from a coalpit on the Kawarau Flat, and this alone would be a sufficient reason for the erection of another bridge like the Victoria across the Kawarau at Morven Ferry.

News has just reached me that a quartz reef has been discovered at Deep Creek, Kawarau. The specimen that I have seen, it is estimated, would produce at the rate of six ounces to the ton.

Up the Arrow River no rich finds have been discovered during the past year, with the exception of one claim, which has paid as much as £20 a week a man for some time past.

A company styled "The Sons of Fortune," is forming a drainage tunnel under the Arrow River, at a cost of probably £2,000, to work some well-known rich ground above the Arrow Falls. The construction of the tunnel will probably occupy eighteen months, but this is believed to be the only method of draining the ground.

On the subject of farming, this interest has suffered much on account of the diminution of population owing to the exhaustion of many alluvial workings, and prices having ruled low. The harvest of 1875 has been a good one, although late. Wheat is selling at 3s., and oats at 2s. 6d. per bushel. I anticipate a great change for the better in this industry, for the following reasons. The farmers are purchasing their lands from the Government, and, as freeholders, find it worth their while to erect more substantial fences and expend money in cultivation. They appear also to be introducing a proper system of farming, and instead of continual cropping with cereals are adopting a rotation of crops, and combining with this employment the rearing of stock. Another inducement for the farmers is the new outlet for surplus produce by the Winton and Kingston Railway.

At Arrowtown there have been great improvements going on since the date of my last report. Roads have been made under the supervision of a municipality which has been formed during the past year, and buildings have been erected at a cost exceeding £3,000, which has greatly enhanced the value of town property. The district has not suffered much owing to the diminution of population caused by the Palmer rush, as the proprietors of races and claims have left representatives to protect their property, and themselves intend to return to a country having so many attractions, especially that of a healthy and bracing climate.

The commonage rights and privileges, about which there have been so many discussions, have at last been partially settled by the sale of leases of about two-thirds of the waste lands in small runs, each for a term of seven years. The balance of the land, comprising about 90,000 acres, is used by the settlers for depasturing purposes, and a Ranger has been appointed to keep the boundaries and act as License Inspector.

The vexed question between the rights of agriculturists and miners is becoming more harassing each year. Undoubtedly it is very difficult to decide what land is auriferous and what is not. At the same time vast tracts of country are lying useless which could afford employment for thousands of men, to their own advantage and to that of the Treasury chest. The difficulty could be obviated by a short amendment (Gold Fields) Act, abolishing the arbitration system, and providing that leases shall be granted with the right to the soil to a given depth for cultivation only, and that clauses be inserted in the leases providing that when gold is traced within the boundaries of any area, on satisfactory proof thereof, portions of the same, in blocks of not less than five acres at a time, shall be yielded up to the gold mining applicant on payment to the lessee of a sum not exceeding £3 an acre, and refund of rent that the agriculturist has paid to the Crown, the exact sum to be paid as compensation to be decided by the Warden and four assessors.

It having been decided by the District Court that the agriculturist has a right to the land to the centre of the earth downwards, and the cumbersome machinery of arbitration having caused so much delay and expense, has aroused the miners to oppose agricultural settlement wherever there is a possibility of gold being found. The consequence is, the Wardens have no fixed basis on which to decide, and it becomes safer to refuse the leases until legislation provides that the agriculturists shall have no control over the minerals, and that an uniform price shall be paid, if required, for mining purposes. Then the agriculturist will be able to calculate whether it is worth his while to fence in and cultivate the land, and opposition will cease. In all decisions he should have a right to remove all improvements, and time be given, if the land is under crops, for them to mature. I am of opinion that in this district the introduction of such a law would cause the almost immediate occupation of about five thousand (5,000) acres under the Agricultural Lease Regulations. The advantages, both to the Government and the people, by revenue and settlement, would be very great.

During the present month, quartz reefs have been discovered near Macetown, at the head of Cardrona Creek, and at Deep Creek, Kawarau Flat, being three distinct localities. The crushing of specimens from the Macetown Reef produced at the rate of 2½ oz. to the ton. From the

reports concerning these reefs, and the liberal offer from the Government recently made to subsidize a pound for every pound raised, to prospect the district, I confidently anticipate the working of quartz reefs, as soon as the winter is over, and judging from the finds that have been made, with little risk and to great advantage.

The gold fields revenue during the past year has amounted to £2,632 15s. 9d. Miners' wages average £3 a week; labourers, £2, and at harvest time £3. Firewood is becoming more scarce, and consequently dearer, as that from Wakatipu has increased in price during the year past from £2 5s. to £2 15s. per cord; but we are in hopes that the construction of railways will so far reduce the price of Newcastle and Greymouth coal, that the scarcity of firewood and its high price will not be felt.

The prices of provisions are as follow:—Flour (per ton) £11, wheat (per bushel) 3s. 6d. to 4s., barley 3s. 6d., oats 2s. 9d. to 3s., potatoes (per ton) £7, hops————, bread (4lb. loaf) 7d, beef 5d. to 8d. per lb., mutton 4d. to 6d., tea 3s., 3s. 6d., and 4s. per lb., sugar 5½d. to 8d. per lb., rice 3d., currants 9d., raisins 1s., fresh butter 2s., potted butter 1s. 9d. per lb., eggs (per dozen) 2s.

The number of cases that have been heard in the Warden's Courts is twenty-nine, and mining disputes, without summonses, twenty-four. In the Resident Magistrate's Courts there have been forty criminal and eighty-nine civil cases.

I beg to enclose herewith annexed a return showing the quantity of gold escorted from the district during the year.

I have, &c.,
H. A. Stratford,
Warden.

Charles E. Haughton, Esq., Under Secretary for Gold Fields, Wellington.

No. 17.

Mr. Warden Willis to the Under Secretary for Gold Fields.

Sir,— Warden's Office, Dunedin, 20th April, 1875.

I have the honor to report on the district under my charge as Warden for the year ended 31st March, 1875, and to forward statistical returns for the same period.

The number of miners in this district has very considerably diminished, all the Chinese having left for other parts of the province. There is a slight increase, however, in the number of Europeans, but nearly the whole of these have been permanent residents for years, varying their mining occupations with shearing and harvesting in the proper seasons, and always returning steadily to their homes and work.

The revenue for the district, for the year, has amounted to £433 15s. The price of gold has been £3 15s. per oz.; but I am unable to state the quantity obtained. The average earnings however, I should think, would be from about 30s. per week, to £3 or £4 per week in some cases.

I regret to state that the Dunedin Quartz Mining Company, Saddle Hill, has collapsed. Not that there is any want of the precious metal, but owing to the unwillingness of the proprietary to find the necessary capital. On the 29th January last, this mine was visited by Mr. Ulrich, F.G.S., consulting mining geologist, &c., from Victoria, who was then engaged reporting on the gold fields of the province; and that gentleman was especially surprised to find that so little had been done to develop it. It appears that some 2,000 tons of quartz had been crushed, yielding an average of 5 dwts. of gold to the ton. A reference to the return which accompanied my report for the year ended 31st March, 1874, will show that 800 tons had been crushed during the period, yielding an average of 8 dwts. to the ton. Alluvial gold, in payable quantities, was found at Saddle Hill as far back as 1862.

At Hindon—where, some years ago, there were quartz workings and some machinery erected, but also abandoned for want of capital—a reef, called the "Golden Fleece," has recently been prospected for some three miles of its length. Two shafts have been sunk, 100 feet and 60 feet respectively, with good prospects in each; but I have not heard anything further of it for upwards of a month. I have just heard that a seam of lignite has been discovered in close proximity, which, if the prospectors are successful, will materially affect the economical working of the mine.

At the Peninsula, some seven or eight miles from Dunedin, between the harbour and the sea, there exists at Portobello what is called the "Peninsula Reef," opened about four years ago, and referred to in my report of the 13th May, 1873, as a company that had collapsed, from which trial crushings were made in Melbourne, and gold obtained in small quantities; but the result not being considered sufficient to pay, the works were abandoned. Recently, Mr. Ulrich and Captain Hutton, the Provincial Geologist, visited the place and pronounced the rock to be of similar character to that found in Hungary and Transylvania, in which are found rich lodes of silver and gold; and also stated that in Nevada, California, a similar formation occurs; and Captain Hutton stated that he considered the formation identical with the trachyte greenstone of the Thames Gold Field. Mr. Ulrich further stated that, assuming the gold referred to above really came out of the trial crushings, he was surprised that sufficient capital had not been found to work the rock, which, in his opinion, supported by his Victorian experience, would pay handsomely.

I have, &c.,
Alex. Willis,
Warden.

The Under Secretary for Public Works Office, (Gold Fields Branch), Wellington.

No. 18.

REPORT ON THE GOLD FIELDS OF OTAGO, BY G. H. F. ULRICH, Esq., F.G.S.

Presented to the Otago Provincial Council.

REPORT on the AURIFEROUS QUARTZ REEFS and CRUSHING MACHINES of the PROVINCE of OTAGO, with Remarks on Auriferous Drifts, and * Occurrences of Copper Ore, Cinnabar, Grey Antimony, and Brown Coal in Different Parts of the Province.

SIR,— Technological Museum, Melbourne, April, 1875.

I have the honor to submit herewith for your consideration the observations I made during my recent journey of inspection through the quartz mining districts of Otago. The instructions contained in your letter of the 21st December, 1874, were, that I should devote myself principally to an examination of the quartz workings, with the view of reporting generally on their geological relations, and more particularly in regard to any improvement I might be able to recommend in the mode of mining, crushing, or amalgamating, as would come within the scope and means of private enterprise; and further that, if not unduly trenching upon the time required for such examinations, I should pay attention to and afford information on the known occurrences in different parts of the province of copper ore, cinnabar, antimony, and other minerals that came under my notice.

In obedience to these instructions, and mostly under the valuable guidance of Mr. D. MacKellar, the Secretary for the Gold Fields, I have visited all the principal quartz mining localities of the province, viz., Tokomairiro, Tuapeka, Waipori, Bendigo, and the Carrick Range, near Cromwell, Arrow, Skipper's Creek, the Rough Ridge, Macrae's Flat, Shag Valley, Green Island, and Portobello; and besides examining most of the quartz reefs in work or opened, and the crushing mills existing in each district, I also made observations in certain localities on the auriferous drift deposits, and on the occurrences of copper ore, cinnabar, grey antimony, and on some of those—for Otago most important ones—of brown coal. Finding that, in merely working out the copious notes taken during these inspections, very frequent repetitions would be unavoidable, more especially in my recommendations touching the working of the mines, crushing and amalgamating, prospecting, &c., I thought it best to embody the principal observations and recommendations in a general report, throwing into appendices the special description of the mines, and certain information I have to afford of a profitable mode of burning brown coal for boilers, in a fireplace of novel construction, invented in Germany. Having, in forming my opinion on the reefs of the province in their various stages of development, and more especially with regard to their chances of carrying payable gold in depth, taken those of Victoria as my principal standard of comparison, I think it but fair to state my reason for so doing. It will be remembered that a celebrated, perhaps the best, authority on the occurrences of gold in matrix in the older rocks—the late Sir Roderick Murchison—propounded in the third edition of "Siluria," when speaking of the Victorian gold fields, the hypothesis that the gold in quartz reefs would gradually decrease in quantity downward, and ultimately run out, or at least become unpayable to work at a limited depth. His reasons for this prognostication were solely based upon mining experience in other gold mining countries. Nevertheless, the miners of Victoria worked courageously and successfully deeper and deeper, and when thus in later years it was incontestably proved that gold occurred there in payable and even larger quantities at depths which certainly did not deserve to be called "limited," Sir Roderick, in his last edition of "Siluria," fairly withdrew from his original standpoint, acknowledging that the results of quartz mining in Victoria put former general experience at fault, and inferring that quartz reefs of similar character and geological relations might offer similar chances of success in depth.

In more recent years the results of deep mining in Victoria have still more fully established the downward extent of the gold, and several reefs are there at present being profitably worked at depths approaching 1,000 feet. Considering all former experience in gold mining in the matrix in other countries (California excepted), everything concerning mineral character, structure, and behaviour of the auriferous quartz reefs of Victoria in depth, is therefore new to mining science, presenting, as it were, a new experience, fairly applicable in judging of the chances of similar quartz-reef occurrences elsewhere. As I found the reefs of Otago to exhibit this resemblance—in many respects a very close one—to Victorian reefs, I shall, I think, be considered justified in basing my opinion of their prospects upon certain features exhibited by the latter in similar stages of development.

THE AURIFEROUS REEFS.

General Geological Observations.—As introductory to the description of the reefs, the following remarks on the nature of the country rocks in which the reefs occur, or gold has been found in matrix, will save frequent repetitions. With the exception of those of the auriferous locality near Portobello, specially considered further on, the rocks consist throughout, according to my observations, and which are confirmed by Captain Hutton the Provincial Geologist's more extensive and detailed geological survey—of metamorphic schist, *i.e.*, argillaceous mica schist or phyllite, changing from the east towards the west into real mica schist, with subordinate bands of chlorite schist, or chloritic mica schist. The line or boundary where this change takes place has with difficulty been traced by Captain Hutton, but it appears that within the large district on the west, occupied by mica schist, there exists at least one rather large area, viz., the Carrick Range, where the rock conforms in all lithological respects to true phyllite, and this range lies, according to Captain Hutton, within the line of a main anticlinal axis, the existence of which he first established. Whether this inlying patch of phyllite represents a remnant of denudation of a once superincumbent general formation on the mica schist, or whether it simply constitutes an area where the metamorphic action and change were of less intensity, remains a difficult problem, to solve by future investigation. Only at two places within the extensive metamorphic district I obtained evidence of the existence of an intrusive rock, viz., high up the Carrick Range, in small dyke-and-knoblike protrusions of a dark "hornstone-porphyry," and at

* This portion of the Report is omitted, having nothing specially to do with the gold fields.

Alexandra in several specimens of a similar porphyry, said to be derived from a reef-like outcrop (no doubt a dyke) on the northern slope of the Old Man Range. Captain Hutton, and Mr. Coleman, of Alexandra, know of several more dykes of this kind in other localities. Massive occurrences of granite, such as characterize the neighbourhood of most of the Victorian gold fields, are, however, quite absent.

As a general rule, both the phyllite and mica schist, but more especially the latter, are rich in interlaminations of quartz, generally from less than from one-fourth to near one inch in thickness, but sometimes assuming considerable dimensions—one to three feet in thickness—though with no regularity and permanency in strike and dip.

These generally lenticular-shaped masses, and, as a specimen shown me at Alexandra proved, also the small interlaminations of quartz, have at several places been found auriferous, which led to their being erroneously mistaken for true reefs or their leaders; and a considerable amount of money and labour has been wasted in their exploration. As a case in point, I may here notice the workings on the so-called Butcher's Gully Reef, near Alexandra. There, on a rocky, high table-land, consisting of nearly flat-bedded mica schist, full of quartz interlaminations, a fine large shaft has been sunk 60 to 70 feet deep, and furnished with a pump worked by a water-wheel, which received its water supply by means of a long wooden flume from an extensive race on the neighbouring range. Gold at the rate of 6 dwts. per ton is said to have been crushed from the quartz; but as neither in the shaft nor in the stuff worked out of it, nor in the surrounding country, any indications of a reef are visible, the auriferous quartz found must, no doubt, have been derived from one or several of the small interlaminations, and the prospects of the place would, therefore, certainly not warrant further expense in more extensive exploration. There are certain inferences to which the existence of these auriferous quartz interlaminations leads, namely, that they may be more frequent and more widely distributed than hitherto supposed, and that the riches in gold of the drifts of the province are in some measure, at least, due to their denudation. As regards the strike and dip of the schists, they are subject to great changes throughout the country, the former running through nearly all directions of the compass, and the latter from horizontal to vertical, from one side to the other; and these variations are in some places, as for instance on the Carrick Range, so frequent, and exist in such close proximity to each other, as to render the taking of any mean dip and strike quite a hopeless task. I have, therefore, in the subsequent descriptions of the reefs, been in most instances obliged to give merely the relative position of the latter to the country—*i.e.*, whether they traverse the rocks either in strike or in dip, or in both. On the large scale there exists, as already mentioned, according to Captain Hutton's observations, a main anticlinal axis running nearly north and south through the country, including the Carrick Range in its course, from which axis the average dip of the rocks is on the one hand eastward, on the other westward; and in the latter direction, more especially between Arrow and Skipper's Creek, a more than usual regularity obtains in the westward dip, as seen in the ranges bounding the Arrow and Shotover Rivers.

Grouping of the Reefs.—The auriferous reefs opened throughout the province differ very much, both in structure and mode of development. Still, there are some districts of which, though they lie rather far apart, the reefs show much resemblance to each other in the above respects; whilst again in other districts, comparatively close together, the difference in the nature and behaviour of the reefs is very great indeed. Taking advantage of these alliances, in order to simplify the description, the reefs and other occurrences of gold in matrix may be grouped as follow:—

First Group: The Saddle Hill Reef, Green Island, near Dunedin; the Reefs of Tokomairiro (Canada Reef, &c.); the Gabriel's Gully Reef, near Lawrence; the O P Q Reef, Waipori.

Second Group: The Reefs of Bendigo, near Cromwell; the Rough-Ridge Reefs; Conroy's Gully Reef, near Alexandra.

Third Group: The Reefs of the Carrick Range.

Fourth Group: The Reefs of Arrow and Skipper's Creek.

Fifth Group: The Reefs of Macrae's Flat and Shag Valley.

Sixth Group: Exceptional occurrences of gold in matrix—the so-called Peninsula Quartz Reef at Portobello.

First Group: *Saddle Hill Reef, Gabriel's Gully Reef, O P Q Reef, Canada Reef.*—These reefs are true lodes, promising permanency in depth. They have well-defined foot and hanging walls and clay casings or selvages, and cross the country (phyllite) both in strike and dip, though the difference in angle, either in strike or dip, or sometimes in both, is generally not considerable. In their structure, development, and mode of occurrence they resemble very closely a certain class of Victorian reefs, called "Block Reefs," the typical characteristic of which is, that they are composed of generally a number of blocks of quartz, either with contractions of the lode fissures between, or, which is the case here, alternating with blocks of mullock—the latter term meaning gangue matter, consisting of country rock slipped into the lode fissure, where, in course of time, it became more or less mineralized, impregnated with pyrites, and traversed by small quartz veins. These quartz and mullock blocks, which reach sometimes considerable dimensions, extend hardly ever vertically downward, but show an endlong dip in strike within the fissures—north or south, east or west, as the case may be—in the same reef invariably, in the reefs of the same district generally, in the same direction. The feature may, in fact, be considered as an oblique banded structure on the large scale. In the reefs under notice the thickness of the blocks reaches in some cases 12 feet, and their dip in strike is generally at rather flat angles. According to experience, gold occurs both in the quartz and mullock blocks; but the former have hitherto invariably been found the richest, and in them its distribution is mostly not uniform throughout, but, as found in the Gabriel's Gully Reef, for instance, a rich small shoot dips at a flat angle across the block; or, as in the Canada Reef, a number of narrow, richer runs, dipping in the line of the blocks, are separated by poorer quartz; or, as in the Waipori Reef, a certain thickness on the hanging and foot walls is richer than the centre, &c. The appearance of the quartz—and this appertains also to that of the reefs of the other groups—varies very much according to whether the stone

comes from the surface or from beneath the water-level. In the first case, it is white, opaque, and mottled and striped with brown iron ore, or ferruginous slaty matter; in the latter it shows a bluish colour, is slightly translucent and glassy, and full of blackish spots and seams of slaty matter, which, as well as the quartz itself, are more or less densely impregnated with pyrites. With the exception of the O P Q Reef, Waipori, which produced from the old workings a very good average per ton, and promises richer yields from the new ones, the other reefs of this group are rather poor in gold, the yields ranging not much above 5 dwts. per ton throughout. Still, considering the thickness and extent of the quartz blocks, the facility with which they can generally be worked, and that sometimes the intervening mullock is worth crushing, on account of thin rich quartz seams traversing it, they ought to be profitable to work—*i.e.*, on a larger scale than has hitherto been the case—for at least several hundred feet in depth; more especially if attention is paid to the saving and treatment of the pyrites; and the truth of this opinion is in some measure already shown by the results of the Canada Reef Mine, which, though worked by shaft on a limited scale, produces from a depth of 80 feet, according to the manager's statement, a small profit from an average yield of 5 dwts. of gold per ton.

Second Group: *The Reefs of Bendigo, and the Rough Ridge, Conroy's Gully Reef, near Alexandra.*—My reasons for grouping these reefs together are based less upon their exhibiting unmistakable structural differences from the reefs of the other groups than upon their similarity to each other in several respects, touching mode of development and relation to the country. Their thickness is, in the average, but small, ranging generally from one half to two feet, and exceeding rarely four feet, and as far as workings have proved, they do not consist of solid quartz throughout, and but seldom so for any considerable extent in strike and dip (Logan's Reef). They represent, in fact, in certain respects, "block reefs," though with this difference from the true reefs of this class, that blocks of quartz and mullock of irregular size and outline are more or less irregularly intermixed, and do not, as those of the latter do, dip at certain angles, and in the same direction in strike. Most of the reefs of Bendigo show well-defined walls with clay casings, strike nearly uniformly east and west, are mostly traceable for long distances, and—what constitutes them very "strong" ones in a mining sense, and indicates permanency in depth—they traverse horizontally, or very flat-bedded mica schist vertically, or at very steep angles. The reefs of the Rough Ridge vary in strike, though not at large angles, and most are not traceable far in strike. They are generally not so well defined as those of Bendigo, and seem liable to frequent irregularities in strike and dip, contractions, and more especially to being faulted by slides; but these unfavourable features are apparently the results of surface disturbance only, and may disappear in depth. It is not uncommon, both at Bendigo and Rough Ridge, that reefs split in strike into branches, which, though deviating at first from, assume gradually again the strike of the main reef, and run thus pretty close and parallel together, some increasing to the same or even a greater thickness than that shown by the latter.

Besides "leaders" that dip towards them, so called "droppers," dipping at generally flat angles away from them, have also been observed in some of the reefs at both places. With regard to the mode of occurrence of the gold, the comparatively superficial work done on most of the reefs hardly permits to form a definite and generally applicable opinion. Judging, however, from those most extensively and deepest worked, it would seem that the metal is accumulated in rich shoots of variable width, that dip at rather steep angles in strike in the quartz blocks; whilst the portions intervening between the shoots, including the mullock patches, are poor, but generally rich enough, or of such limited extent as to render it the most economical to work them with the rest, without resorting to special selection. Excepting the yields from Logan's Reef, as unusually rich ones, those from the other reefs have been by no means low in the average, as they ranged up to 2 oz. per ton, and from hardly a single reef were they reported much below half an ounce per ton. Considering this, I was much astonished to see so many of the reefs and claims neglected (at the Rough Ridge over twenty claims were once worked, whilst at present only a single one); but the reason was explained to me to consist partly in the high prices charged for crushing, partly in expensive cartage, and more especially in the want of enterprising miners, those who worked the top having become afraid of the hard work and expense required in contending with the water. With regard to the prospects of the reefs in depth, I consider them, where the reefs are well defined, as favourable, both as concerns persistency in auriferous character and regularity in average size. But in speculating upon profits to be derived from future working, several important points must not be left unconsidered—namely, the comparatively small size of the reefs, expenses connected with getting rid of the water, and greater difficulty in extracting the gold from the quartz; for below the water level, which lies in several of the reefs considerably higher than one would suppose from their elevation above the nearest permanent surface water, the seamy quartz is throughout very metalliferous; in fact, it promises at greater depth to become more highly charged with metallic sulphides (iron and arsenical pyrites, galena, zincblende, &c.) than in any of the reefs of the other districts I examined. Timely attention to improvements in the gold-saving appliances is therefore highly advisable. The expense of working narrow reefs will, in depth, also considerably increase, in consequence of the increasing hardness and closeness of the country, which latter is comparatively more unfavourable to work on account of its horizontal bedding. However, against this may be placed, as a perhaps more than adequate set-off, the high dip of the reefs, which much facilitates working, and what is of greater importance, that the hardness of the rock in conjunction with its horizontal bedding renders the supporting of the workings very cheap and simple.

Third Group: *The Reefs of the Carrick Range.*—The generality of these reefs present in several respects quite distinctive characters from the reefs of the other groups. They are peculiar clayey ferruginous "mullock reefs" or rather "quartz-mullock reefs," so soft that they can mostly be worked by pick, without the aid of boring and blasting; and the quartz, which apparently forms no large percentage of their mass, occurs only in the shape of coarse sand and small angular and slightly rounded pieces—such reaching or surpassing the size of a fist being rather rare. Whether it represented originally interlaminations in the mullock, or was formed in veins, is uncertain, but a kind of banded structure in the line of dip of the reefs speaks in favour of the latter. These reefs vary in thickness from less than 1 foot to over 6 feet; they strike in all directions across the country, but are only of

short extent, and differ very much both in direction and angle of underlay, the latter ranging from vertical to less than 20°. Some of the reefs show also much irregularity in their course, for they expand and contract, twist and curve in strike and dip in quite a peculiar manner, and are, what is the case also with most of the others, frequently faulted by slides and cross-courses, so that it requires very great attention and perseverance on the part of the mining managers not to lose them. Considering all these points in connection with the fact that the country—a rather soft phyllite—is also very much disturbed, both in strike and dip—steep and flat dips alternating and changing in direction within short distances—it appears next to certain that not only the peculiar soft and gravelly nature of the reefs, but also the exceptionally flat dips of some are not original, but due to strong pressure, friction, upheaval, &c.; and as the cause of these disturbances appears the most likely the intrusion of the dark hornstone-porphyry, which, as mentioned at another place, occurs in small knobs and dykes at several places on the range (near Carricktown). Unfavourable as these features no doubt appear, touching straightforward and uninterrupted working of the reefs in future, I feel no apprehension of the latter giving out suddenly, or at a limited depth, for they are in every respect true lodes, crossing the country both in strike and dip, and showing most frequently the hanging wall, less frequently the foot wall, and in some instances both walls well defined and separated from their mass by clayey casings, mostly polished and striated, representing the so-called "slicken-sides," which afford unmistakable proof of movements of the walls of the reefs.

The gold, both in the quartz and mullock, is very fine, and, owing to the soft and ferruginous nature of the stuff, specks can but very rarely be seen during working. Judging from the crushings and occasional washing of prospects, it occurs chiefly in shoots dipping in strike, less in irregular patches, but seems also to be pretty generally distributed throughout the whole extent of the reefs, as far as opened. The yields of most of the reefs opened have in the average been very fair, as they ranged between $\frac{1}{2}$ and $1\frac{1}{2}$ oz. per ton. On account of its softness the quartz mullock is easily crushed, but the saving of the fine gold requires great attention; and, as the supply of water, which the proper treatment of this kind of stuff requires, is rather above the average, but has at the existing machines been frequently much below it, and their saving appliances are not the most suitable ones besides, I am sure a great deal of the gold has been lost in the tailings. There is at the level of even the lowest workings not much pyrites observable in the reefs: still the ferruginous character of the mullock, as being no doubt a result of its decomposition, points to its former presence in larger quantities, and it may with certainty be expected to increase in abundance in depth. As regards the expense of working the reefs, the soft nature of both the mullock and country renders it small in one respect, viz., that of exploitation proper; in another, however, viz., that of supporting the workings, rather large, on account of the high price of timber, and the expense in this respect increases of course, in order to avoid accidents and collapse, the flatter the dip of the reefs. Fortunately there are on this field experienced managers and miners, well able to cope with this difficulty in the most economic and practical manner.

Fourth Group: *The Reefs of Arrow and Skipper's Creek.*—The only reefs of this group in course of being worked, and of which I was able to examine the workings, are "Southberg's" and the "Nugget and Cornish," Skipper's Creek; still, from examination of the outcrops of some reefs at Arrow, and information received about the character of a number of others once worked, but since abandoned, in both districts, I was enabled to form the following opinion on the general character of the group: These reefs are true massive lodes, ranging from 4 to over 20 feet in thickness, which cut through the country both in strike and dip—the latter being generally steep—and show more or less well-defined walls, with clay casings; a number are traceable for long distances—some for miles—in strike. In point of composition and structure they approach, however, far more mullock reefs than true quartz reefs—they represent, in fact, fissures partly filled with *débris* from the country, full of interlaminated quartz, partly occupied by bunches and veins, of variable size, of true reef quartz. The mullock seems in the larger reefs to be generally predominating, and forms, in places where their width very much increases, by far the greater part of their mass. In fact, experience tends to prove that the thicker a reef is, or the wider it becomes, the more mullock it contains, whilst, on the contrary, decreasing thickness is connected with a relative increase in quartz, and the reefs become also better defined. The bunches and veins of reef quartz occur either on the hanging or foot walls, or on both walls, rarely in the centre. They appear to dip shoot-like in strike, and are generally payably or richly auriferous; but the somewhat mineralized mullock, with its interlaminations and fine cross veins of quartz, has also, in all the reefs opened, been found to contain gold throughout, though generally only in payable quantity within the line of the quartz shoots, or where the reefs much contract in size. The yields have ranged from several dwts. to over 4 oz. of gold per ton, but average from the reefs at present worked about 10 to 16 dwts. per ton. Although none of the reefs at Skipper's Creek have as yet been opened below permanent water level, they are already highly charged—both quartz and mullock—with pyrites, which seriously interferes with the satisfactory saving of the generally fine gold during crushing. This led the Phœnix Company, after Mr. F. Evans, the manager, had proved the payably auriferous character of the ore as such, to erect in connection with their crushing mill the necessary works for extracting the gold from the large quantity of it saved on long blanket strakes. The country is, with regard to most reefs, very favourable for their being easily and cheaply worked, owing to the highly precipitous nature of the mountains which they traverse, and the deep valleys and gorges from which they can be opened, either directly in strike, or by but short cross adits. Still there is at Skipper's Creek one serious drawback to regular and systematic working, affecting the most important of the reefs within certain depths, namely, although the country rock—mica schist—appears on the large scale but little disturbed in strike and dip, it is throughout highly fissile, and traversed by numerous cracks and joints; and these features combined, aided by percolation and freezing of water, have originated enormous slips from the precipitous mountain sides—faults, in a certain sense—by which the continuity of the reefs is completely broken. In fact, nowhere on the slopes of those steep mountains can the miner be certain of having a reef exactly in its original place or unshifted. These disturbances, which render working dangerous and cause much expense in timbering, extend, however, to within the level of the nearest gorges or valleys only; below this, there is every

probability of the lay of the reefs becoming less broken, though the existence of smaller faults and other irregularities must there also be apprehended on account of the fissured nature of the country. As regards the continuance of the gold in depth, I see no reason to doubt it, yet I think it very likely that the doubtless increasing abundance of pyrites may, as in Victoria—and this refers also to the reefs of all the other groups—be connected with a corresponding decrease of fine, free gold, in depth.

Fifth Group: *The Reefs of Macrae's Flat and Shag Valley.*—In point of definition and mode of occurrence these reefs, which I found all deserted, are, in my opinion, the least promising ones of the province. Judging from those I could examine, and information obtained about a few others that have been prospected, they represent either so called "layer-lodes" (Duke of Edinburgh Reef, Macrae's Flat, Shag Valley Freehold Company Reef), or are merely interlaminations between the beds of phyllite that form the country in both districts.

Touching the layer-lodes, their general characteristics are, that they strike and dip with the country, having the foot wall (one and the same country) generally pretty smooth throughout; but the hanging wall mostly quite irregular, uneven and traversed by leaders. They are, on account of this mode of relation to the country, subject to all the changes in strike and dip of the latter, and, if these are great, are liable to frequent changes in thickness, and can generally not be depended on for persistency in depth. In the cases under notice, the stratification of the country is fortunately pretty regular, and all points are therefore in favour of the reefs being also more regular in course and thickness, and having a better chance of persistency in depth than is usually the case. Their dip is rather flat (less than 45°), and they are from 2 to 5 feet thick in the average, being composed of mullock and rather good-looking quartz; the latter generally predominating and occurring in bunches and veins, mostly on the foot wall, sometimes on the hanging wall, or being irregularly intermixed with the mullock. The gold occurs both in the quartz and the mullock, though mainly in the former, and the yields have ranged from a few dwts. up to 2 oz. per ton, but did not pay in the average; therefore the reefs were abandoned at a very shallow depth. Considering that the gold did not run out, and that the reefs, as far as opened, show a good thickness for considerable extents, in connection with the circumstances under which they were worked, the advisability of giving them another more extensive and systematic trial certainly deserves consideration. With regard to the interlaminations, which were considered to be reefs, and of which some are in places several feet thick, they conform in all respects to what was said about these bodies in the beginning. That they are quite unreliable, concerning gold-bearing character and extent in strike and dip, is proved by the fact that, though several carried good gold (above 1 oz. per ton) near the surface, either their irregularity or impoverishment, or both cases combined, rendered working soon unpayable, and they were deserted in consequence, and, I may remark, do not invite renewed and more extensive prospecting.

Sixth Group: *Exceptional Occurrences of Gold in Matrix.—The so-called Peninsula Quartz Reef at Portobello.*—These curious occurrences of gold, which I inspected, in company with Captain Hutton, the Provincial Geologist, do not, though believed to do so, represent a quartz reef at all, but are, as far as the superficial workings and the reported results of trials allow one to judge, impregnations of gold in a finely divided state through various kinds of rock that will be described farther on. In a geological point of view the auriferous locality and neighbourhood are the most interesting I have seen during my visit, and would well deserve a special detailed topographical and geological survey. True trachyte, trachyte-breccia, and tufa, and indurated ash-beds, broken through by dykes, and irregular dyke-like masses of basalt, compose principally, as it seems, that part of the Peninsula, whilst sedimentary rocks—sandstone and limestone—the geological relation of which requires yet to be determined, form apparently a narrow strip between it and the mountain on which Mr. Larnach's mansion is built. This mountain, consisting in its upper part of trachyte and basalt intermixed, seems from half-way down its slope, towards the base, to be composed of sandstone, which in a small quarry is clearly seen to dip underneath the volcanic top rock. As regards the places opened—four in number, in three of which gold has been proved by trial crushings to exist—they lie pretty nearly in a line (the supposed line of reef) down the steep slope of a mountain, at that part composed of greyish-white trachyte. Progressing from above downward, the place highest up the slope consists of an old sawpit, from which a short prospecting drive has been put into the mountain. Quartz of a rather concretionary character was here found in the shape of an irregular bunch, enclosed within trachyte—the whole quantity lying about amounting to about one ton. In this no gold was seen and no trial was made of it, but a specimen has been reserved for assay. The second opening, about 100 feet lower down hill, is a small shallow excavation in trachyte, which is here full of silicious segregations of irregular outline—some nearly one foot in diameter—of a quartzite-like character and bluish-white colour ("bastard quartz," in miners' phrase), in which very fine grains of pyrites can be seen in abundance. Of this stuff, of two trial crushings, one of 2 cwt. gave 18 grains, the second of a ton yielded ½ oz. of gold; and Messrs. Forbes and McAuley, the prospectors, who kindly showed us over the ground, affirmed that they could wash a pretty fair prospect of fine gold from every tin dishful of the small stuff excavated. In the third opening—a small open cutting, some 60 feet below the previous one—very close-grained white trachyte was excavated, of which a trial crushing of a ton yielded 3 dwts. of gold. The fourth and last opening lies at the foot of the mountain, and consists of a good shaft of 40 feet in depth, with a small drive at the bottom. It penetrated for the first 25 feet through loose ground, and the last 15 feet through a decomposed cap into a hard coarsely crystalline rock, composed of hornblende, triclinic feldspar, and some quartz, and being more or less densely impregnated with very fine grains of pyrites. This rock continued also in the drive. Three trials were made, viz., two of the hard rock of 1 ton and ½ ton, which yielded respectively 8 dwts. and 11 dwts. of gold; and the third of 1 ton of the softer decomposed cap-rock, which gave, strangely enough, only 6 dwts. of gold, whilst generally decomposed portions of pyrites-bearing rock are richer than undecomposed ones. All the recorded trial crushings were executed at a good battery in Victoria, and, in order to remove further doubt about the genuineness of this strange auriferous character of the quartzose white trachyte, and the rock from the shaft, several small parcels were most carefully tried in Dunedin, and these all produced gold. Accepting the auriferous character of the rocks, therefore, as satisfactorily proved, and

considering that between the places opened there exists virtually not a feature such as would indicate a narrow auriferous zone or streak in their line down the mountain side, whilst it would seem very improbable that just per accident the auriferous portions of the rocks were opened and exhausted, we must come to the conclusion that there is a great likelihood of the gold being generally disseminated—richer and poorer in places—through these peculiar varieties of rock as far as they extend. As the matter stands, the average results of the washings from Nos. 2 and 4 workings are certainly such that, taking into account the facilities the ground offers for mining, abundance of timber close to, &c., they should render working on a large scale, with ample crushing machinery near at hand, highly payable. Considering this, it would be really deplorable if the still lingering doubts of the reliability of the results of the trials made, *i.e.*, whether the gold really came out of the stuff and not out of the crushing machine, were not definitely set at rest by a further and more extensive trial, say of 10 to 15 tons from each of the two good places.

Strange as the occurrence of gold in such matrix, and under such circumstances, no doubt appears, it is in reality not without its alliances—at least, in certain respects—both in another part of New Zealand and in foreign countries. Captain Hutton, who is intimately acquainted with the Thames Goldfield, North Island, recognised at once a certain resemblance between the geological features of the locality under notice and those of the Thames district. He thought the greyish white trachyte of the former looked much like the gold-bearing trachyte-tufa of the Thames, though there, as well known, the gold is found in bunches and veins of genuine quartz, and does not occur finely disseminated through the mass of the rock. The hard crystalline rock of No. 4 workings, he also considered similar to a rock, of which dykes traverse the original tufa of the Thames, but which itself had not been found auriferous. As regards my own experience touching this rock, I think the latter bears considerable resemblance to certain trachytic rocks (trachyte greenstone) which I have seen on a journey through Hungary and from Transylvania, and which are there rich in auriferous silver and lead lodes. But from comparative examinations of specimens, I can also state that in mineral composition it is quite identical with, and in appearance hardly distinguishable from, the quartzose diorite greenstone of some of the dykes which in Victoria traverse upper Silurian rocks, and are themselves traversed by generally highly auriferous quartz veins. That the rock is, notwithstanding this latter close resemblance, of volcanic origin, and represents in reality "trachyte greenstone," there can hardly be a doubt, however, on account of its mode of association with the typical trachyte of the locality. For besides in the shaft, close round which the greyish white trachyte is plainly exposed, outcrops of it (the greenstone) have also been found in several places in a neighbouring gully which cuts through trachyte, and on the slope of the trachyte range. According well with this opinion about its origin, and what it lithologically represents, and further showing the importance of this find of rock, is what the celebrated geologist Von Richthofen reports from the Washoe country and other parts of America, namely, that the rock there most prolific in gold and silver lodes is a volcanic rock of the trachyte series, closely allied to diorite both in composition and appearance, and for which he proposes the name "Hornblende propylite." Considering all the foregoing observations in connection, there exists, besides what we already know of their auriferous character as such, the chance that any quartz reefs or veins found traversing the trachyte and trachyte-greenstone in the locality under notice, or in fact wherever they occur, may prove highly auriferous. And on this account not only the neighbourhood of the workings, but the whole of that part of the Peninsula is well worth a thorough prospecting, the shore line, showing the rocks generally plainly exposed, offering in this respect special advantages.

Modes of Opening and Exploitation of the Reefs.

Opening of the Reefs.—As the steeply mountainous, rugged, and broken character of the country where most of the reefs are situated affords special facilities for their being opened and worked by adits, or tunnels, as they are generally though incorrectly called*, this method has exclusively been made use of, and there are but few reefs which had by necessity to be opened by shaft (Saddle Hill Reef, near Dunedin; Criterion Reef, Arrow—lying in low flats), or for which economic reasons, obtaining of quick returns, &c., rendered shaft sinking the most advisable at the start. Touching the facilities afforded by the adits in working the reefs, they are in all cases, no doubt, more or less considerable, according to circumstances; but with regard to positive advantages in a money point of view—considering in comparison the cost of working by shaft to the depths the adits come in—they appear in some instances very doubtful, or are quite on the side of the latter method. Want of water power, and great expense connected with employing steam power for hoisting the stuff and pumping the water, as also the procuring of easy transport of the stuff to the crushing machines, formed in these cases the main reasons for driving the adits, but then some of the latter might, at a comparatively small increase in expense, have been at once put in much lower; or more careful calculation and scrutiny of circumstances at the outset would in another case have clearly shown that the length, respectively to the cost of the adit, was out of all proportion to the small height of reef overhead available for working, and that the water difficulty might at that depth have easily been overcome by horse-whim. It is not, of course, possible to lay down special rules, applicable in all cases, touching the advisability of opening reefs by adit instead of shaft, for local circumstances differ, and monetary reasons come into play; however, I may draw attention to several general or, as it were, starting points that ought never to have been left out of sight in the consideration of cases in point:

1. If adits can be driven direct in the lines of strike of reefs in which the gold occurs in such a way that they (the adits) prove productive workings from the commencement, they offer the greatest advantages as compared to shafts.

2. Where the direction of an adit would have to be at right angles, or obliquely against a reef, representing deadwork, the whole capital required in its construction must be considered as lost, or calculated as part working expenses of the portion of the reef available overhead, if, when this is worked out, a new lower adit can be driven for working the reef under foot; for it (the upper adit) is thereby

* To be tunnels, in the strict acceptation of the term, they ought to run right through the mountains, each connecting two points on the surface, which none of those under notice do.

generally rendered quite useless. It maintains, of course, a certain value, if shaft sinking from it, and erection of hoisting and pumping machinery in a chamber constructed inside, have to be adopted for deeper working. But in such cases it is generally questionable, considering the discomfort and greater expense of this method, whether the working by shaft right from the surface might not in reality have been the cheapest at the start.

3. Whilst every lower adit will generally be much longer, and consequently more costly than the preceding higher, useless one, and take a longer time in construction, a good shaft remains permanently useful for direct deeper working, and in the generality of cases a new block of a reef will thereby be opened far sooner and cheaper than by a long adit coming in at the same depth. Where adits are considered the most advantageous, and the prospects of a reef under-foot of an upper adit warrant it, an intended lower one should by rights always be commenced at the same time as the exploitation of the reef above the upper adit, in order to render the interval between the productive periods of working as short as possible.

4. In case of the abandonment of a mine, the machinery attached to a shaft has always a certain value.

These several conditions on the question of "shaft *v.* adit" are only intended, however, to bear upon the real opening and working of single mines. Shafts are out of the question in the case of large main adits, intended for working several adjoining mines or of draining them of water, or of such to be driven for prospecting purposes at considerable depth across the country. For both these kinds of adits, the Carrick, Bendigo, and Skipper's Creek districts offer special inducements and facilities; and whilst at Bendigo a Deep Tunnelling Company is already in operation, another is contemplated to be formed at the Carrick Range. Particulars about these are given in the respective appendices.

Exploitation of the Reefs.—The matter of exploitation, or of working the reefs, practised in the progressive mines of the different reefing districts, is, one single case excepted, "over-hand stoping," and I must say that, unless the broken nature of the ground prevented it (Nugget and Cornish, Skipper's Creek), wherever the mines were far enough advanced (most of the mines on the Carrick reefs), I find this mode of working carried out systematically, and with due regard to rendering levels and winzes safe, by timbering and filling worked-out places with mullock. The exceptional case alluded to is Logan's Reef Mine, which, considering the small width of the reef, is, contrary to general mining rule, worked by "underhand stoping," and very economically, I must admit; yet, in a certain measure, at the expense of safety to the workmen, by not properly filling the worked-out spaces with waste. Speaking generally, this method, which is only practised in very wide lodes (two to three fathoms)—for instance, in Cornwall—has, no doubt, many advantages over stoping over-hand; but also very serious disadvantages. As the principal advantages may be mentioned, that working, by being carried on downwards, is easier, allows the use of heavier tools, and the men stand secure and convenient; whilst in over-hand stoping it is more inconvenient and tiring, though the weight of the rock, in acting downwards, facilitates it; it is also more dangerous, especially in jointed, fissured, and loose ground, as the men have to work underneath. The disadvantages of underhand stoping consist chiefly in the great expense entailed by the necessary timbering and mode of disposing of the waste in the filling up of the worked-out places, it (the waste) having to be piled on platforms in front of the stopes. Next comes, that more manual labour is required in raising the ore from stope to stope, that the miner has to contend with water, and is often troubled with bad air. These drawbacks are so serious that, according to mining report, the method comes more and more out of use, and is likely to be entirely superseded by over-hand stoping. As working is at present being carried on in the progressive mines I examined, hardly anything is done in prospecting the country in the hanging and foot walls of the reefs; but as this is of great importance and often very profitable, touching the discovery of rich, small companion reefs, branches and leaders, the driving of occasional small crosscuts ought not to be neglected. Before leaving this subject I have to draw special attention to one great defect I found in the management of most of the mines, namely, the non-provision of correct and detailed plans of the workings. I need not enter upon detailing the advantages such plans have in the systematic management of a mine, and the understanding and tracing of occurrences of unforeseen mining features (faults, turns, breaks of the reefs, &c.). Every experienced mining manager knows these well enough. But I must say that, before entering upon the driving of adits, preliminary mining surveys of the ground and the preparation of working plans are quite indispensable, in order to avoid false conclusions as to distances, errors in direction, &c. (See Lucknow Reef, in appendix 6.) The reason of these deficiencies hitherto consists, I was informed, in the want of qualified mining surveyors, and, considering the importance of the subject, I would therefore take the liberty to recommend the Government to appoint several surveyors of this class for the principal mining centres. Touching the duties of these gentlemen, they might, as is the case in Victoria, consist in the surveying of leases and claims, and in the execution of over and under-ground mine surveys, all which, as private work, to be paid for by the parties requiring it; whilst, during intervals between such work, the preparation for the Government of detailed topographical plans of the mining districts, to aid geological examination, might be carried on at certain fixed rates.

Chances of Prospecting for New Auriferous Reefs.

As regards the chances of the occurrence of other auriferous reefs in the districts under notice, I consider them to be very good. In the neighbourhood of Saddle Hill Reef, several (four) good-looking, strong reefs crop out, which, as superficial prospecting has already proved them to be slightly auriferous, might likely yield payable stone on being tried at other points in their lines of strike. But, besides this, there is, in my opinion, a very good chance of the existence of an auriferous reef about the head of a highly auriferous gully, worked abreast of the Saddle Hill Reef, on the right hand side of the main road leading from Dunedin to the Taieri. In the neighbourhood of the Canada Reef, Tokomairiro, the finding of rich quartz specimens outside the lines of the reefs opened, coupled with that of rich, nuggetty gold in the north branch of the Tokomairiro River, is pretty good evidence of the occurrence of other auriferous reefs in that district. That the Gabriel's Gully reef should be the only auriferous one in the Tuapeka district is also very unlikely. And, touching the country round

Waipori, where no systematic prospecting seems to have been carried on at all, I feel quite convinced that good reefs exist besides the one in work—not only in the neighbourhood of the latter, but also in the ranges on the opposite side of and about the head of the Waipori River,—in order to account for the gold in the drift of the Waipori Valley, the angular specimens of auriferous quartz, and the patches of highly auriferous angular drift found here and there in the ranges. At Bendigo, the Carrick Range, and Skipper's Creek, where the tracing of auriferous gullies and quartz specimens led, I was told, to the discovery of most of the principal reefs worked, though some showed by no means plain outcrops at the surface, partly by reason of their mullocky character, partly on account of being covered by detritus or being disturbed. And these features are the most serious obstacles the intelligent prospector has to contend with in these districts, for that the latter are promising fields for further discoveries of quartz reefs is plainly indicated by numerous auriferous alluvial gullies and creeks, and the occurrence of quartz specimens outside the drainage range of the known lines of reefs. The recent discovery, by tracing specimens, of a new reef in the Bendigo district presents a case in point. The same reasoning, based upon similar data, applies more or less to all the other reefing districts (Arrow, Rough Ridge, &c.). And not to them alone, but also to the north and south slopes of the Old Man Range, and to the rich alluvial diggings dotted along the edges of the Manuherikia, Idaburn, Upper Taieri, and other main valleys, though the reefs that, in the latter cases, supplied the gold to the drift would most likely lie in the ranges at the heads of and bounding the permanent creeks and rivers, entering the main valleys at, or in the neighbourhood of, the diggings. With regard to accepting the occurrence of massive auriferous drift or of mere surface at any place in rangy country as a promising indication of the existence of auriferous quartz reefs in the neighbourhood, the prospector ought to pay special attention, however, to one point, viz., to the nature of both the drift and the gold, *i.e.*, whether the pebbles and gold-specks are waterworn or not. For, if the first is the case, the deposit may be a remnant of a former terrace formation far transported from its original source, whilst the more angular the stones, the more hackly and crystalline the gold specks are, the nearer lies their place of derivation. There is one district (I had no time to visit it) hitherto only known as an alluvial diggings, which, according to information kindly afforded to me by Messrs. L. H. Preston, Jenkins, McDougall, and Smith, of Arrow, presents first-class indications of being a good reefing district. This refers to the Twelve-Mile Creek diggings, and mainly to the Great Barrier Range, in which the Arrow and Twelve-Mile Creek take their rise, and that forms the watershed between them and the Shotover River, the position of the tract being pretty nearly in the line of strike of the Skipper's Creek reefs. A big reef runs right along the top of the range, and in the drift of the top part of the Twelve-Mile Creek, Scanlan's Gully, Specimen Point, and in that of Rodger's Gully and Tobin's Point, at the head of the Arrow River, rich quartz specimens were frequently found, and shown at the stores and banks of Arrowtown; whilst, at certain points in the Twelve-Mile Creek, large quartz specimens can be seen—one of nearly half a ton in weight—showing fine specks of gold all over. The gold obtained from Rodger's Gully was generally so quartzose that it required careful crushing and separation of the quartz before it could be sold. Lower down country, about half a mile from the junction of the Twelve-Mile Creek and Arrow River, a mullock reef, full of quartz veins, appearing as a wall-like formation on the mountain side, was cut through by a race, in which it proved to be 8 feet thick, showing well-defined walls, and dipping nearly vertical. Its promising appearance led a party of miners, some time ago, to prospect it, but, though gold was found in the stuff, they deserted the reef again, and no work has been done on it since. Strong evidences of auriferous reefs are said to abound in many other places on the Arrow River and over the Twelve-Mile Hill, and only await the pick of the enterprising prospector for their development.

Concluding with a general comparison between this province and Victoria as to the facilities and chances of prospecting, I must say that this work—looking at it in a strictly mining point of view only—is here much more difficult than in Victoria; for, whilst there, reefs consist mostly of massive white quartz, and are plainly exposed on the surface, they are here more frequently of a mullocky character, and more or less covered over by detrital matter. And there is besides one striking difference between the two countries, namely, that whilst in Victoria reefs abound all through the gold fields, but, as the saying goes, ninety-nine in a hundred prove barren, here they are comparatively very scarce, but with this redeeming feature, that nearly every one hitherto found has proved to be auriferous, and therefore we may fairly assign the same chance to any new ones discovered in future.

Crushing Machinery and Gold-saving Appliances.

The number of crushing machines erected and in course of erection at the different gold fields I visited, amounts to twenty-one, eighteen of which—including two near completion—are for quartz crushing, whilst the remaining three—including two in course of erection—are for crushing the cement of the Blue Spur.

Crushing Machinery.—Speaking of the crushing machinery proper, all these machines are, with but slight variations, constructed after the same model, viz., they consist of batteries of revolving stamps, four and five in a battery, worked in cast-iron coffers on false bottoms, and being partly fed by hand, and partly supplied with self-feeding hoppers. As far as I could see, they are all well and substantially erected, the comparative freedom from jar of those I found at work proving their stability, and that due care had been bestowed upon the preparation of their foundations. At one or two machines the discs on the shanks were not quite in order, and the wipers too long, but the managers knew of these defects, and were going to repair them. On the, at one time in Victoria, much-discussed question, whether round stamps are equal in crushing power to square ones, I need only remark that careful experiments under equal conditions have proved that they are nearly, if not quite, as effective as the latter, whilst their wear and tear, in consequence of the turning, is in the average less. In the weight and lift of the stamps, and the speed at which they were driven, there were considerable differences between the machines, the weight ranging from 4 to 7 cwt., the lift from five to eight inches, and the speed from 56 to 85 blows per minute. As regards the most advantageous weight for stamps, opinions are still divided in Victoria; still, heavy stamps are, on account of greater efficiency on the generally hard quartz, the most in use. In my opinion, a medium of about 5½ to

6 cwts. would best suit the character of the stuff of most of the Otago reefs, though for such, consisting principally of hard, more or less solid quartz—as, for instance, Logan's Reef, the Canada Reef, &c. —stamps up to 8 cwts. would, no doubt, be preferable.

Touching the height of drop and speed of the stamps, the former should not be less than seven inches, and might advantageously be increased to nine inches, especially if the stamps are light; whilst touching the speed, it is generally considered best at the rate of 75 to 80 blows per minute. On the amount of stuff crushed during a certain time I could not obtain any definite information, but the figures given seemed to me to be rather low, and in order, therefore, to show what ought to be done under certain conditions, I may mention that at the Port Phillip Company, Clunes, stamps of 6 cwts., driven at a speed of 75 blows per minute, and with a drop of eight to nine inches, crush in the average 2 tons 4 cwts. per 24 hours; whilst others of 8 cwts., with the same fall and speed just given, are expected to reduce each up to 5 tons per diem. Regarding the iron coffers, they seemed to me rather, if not too shallow for both economic and effective working. They allowed hardly one inch of loose quartz to be put beneath the false bed-plates, and it would, therefore, require the greatest care in the placing of these plates, the feeding, &c., to prevent the plates from working unevenly into the shallow gravel bed. In fact, I think it can hardly be avoided that they (the plates) come frequently in contact with the iron bottom, the result of which, of course, is, as the sound of the blows already indicates, ineffective working and great wear and tear—sometimes even an unexpected breaking of the coffers. On this account I think it would certainly be advisable to have the latter, say, about two inches deeper, so as to allow a gravel bed of three inches beneath the false bottoms. Considering that the office of these latter is not only the saving of the coffers from wear and tear, but mainly to prevent the gold from being smashed too fine, or "beaten dead," as it is called, they should be only of the same size as the stamp-heads, in order to leave sufficient space around them for the liberated gold particles to get into the gravel out of reach of the stampers.

The provision of self-feeding hoppers—a great desideratum for saving labour—has been neglected at a great number of the machines, and would deserve early attention. Many practical quartz crushers consider, and no doubt rightly, that hand feeding, if properly executed, is more effective; still it is extremely doubtful whether, especially in the case of small machines, the value of the increase in the quantity of stuff crushed is equal to that of a man's labour; in my opinion, this labour is far more profitably applied to attending upon the gold-saving appliances. With only one or two exceptions, I found the great defect of the coffers having only front discharge; for it must stand to reason that, as it is, or ought to be, the aim to get the finely crushed material quickly out of the boxes, large escapes both in front and at the back are the most effective. Of course, such a double-discharge arrangement necessitates a corresponding increase in the quantity of water to be supplied per stamp-head: a supply of from five to eight gallons per head per minute, regulated according to the weight of the heads and the nature of the crushing stuff, would, however, satisfy all requirements. The gauge of the gratings, varying at the different machines from 122 to 144 holes per square inch, is, I think, scarcely well adapted to the nature of the stuff treated; for, as the gold is mostly very fine, the gratings should be very fine also, in order to insure the necessary degree of reduction for a satisfactory liberation of the gold particles. Gratings with 169 to 196 holes per square inch would certainly be safer.

Gold Saving Appliances.—As regards the gold saving appliances in use, they consist, with the exception of two machines, which have deep drop-ripples attached, of amalgamated copperplate tables, in some instances with improvements in the arrangement of the ripples, and all, except the cement crushing machines, have various length of blanket-strakes succeeding. During working, it is the regular custom to put quicksilver into the stamper boxes. For the treatment of the blanket sand, serve the common revolving barrel with shaking table or ties attached, dolly tubs, small Berdan machines and simple ties, though the latter inferior appliances at a few machines only. Although generally well constructed and carefully attended to, as I found these appliances at the machines at work, and as they respectively are, and were said to be at those at a standstill, most of the managers I came in contact with were well aware that they lost a considerable percentage of the gold, and in some instances notable quantities of quicksilver besides. Considering this general loss, which in some establishments was occasionally much increased through an insufficient supply of, and the use of muddy water, I attribute it mainly to three causes, viz., the use of amalgamated copper plates, too strong an inclination and insufficient length of the blanket strakes, and last, though not least, to the introduction of mercury into the stamper boxes. It would lead too far here to enter into a discussion upon the merits or otherwise of copperplate tables generally; suffice it to say that tables of the same pattern as those under notice were, at one time, in high favour in Victoria, but careful trials soon proved their inefficiency in many respects, and they have at all the principal crushing establishments been long ago discarded in favour of more perfect appliances, which I shall mention further on. According to Küstel and other authorities on the subject, they have also suffered a similar fate long since in California—the country where they were first introduced. The putting of quicksilver into the boxes is no doubt a great improvement in case of copperplates being used, but it is fundamentally detrimental in the crushing of stuff so highly charged with pyrites as most of the Otago reefs produce. For it is a well-known fact that pyrites generally, though certain kinds more than others (and these abound in the latter reefs), cause a flouring of the mercury and amalgam in the boxes, and for the saving of such floured stuff no method has yet been discovered. On this account I would therefore strongly advise to abandon the practice, even in case of copperplates being retained; for the loss both in quicksilver and gold caused by it alone is, perhaps, much larger than what would be sustained by less efficient working of the plates through its disuse. I may at this place take the opportunity to remark, that I hold the practice of special harm with regard to the cement crushing machines at Blue Spur, on account of the abundant occurrence in the bottom portions of that cement of secondary pyrites, *i.e.*, such formed in the drift, a kind that through easy decomposition is very prone strongly to flour the mercury. Considering also that the generality of the gold crushed from the cement is dirty, *i.e.*, more or less coated with oxyde of iron, or pyrites, and that therefore the copperplate tables (which I found only in use) have but a poor chance of retaining it, I think the attachment of blanket-strakes, or perhaps better of a well-constructed tail-race, would be found very profitable. Touching the blanket-strakes, they are, at most

machines, from ten to fourteen feet in length, and their inclination is seldom less than one and a half inches, and reaches two inches per foot: both figures which, considering that the supply of water is mostly rather copious, are certainly not calculated to insure a satisfactory saving of the fine gold and amalgam escaping from the copperplates; irrespective of that, at some machines, the blankets are not, or have not been, washed frequently enough. Having herewith given my opinion on the point from whence at least the greater percentage of the loss in gold and mercury proceeds, I would recommend the exchange of the present appliances and system for, or respectively their modification according to, those for years successfully in use at the Port Phillip Company's works, Clunes—an establishment which in Victoria occupies the foremost place in satisfactory gold extraction, mainly because the practice there introduced of daily taking and assaying samples of the tailings serves not only for controlling and guiding the working of the appliances adopted, but in the case of any new invention in gold saving being tried, it affords also the best proof of the merits or otherwise of the latter. The system of appliances used at Clunes simply consists—starting from the battery—of three connected quicksilver troughs—the first with a 10-inch drop, the second with a 9-inch, and the third, or lowest, with an 8-inch drop—through which the material passes in succession, to run next over 24 to 27 feet of blanket-strakes, laid at a pitch of only one foot in 16, and ultimately to pass from the blankets through another quicksilver trough before it reaches the waste channel. This last trough is only cleared, however, at intervals of several months, whilst the upper troughs are cleared every week. In order to keep any coarse stuff from entering these latter, and also for even distribution of the material, a perforated plate is fixed right in front of the battery, through which both back and front discharge pass on to an apron which leads it (the material) into the first trough. An important part of each trough is the splash-board, which, reaching down to within about one and a half inches of the bottom (of the trough), near to the surface of the quicksilver, compels the material, in its drop, to pass more or less through the latter before rising over the lip of the trough. All the troughs are supplied with tap-holes on one side, by means of which the quicksilver and amalgam can be drawn off when required. The whole system will be easily understood by reference to appended Plan I., Fig. 1, which represents a longitudinal section, whilst Fig. 2 is a section of the troughs on a larger scale, with the principal measurements marked. As to the blanket-strakes, their small inclination requires the supply of water to be up to eight gallons per stamp-head per minute, according to the nature of the stuff, in order to keep them free from sandy settlement. The rate at which the blankets are washed at Clunes is generally the upper row every hour, the second row every two hours; and of the remaining length of the strakes the blankets of the upper half every six, those of the lower half every twelve hours. Considering the nature of the stuff of the Otago reefs, I think, however, that, partly because the more or less slimy stuff from the mullock reefs renders the surface of the blankets quickly inactive, partly on account of the great amount of pyrites contained in the quartz, a more frequent changing of the blankets than the above is advisable.

Touching the treatment of the blanket-sand, the method in use at most of the machines, viz., by revolving barrel and shaking table, gives, if properly carried out, the most satisfactory results, and deserves, therefore, general adoption. In the proper working of the barrel, upon which depends most, certain rules require to be followed, however, and as I had no opportunity of judging of the mode of operation at any of the machines, I give the following particulars on this head for comparison and guidance. Assuming the barrel to be about 4 feet long by 2 feet in diameter, it should be charged with 8 to 10 cwt. of damp sand, and 2 to 300 lbs. of mercury, and set to revolve for about 8 hours at a speed of from 14 to 16 revolutions per minute. After this, it should be filled with hot water and set to revolve again for another 4 hours at the rate of 5 or 6 revolutions per minute, when the operation is finished, and the charge—quicksilver first—may be drawn off. Having been informed that at several of the machines the practice is followed of putting round stones or pieces of iron into the barrel, in order to grind the sand finer and aid the amalgamation of the gold, I have to remark that I consider this proceeding likely to prove more harmful than advantageous, on account of the large quantity of pyrites generally present in the sand, which through the grinding is very likely to sicken or flour the mercury and amalgam, and this invariably is followed by a loss of mercury and gold afterwards. A determination of the exact loss of mercury in this and the main gold-saving process by carefully weighing the metal at short intervals, is not practised, as far as I could glean, at any of the machines, but as it is of the greatest importance in testing the comparative efficiency of the amalgamating appliances, it ought certainly not be neglected in future.

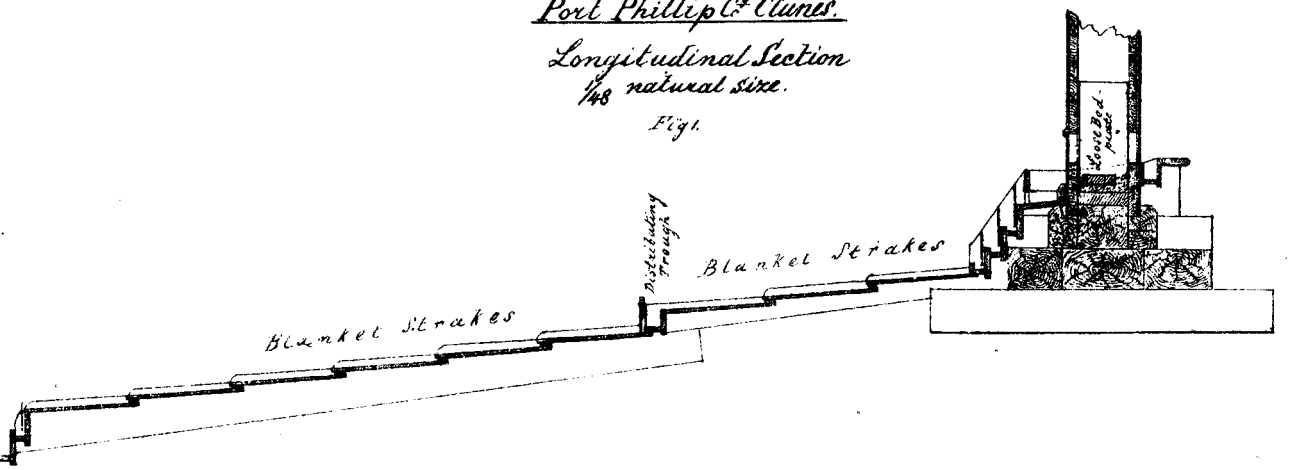
Having herewith noticed all the principal points touching the saving of gold from the crushed material, it remains to draw attention to the saving and treatment of the pyrites, which, as already mentioned, occurs in greater or less abundance in most of the quartz reefs of the province. Although small experiments have as yet been made of the pyrites of but a few of the reefs, and trials on the large scale of that of only one reef (Southberg's Reef, Skipper's Creek) proving the payably auriferous character of the ore, still I think there can hardly be a doubt, judging from Victorian experience, that the pyrites of all the other auriferous reefs of the province is more or less payably auriferous also; and it would be highly advisable, therefore, after the truth of this supposition has been established by fire assays*, to take early steps towards the concentration of and the extraction of the gold from the ore.

* A good practical experiment for determining the quantity of gold in pyrites is the following:—Weigh a good average sample of the dry ore—say about 2 lbs.—and roast it perfectly *sweet* (on a shovel over a fire will do), *i.e.*, till no more smell of arsenious and sulphurous acids is perceptible on stirring. Place the roasted mass into an iron mortar, mix it with so much water that it just packs or forms a *very stiff* paste, and add a tablespoonful of quicksilver. The mass has now to be rubbed with the pestle for so long till all the quicksilver has disappeared, *i.e.*, has been broken up into nearly microscopical particles, which are evenly distributed all throughout. A second similar amount of quicksilver may be worked through in the same way, and then hot water, a little soda, and a larger amount of quicksilver—about five or six tablespoonfuls—are added, and the mass gently stirred for some time, in order to allow the fine particles of the quicksilver to settle down and unite with the large lot at the bottom just put in. Now follows the careful washing away of the red oxyde of iron slime in an enamelled iron dish, and ultimately the retorting—at not too strong heat—of the whole of the quicksilver collected. From the weight of the gold left behind—if any—the contents of gold per ton of the ore can of course easily be calculated. This experiment closely imitates the process to be adopted on the large scale, and, if carefully executed, gives within 80 to over 90 per cent. of the fire assay

System of Goldsaving Appliances of the Port Phillip Co. Clunes.

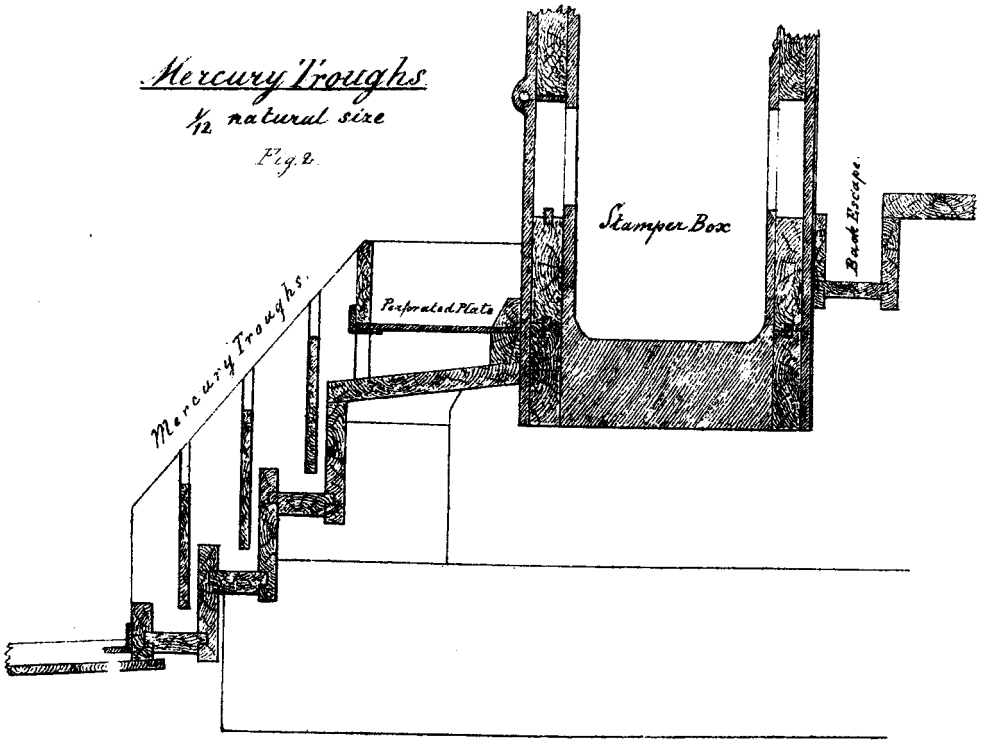
Longitudinal Section 1/48 natural size.

Fig 1.



Mercury Troughs 1/12 natural size

Fig 2.



Both these operations are not, however, very easy ones, but require, for profitable and satisfactory execution, much care, favourable natural conditions, and a considerable amount of capital in the construction of the necessary works. The saving operation has to be effected at each single crushing mill, and for it the so-called Borlase's buddle, with Munday's patent scrapers, is the most approved in Victoria; but where capital and favourable conditions are wanting for the erection of these rather cumbrous machines, the use of a good length of blanket strakes—say 20 to 30 feet—and careful attention to and more frequent washing of the blankets than hitherto practised, would at least save the greater quantity of the pyrites. With regard to the after treatment of the latter for the extraction of the gold, roasting furnaces and certain kinds of amalgamators are required, the working of which has to be specially learned. In fact, it may be said to constitute a special industry, which not every company or reef-owner might care or be able to enter into. In Victoria nearly all the larger companies have their own pyrites works, but there are also special private establishments of the kind, unconnected with crushing mills, at which miners or companies can either have their pyrites treated at a fixed rate per ton, or can sell it at a certain reduction on its gold value, which latter is ascertained by careful metallurgical sample assay. A similar course must be left for private enterprise to follow in Otago.

In view of the fact that in the reefs of Victoria—and this, as already stated, will most likely also happen in the reefs of Otago—the pyrites generally increases in quantity in depth, whilst the free gold correspondingly decrenses, and that, moreover, the latter is the more difficult to save the more pyrites the stuff contains, the pyrites question, as it is called—referring to the best modes of concentration and after treatment of the ore, sanitary precautions connected with the roasting, &c.—has there for years been one of increasing importance, and the Government appointed some time ago a Commission to fully investigate the subject in all its bearings. The recently published report of this Commission contains full information, with drawings of machinery, &c., on the best methods of pyrites concentration, and gold extraction, and as, if I entered upon a description of the respective processes, I should merely have to recount what is stated in it, I append a copy of this report instead. Considering, in conclusion, the general working effect of the crushing machines throughout the gold fields of the province, there are two serious natural disadvantages under which all suffer, though some in a stronger degree than others. I refer to the hard frost in winter, and the general low temperature of the water throughout the greater part of the year. The former compels the actual stoppage of the works for several months (five or six months at Skipper's Creek); the latter affects the liveliness of the quicksilver, and thereby impairs, as it were, its amalgamating power. Against the first nothing can be done, and to ameliorate the second difficulty the introduction of hot water into the coffers can only conveniently be practised at those machines driven by steam engines. However, I think that, whilst the introduction of long blanket-strakes would prove a great safeguard against any loss of gold caused by imperfect amalgamation, the most rational way to meet the frost difficulty would be to have all parts of the machinery sound and in best working order, so as to guard against interruptions in crushing day and night through the summer months, in order to work up as well the crushing material accumulated during winter stoppage, as also that concurrently produced.

Auriferous Drifts.

On this head I have only to record some observations that my time allowed me to make, whilst travelling between the different quartz mining centres. Not having seen enough, therefore, to attempt any geological classification of the drifts, I will simply separate them into "newer" and "older," "upper" and "lower" drifts, as the case may be—main divisions, the existence of which everyone interested in the matter will easily recognize on visiting the gold fields.

Newer Drift.—Under this head belong all those extensive striking terrace formations of shingle and sand, and a certain thickness, running from a few to perhaps over 100 feet of the flat stratum of similar material on which they rest, accumulated in those far-stretching, wide portions of the present river-valleys, the original character of which as lake-basins has long been recognized. The terrace formations of shingle, &c., resting on the rock of the ranges, fringing the valleys, the drift occurring in the smaller valleys or gullies between the ranges and the real drift, are also here included. Besides the extensive sluicing operations which I saw executed in this drift along the banks of the Molyneux, Kawarau, and Shotover Rivers, the really grand scale on which hydraulic sluicing is carried on at Tinker's (Blue Duck Claim—manager, Mr. J. Spratt) and Drybread diggings excited most of my admiration. To give an idea of the scale, I may mention that, at Drybread, Greenbank and Company use forty sluice-heads of water with a mean vertical pressure of 130 feet, lessened about 25 feet through friction in the pipes, and have 4,500 feet of iron piping, besides an expensive stock of necessary appurtenances on the ground. Although the stuff washed is very poor, still the enormous quantity sluiced through in a short time, work being carried on day and night, renders the operation highly profitable. Work like this is entirely unknown in Victoria; perhaps the only other place in the world where it is practised being California. The thickness of the drift which rests on the so-called "Maori Bottom" surpassed, in some places, 30 feet, and considering this in connection with the promiscuous way in which patches of it are worked along the foot of the Dunstan Range, though the generality are in front of, or near, the mouths of large permanent creek-valleys, one cannot help coming to the conclusion that the gold extends all along the foot of that range, the richer accumulations existing most probably in front of where the latter is most broken by rifts and gullies, whilst towards the centre of the wide valleys it no doubt decreases in quantity, owing to causes to be explained further on. And the same chance I believe exists not only along the foot of the range on the opposite side of the wide valley, but also round the edges of all the other large old lake-basins. In fact, the resources of the province in this kind of auriferous drift alone are practically inexhaustible, and their successful development only requires more of the enterprise and energy, as displayed by Greenbank and Company, in rendering the splendid water resources of the province available for hydraulic sluicing. As some of the places which I consider very promising, and certainly deserving of the special attention of the drift miner, I may mention the part of the old Clutha lake-basin in the angle where the Bendigo Creek enters, and along

the foot of the range on which the Bendigo reefs occur. Also the extensive so-called Miller's Flat, between Arrow and Queenstown, which, to all appearances, represents an old channel of the Shotover River, and should, as such, be very rich, judging from the splendid yields obtained from the river workings higher up. Mr. Warden Beetham first drew my attention to this dormant field, the high prospective mining value of which is believed in by many miners in the district. Another very promising area I take also to be the extension of Macrae's Flat towards the Taieri River.

Older Drift.—This comprises all those enormous deposits of harder gravel and cement called "false bottom," "Maori bottom"—from its brown colour—upon which the newer drift rests in the extensive old lake-basins of the Manuherikia, Upper Taieri, Clutha, and other river valleys. Also, the cement and gravel worked on the tops of the ranges between Milton and Havelock, that remarkable cement deposit of the Blue Spur near Lawrence, and the false bottom of Weatherstone and Waitahuna Flats, which three latter, it must be borne in mind, represent also nothing else than lacustrine deposits, though small in surface extent, yet of comparatively great depth. The character and relation of all these deposits to the newer drift would at once suggest, to anyone acquainted with the gold fields of Victoria, the existence of runs or leads in their deepest parts or gutters; for, from the fact that they are all composed of the same kind of rock material as the newer drift, there is no reason why they should not be equally auriferous. But yet, on comparing the relative conditions under which deposition of water-worn material takes place in water-courses—river and creek channels—which latter the Victorian deep leads unmistakably represent, we find great differences; namely, whilst in a continuous water-course, with evenly falling bottom, the current is steady onward, deposition takes place all along, and—leaving exceptions, caused by turns and local obstructions, unconsidered—the heaviest material settles in the deepest part, it is not so in a lake. There the current of the water of a river, or and smaller water-course, on entering at one end, or any part round the circumference of the lake, gets suddenly checked either on account of the surface expanse or the depth, or both combined, of the stagnant mass of water, and the consequence is that the heaviest of the waterworn material (including, with regard to both the newer and the older drifts, most of the gold), settles along the side of the lake-basin, whilst towards the centre of the latter there is gradually less and finer material deposited. And this process goes on till the basin is ultimately filled up, though towards the other end or outlet of the lake the deposited material will then consist of an increasing thickness of poor and light stuff at the bottom, and a thinning stratum of heavy one at the top. Of course the more inlets or sources of supply the lake has, the more they vary in strength, the more irregularly they are distributed around the margin of the lake, and the nearer its outlet, the more irregularity will be observed in the arrangement of heavy and light material towards the latter part and the centre. For these reasons, therefore, the old deposits of the lake-basins mentioned do not, in my opinion, contain deep leads in the true meaning of the term, but what I think very likely is, that a certain width around the circumference of each deposit is auriferous and payable, or, perhaps, richly so—(there may be more than one layer of washdirt)—in front and near the mouths of old, or of those present main water-courses, which seem also to have been the sources of supply in olden times. And thus, these sides would, respecting the Manuherikia basin, for instance, conform with those of the present upper drift workings (Tinker's, Drybread, St. Bathan's, &c.). Only in cases of very circumscribed basins, there would be chance, especially if the inflowing currents were strong and much charged with material, of coarse stuff and gold being distributed all over the basins, though the heaviest stuff and richest gold would likewise be deposited partly on the inlet sides, partly on those rises on which the currents impinged; and, if these were steep, it would partly also slide down to the deepest parts of the basins. Of this feature, the Blue Spur furnishes, in my opinion, a striking example. In a long, but very narrow basin, the gold might also be carried by the current far down the centre, and if supplies came in at places down the sides, such a trough might prove auriferous for its whole or the greater part of its length, just according to the number and position of these supply channels. In this respect the valley of the Waipori (false bottom) offers, I think, by no means a bad chance. If anything deserves the term "lead," it would be the old drift-filled channels leading into or connecting two or more lake-basins lying in the same line of drainage, or the end channels leading towards the sea. Of such leads, some have been wholly or removed by denudation—they once existed over our heads, as Mr. Vincent Pyke aptly remarked to me; for instance, that between the Blue Spur and the false bottom of Weatherstone Flat, and part of the one that must have supplied the Blue Spur from the north-west, both which, with the denudation of adjoining parts of the latter itself, respectively furnished the gold to Gabriel's and Munroe's Gullies. The cement deposit on the top of the ranges between Milton and Havelock may also represent remnants of denudation of such a lead. However, I am convinced there are some channels of this kind yet existing, which it would be advisable to look for; for instance, two—one connecting the old drift-lakes of Weatherstone and Waitahuna Flats, and the other which fed the Blue Spur from beyond Munroe's Gully. In fact, I think, there is even a likelihood of the existence of similar deposits in that direction. From what I learned about the Cardrona workings, they certainly seem to represent a true old lead, and so does also a deposit Mr. H. J. Cope kindly informed me of, namely, a succession of cemented gravel hills, commencing at the Eight-Mile Diggings, Arrow River at a height of at least 500, feet above Arrow, and dividing into two branches—one terminating at Roaring Billy, the other at the Arrow River, about one mile from Arrowtown. This lead has in places been worked by adits, and found highly payable. In summing up my observations about the old drifts, I certainly think it not only very promising and advisable to prospect for the old channel between certain of the lake-basins mentioned, but also to test the false bottom of the lake basins themselves at the places previously indicated. The cheapest and most convenient mode of effecting these trials would, no doubt, be by boring.

In herewith concluding this report, I beg to return my cordial thanks to Mr. Mackellar, the Secretary for the Gold Fields, for his urbanity, and the kind and valuable assistance he afforded me in my work during the time of our joint travel, and to state that I found on the part of all—whether engaged or interested in mining—with whom I came in contact, an earnest desire to further, in every way, the object of my visit. In the subsequent descriptions of the reefs, I have given the names of those who principally aided me in my examinations, whilst I beg here especially to acknowledge my

indebtedness to Mr. L. O. Beal, Captain Hutton, and Mr. H. J. Cope, for much valuable information and advice they imparted to me on many subjects comprised within the scope of this report.

I have, &c.,

GEORGE H. F. ULRICH, F.G.S.,
Consulting Mining Geologist and Engineer.

His Honor the Superintendent, Otago.

LIST OF APPENDICES TO FOREGOING REPORT.

1. Saddle Hill Reef, Green Island, near Dunedin.
2. Canada Reefs, near Tokomairiro.
3. Gabriel's Gully Reef, near Lawrence.
4. Otago Pioneer Quartz Mining Company's Reef, Waipori.
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7. Reefs and Companies of the Carrick Range.
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10. Reefs of the Rough Ridge.
11. Reefs of Macrae's Flat.
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* 13. Notes on the German "Treppen Rost," or Step-furnace for burning Brown Coal.

APPENDIX 1.

THE SADDLE HILL REEF, GREEN ISLAND, NEAR DUNEDIN.

This reef strikes E. 14° S., and dips northward at an angle of about 55°, crossing the country—a soft phyllite—both in strike and dip, the walls appearing pretty well defined. The workings being inaccessible, Mr. Eggers, a shareholder in the company, and who worked the mine last on tribute, gave me the following particulars respecting their extent and the nature and behaviour of the reef as far as opened. There are two vertical shafts on the ground which struck the reef on the underlay, one at 49 feet, and the other at 125 feet in depth, whilst an inclined shaft, in the line of dip of the reef, runs from the surface to the bottom of the first vertical shaft. From between this shaft and the deep shaft a considerable portion of the reef has been taken out, and at the bottom of the latter the workings extend 80 feet towards the east and 50 feet westward—the quantity of stone removed and crushed amounting, on the whole, to about 2,000 tons. There was not much water to contend with. The reef, which has a ferruginous casing on the hanging, and a clay casing on the foot wall, consists of alternating blocks of good and hungry-looking quartz, and such of mullock, dipping westward in strike at a rather flat angle. It was from the surface down to 50 feet about 7 feet thick, but increased to 9 feet, and even 12 feet, in parts of the lower workings. At the eastern face of these latter the good-looking quartz is only from 5 to 12 inches in thickness, the remainder being hungry-looking, but in parts rich in pyrites. At the western end there are 4 feet of good quartz on the foot wall, and 3 feet of a poor one on the hanging, with about 5 feet of mullock in the centre; good stone exists also for some distance under foot. As regards the auriferous quality of this good stone, it would yield about 14 dwts. per ton, but as it could not be specially selected, and a good deal of the poor stuff had to be taken, the average yield from the 2,000 tons crushed was only at the rate of 5 dwts. per ton. In its direction westwards from the workings, the reef disappears under the alluvial of the flat, and is not traceable up to a point about half a mile distant, where a small outcrop again indicates its presence. Towards the east it is also hidden for a distance of about 5 chains, but there, close to the battery, it crops out again, showing a thickness of about 7 feet, whilst a shaft sunk about 24 feet northward struck it on the underlay at a depth of 37 feet. It proved here to be about 4 feet thick, and the stone would, according to Mr. Eggers's estimate, pay about 7 dwts. per ton; but none of it has, as yet, been crushed.

The crushing machine is erected about 5 chains from the workings, and consists of 10 heads of revolving stamps of 4 or 5 cwts., in two batteries driven by a steam-engine with brown coal as fuel. One of the coffers is deep, the other shallow, and the stamps are fed by hand. The bunched gratings have 122 holes per square inch, but the holes are judiciously made considerably smaller than their usual size at this gauge, by the gratings being brought to red heat and hammered. As gold-saving appliances are used for one battery, an improved kind of amalgamated copper-plate table (three plates, each with a flat ripple in front, fixed step-like, the drop from one to the other being seven inches), succeeded by three blanket strakes of 14 feet in length, fixed at a pitch of one inch per foot; for the other battery serve the common amalgamated plate-table with shallow safety-ripples in front, from which the stuff passes over three blanket strakes 12 feet long, and having the same inclination as the others. The blanket-sand is treated in a small Berdan machine, from which it runs over a copper-plate strake. The crushing capability of the batteries is about 60 tons per week. Mr. Eggers was cognizant of a considerable loss of gold and floured mercury, on account of the large quantity of pyrites contained in the quartz. With 100 feet length of blanket strakes he thought he could save about three tons of this ore during a week's crushing. An experiment which he made with a sample of 300 lbs., by first roasting and afterwards treating it in the Berdan machine, gave 4 dwts., or at the rate of about 1½ oz. of gold per ton—a yield which, considering the imperfection of the trial (roasting having not been carried on far enough, and the Berdan being not a good amalgamator for the purpose), must be regarded as very satisfactory. Looking at the character and prospects of the reef, I certainly think it ought to be profitable to work, *i.e.*, on a larger and more systematic scale, and with the gold-saving appliances improved.

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* This is omitted, having no special reference to the gold fields.

There are three other strong and apparently well-defined reefs occurring between the reef just described and the main road, a distance between a quarter and half a mile, in all of which gold has been found, and in which it would therefore be advisable thoroughly to prospect. Of one nearly 8 feet thick, 50 tons were crushed by Mr. Eggers, and produced at the rate of 2½ dwts. per ton, though previous small trials had indicated a far better yield.

APPENDIX 2.

The Canada Reef and Bruce Company, Tokomairiro.

This reef, to which I was kindly conducted by Mr. Capstick, jun., of Tokomairiro, numbers amongst the strongest and best defined of the province. Its strike is E. and W., and its dip north at 75° to 80°. It shows fine smooth walls with clay-casings, and crosses the country both in strike and dip —the latter a blue and greyish-blue hard phyllite, striking E. 23° S., and dipping southward at 75° to 80°. The length the reef is traceable reaches perhaps a mile, and it has more or less extensively been worked at various places by adits, deep open cuttings, and shafts over a distance of nearly half a mile, the workings furthest west lying high on the steep mountain slope facing the north branch of the Tokomairiro River. At present it is worked about half a mile east of the river by a fine vertical main shaft, 7½ by 3½ feet in the clear, arranged for ladders, double hoisting, and a 6-inch drawing lift. This shaft, sunk close to the reef, is 80 feet deep, and a cross-cut from the bottom north struck the reef at 10 feet. From this point a drive along the strike of the reef extends westward 180 feet, and eastward 550 feet, meeting at 400 feet a windlass shaft, from which stoping is being carried on towards the main shaft. As regards the nature of the reef, it consists of alternating blocks of good and hungry-looking quartz and mullock, dipping apparently eastward at a steep angle, and varying in thickness from 2 to 7 feet. A small block of hungry, white, and glassy stone exists close east of the main shaft, but farther on fine seamy, ferruginous quartz appears in the eastern drive, and continues, though interrupted by occasional small bands of mullock, the whole distance to the windlass shaft. West of the main shaft the reef looks well, and carries much pyrites along to very near the end of the drive, where a block of mullock makes its appearance. All the quartz passed through contains gold in very fine particles, but the blocks of the seamy, good-looking stone most, and there are in them also occasional narrow shoots, which, if taken out by themselves, would give very good returns. Such work, however, would amount to nothing else but robbing or picking the eyes out of the mine, and prove also the most expensive in the end; and Mr. Todd, the skilful mining manager, intends therefore, very properly, to work all out straight ahead. The quantity of stone available in this way on the eastern side alone will be very considerable, as by far the greater part of the backs between the level and the surface is still standing, and the windlass shaft lies 50 feet higher than the main shaft. Touching the yields, they are rarely above 5 dwts. of gold per ton, and according to Mr. Driver, the legal manager of the company, the mine pays its way at less than, and leaves a profit at, that figure. From what I could learn about the character of the reef in the old workings towards the west, it was very similar as in those just described—*i.e.*, blocks of quartz, alternated with such of mullock, and the former proved more or less auriferous. At one place, in fact, in an adit driven from the steep slope facing the Tokomairiro River, a patch of stone was found, yielding 5 oz. of gold per ton. The reef might on this side be opened by an adit from the river at a depth of perhaps 300 feet or over.

The crushing machinery consists of one battery of five heads of revolving stamps, driven by a fine turbine, which also work the hoisting gear and pumps for the shaft. The gauge of the gratings is 122 holes to the square inch, and the battery is supplied with a self-feeding hopper. The speed of the stamper is from 72 to 76 blows per minute, and the crushing capability of the battery 50 to 54 tons per week. As gold-saving appliances, are used two quicksilver troughs, with splash-board and 8-inch fall each, and four lines of blanket-strakes of 15 feet in length, laid at an inclination of 1 foot in 12. The blanket-sand, which contains a good deal of pyrites, is treated in the common revolving-barrel, and a dolly-tub and strake serve for collecting the quicksilver and amalgam. The aggregate of these appliances, which are each carefully superintended by Mr. Todd, and work to his satisfaction, comes very near to that of the Port Phillip Company, previously recommended. On considering the character and extent of the reef, in connection with the fact that, with good management, so small a yield as 5 dwts. per ton, and from so small a quantity of stone as the small battery is able to crush, already leaves a profit, I think there can hardly be a doubt that this mine would become a steady dividend-paying one, if worked on a larger scale, and with increased crushing power; at any rate, as the turbine is strong enough to drive another five heads of stamps, these ought, at least, to be added. About 6 chains to the north of the reef just noticed, and running quite parallel with it, its strike being E. and W., and the dip north at 75° to 80°, there is another reef, originally worked by the Table Hill Company, but apparently for a long time neglected. This is also remarkably well defined, judging from the fine smooth walls exposed in the top part of the old workings, which extend for 7 to 8 chains in length. According to Mr. Todd, its thickness ranged in these workings, which are quite inaccessible, from 2 to 7 feet, and its block structure, and the mode of occurrence of the gold, were quite the same as in the Canada Reef. The top portion paid in the average 5 to 6 dwts. per ton, but in depth it became poorer, the stuff from about 150 feet down, where it was opened, but not much worked, by an adit from the northern face of the hill, yielding only about 2 to 3 dwts. per ton. This, in connection with considerable expense attached to the timbering of the workings, and more especially to the conveyance of the stone to the crushing machine, brought the mine to a standstill. However, if this latter expense were saved by the machine being shifted to the bottom of the hill, near the mouth of the adit, the prospects of the reef are still such as to warrant the hope of its paying renewed working. As regards the crushing machine, which lies by road nearly a mile away on the slope facing the Tokomairiro River, it consists of two fine batteries of five heads of revolving stamps each, driven by a splendid water-wheel of 39 feet in diameter—perhaps the largest in the province. On account of the absence of a fly-wheel, the working of the batteries must, however, have been very unsteady. The gratings have 122 holes to the square inch, and the gold-saving appliances,

with the exception of there being a spare blanket-strake (nine in all), are the same for each battery as in the previous case.

APPENDIX 3.

The Gabriel's Gully Reef, Lawrence.

Amongst the once celebrated reefs of the province, this is perhaps one that most disappointed its its original proprietors, though there are still some who believe in its being worth more than generally supposed, and who occasionally brave the dangerous character of the old workings, by putting in prospecting drives at favourable places. I inspected what was accessible of the old workings, in company with Mr. Warden Carew and Mr. H. Squires, legal manager of the old company, to whom I am indebted for all particulars concerning the character and behaviour of the reef, of which latter itself nothing could be seen. It lies at the head of a small gully running from the N.E. into Gabriel's Gully, and was discovered by a party working the alluvial at that place. The first workings, by open cuttings and shafts, extend for about 240 feet from the northern hill slope across the gully, a short distance up the opposite slope, and it was from them that the best returns were obtained. Afterwards, to ease the work, the reef was opened at 50 feet in depth, by an adit of 215 feet in length, starting lower down the gully; and 120 feet below this again, a second adit, about 1,200 feet in length, was driven for the purpose, both of opening it at that depth, and also to prospect for another reef supposed to exist beyond. This adit, which I inspected, proved unsuccessful in both points. It ought to have intersected the reef under notice at about 900 feet in, but only a thin, slightly auriferous casing was struck there, which, on being followed by a crosscut on the left of the adit, was found to bend flat and run out in the line of dip of a black carbonaceous bed, overlying common hard phyllite. Several small drives, in different directions from the crosscut, disclosed also no sign of the reef, but it was proved by a winze, sunk in the latter from the upper adit to the level of the lower one, which it strikes in the crosscut a few feet in, that the quartz runs completely out into the just-mentioned casing, within about 20 feet above the crosscut. Judging from the surface workings, the reef strikes N. 15° E., and dips to westward at 70-75°, crossing soft phyllite, striking N. 30° W., and dipping westward at 30-35°. Its thickness ranged from a few inches to 12 feet in the upper adit workings, and the walls were very well defined, the hanging one showing a thin ferruginous casing. The gold occurred in a shoot extending from near the top of the northern hill (where the reef runs completely out into hard phyllite) to the end of the workings in the south, and, though at first shallow, deepened rapidly in depth to about 50 feet down the winze, between the two adits. At the south the reef was found to be displaced by a slide, and on recovering it again about five feet out of its previous line, it soon became poorer, broke, and thinned out. The quartz containing the gold, *i.e.*, that within the shoot, was of a soft, ferruginous character, whilst below it a hard bluish stone came in, in which no gold could be seen. Except low down the winze, as above mentioned, and on the north and south in strike, this bad stone was nowhere lost under-foot in the upper adit workings. Regarding the yields, the stone from the shoot, though in places carrying at the rate of several ounces of gold per ton, paid in average only 4 or 5 dwts. per ton: yet in spite of this low yield, the mine paid a handsome sum in dividends. The crushing machine of the company, lately removed to the Blue Spur for crushing cement, stood at the lower end of the small gully, and consists of two fine batteries of five heads of revolving stamps each, with common copper-plate tables, and blanket strakes attached—a turbine supplying the motive power.

In reviewing all the different points of Mr. Squires's information concerning the extent, lay, and character of the reef, I think there is a strong probability of the latter representing a large block, which dips at a rather steep angle southward in strike, passing the lower adit over-head, and lies therefore on its right-hand side, not perhaps far off, where it would be advisable to search for it by a branch drive. For the hard blue quartz left overhead, and likely to continue downward, and which owes its colour mainly to a dense impregnation of minute particles of pyrites, has not at all a bad chance of containing a payable shoot, judging from assys of specimens made for me by Mr. Morley, at the Melbourne Technological Museum laboratory, which gave at the rate of 14 dwts. of gold per ton.

APPENDIX 4.

The Otago Pioneer Quartz Mining Company's Reef, Waipori.

This reef, one of the richest, best developed, and most extensive in this province, I inspected in company of Mr. E. Hill, the manager of the O P Q Company, who kindly afforded me all the subsequent information about the yields and old and new workings, which were not accessible for examination. It strikes N. 25° W., and dips eastward at an angle of 56° cutting through hard grey phyllite, bearing about N.E., and dipping at angles varying between 15° and 30°. The walls are especially well defined, and show strong casings of tough blue clay. It has been opened, and in parts extensively worked, for a length of nearly two miles, and most likely extends considerably further both N. and S. The furthest point opened on the south, by several shallow shafts in Thompson's claim, is at the edge of a wide flat which stretches towards the Waitahuma Heights. Here the reef is about 10 feet thick, shows well-defined walls, and fine gold can easily be seen in the stone. Owing to the low position, there is a large influx of water, which will no doubt require powerful pumps to keep under. As I saw them, the water stood close up to surface in these workings. Proceeding northward, the reef crosses and runs up the eastern side of a gully which was found rich in gold, having no doubt received its supply of the precious metal from the denudation of the reef. There are several old workings—adits and shafts—along this line, from which very good gold was obtained. These were stopped partly on account of the water, partly on account of the quartz running out into mullock in strike. Further north, about half a mile from Thompson's Claim, we came to the site of the operations of the old company, right at the foot of the range that divides this part of the country from the Waipori Valley. A fine vertical main shaft has here been sunk to a depth of 220 feet, about 40 short of striking the reef on the underlay; and by workings extending from it about 200 feet south and 100 feet north, the reef has more or less been taken out right to the surface. It (the reef) was 6 to 8 feet thick in the average,

but in places it increased to 10 feet, and in others, near the main shaft, it decreased to 2 feet. It consisted of larger blocks of quartz divided by smaller blocks of mullock, dipping southward at 50-60°, but at the south end of the workings a large block of mullock, full of small quartz veins, was struck, which, as proved by an adit at the surface, extends southward for nearly 200 feet. The quartz, especially from the lower parts of the workings, was very rich in pyrites. Touching the yields, they averaged from the upper part of the workings 7 dwts. of gold per ton; but lower down, where occasional rich patches were struck, they increased to 11 dwts., and throughout the workings south of the shaft, over 12 dwts. per ton were obtained. Stone of pretty good quality was left nearly all along under-foot. The quartziferous mullock on the south end, just noticed, would pay from 3 to 4 dwts. of gold per ton. There were formerly a crushing machine, hoisting gear, and pumps, driven by a steam engine, but these have all been removed, and the mine deserted for a long time. Mr. Hill believes that a great deal of fine gold and amalgam were lost in the tailings. From these workings northwards up the range, the reef is not very plainly exposed, but right on the top it crops out 3 feet thick; and there is a leader about 2 feet thick in the foot wall, 8 to 10 feet distant, which dipping towards the reef will join it at about 20 feet in depth. Mr. Hill, who opened these outcrops by several small shafts, thinks the stone will pay from 6 to 7 dwts. of gold per ton. On following the line of the reef from these working down the very broken slope of the range facing Waipori, a small adit is passed which has likewise struck the reef, but no more plain outcrops are met with beyond a distance of 150 yards. However, Mr. Hill, by intelligent prospecting, found it at several places, proving it to extend right to the foot of the range, and underneath the alluvial of a gully near where this joins the Waipori Flat. And judging from the character and prospects of the reef, as disclosed at one of these places, the present company, which owns all the ground south across the range, beyond the old company's workings, has a fine chance of a prosperous future before it. This place lies in a narrow rift, a good height up the range, about 400 yards from the top workings; and the reef, which is opened by a shaft 20 feet deep, is about 8 feet wide, and shows very well defined walls, with strong bluish-grey casings. Near the surface there are only 1½ to 2 feet of quartz on the foot wall, the remainder being mullock; but towards the bottom this quartz thickens, while at the same time about 15 inches of quartz come in on the hanging wall,—in fact, there is every indication of the mullock cutting soon out in depth. As regards the character of the quartz, of which a considerable quantity is taken out of the shaft, that from the foot wall is seamy, rich in pyrites, and shows gold—some in coarse specks—freely, especially in the seams (might pay several ounces to the ton), whilst in that from the hanging wall no gold could be seen, though it is also seamy and very rich in pyrites. On first exposing the reef, Mr. Hill washed 8 oz. from one tin-dishful of stuff, and obtained a number of specimens, rich in coarse gold, besides. At the other places opened by Mr. Hill, near the foot of the range, the reef is 8 feet wide, and its walls are well defined, but it consists only of mullock, traversed by quartz-strings, which has shown but poor indications of gold; yet it certainly deserves a trial crushing. The company have very judiciously, I think, adopted the plan proposed by Mr. Hill, namely, of opening the reef in strike by a large main adit, starting in the gully, right at the foot of a steep spur of the range—about 150 yards north of, and 100 feet below, the shaft in which the good gold has been struck. According to Mr. Hill's rough traverses and estimates—for no proper survey, though highly desirable, has as yet been made of the line—this adit would strike the old workings at the southern side of the range, at a distance of 1,000 yards, and 100 feet below the bottom of the main shaft, whilst there might be about 400 feet of backs to rise upon towards the workings on the top of the range, which lie about 550 yards distant.

The crushing machinery in course of erection within about 80 feet of the mouth of the adit, with which it is connected by a tramway, consists of ten heads of revolving stamps in two batteries, with the common amalgamating tables and blanket-strakes—four for each battery—in front. I believe, however, that, according to my recommendations, deep quicksilver troughs will be used instead of the amalgamating tables, or at least be interposed between them and the batteries. The motor for the batteries is to be a turbine, supplied with the necessary water at a vertical pressure of about 100 feet from a splendid race, which is cut twenty-two miles up the Waipori Valley, and capable of carrying twenty heads of water.

Having herewith given all the particulars I collected about this reef and the O P Q Company's operations, I can only repeat what I stated above, that the company have every chance of a prosperous future. Although the quartz occurs only in blocks, dipping most probably south in strike, still these are, no doubt, very large, and have afforded payable, and even rich prospects; and it is not unlikely that the mullocky parts of the reef, or at least portions of them, might pay to work. The facilities for working are excellent, and I have no doubt it will soon pay the company to increase their plant by another ten heads of stamps, for the driving of which the turbine will have the necessary power. There is one point to which I would draw the company's special attention, and which Mr. Hill, their experienced manager, well understands—namely, to the great advisability of opening the first block of stone up well before commencing exploitation; and also, generally, of always keeping the adit going steadily ahead, in order to open up another block whilst that previously driven through is being worked out.

APPENDIX 5.

The Conroy's Gully Reef, near Alexandra.

To this reef, which has been for a long time deserted, I was kindly conducted by Mr. Warden Simpson, Mr. Coleman, and Mr. R. Poole, of Clyde, who also afforded me all the particulars of its history. It strikes W. 23° N., and dips northward at an angle of nearly 80°, cutting very flat-bedded, nearly horizontal mica schist, strongly interlaminated with quartz. The walls appear pretty well defined. According to a description given, it averaged in the workings—now more or less fallen in—from six to eighteen inches in width, and consisted of quartz and mullock running side by side in strike, the latter frequently predominating. It has been opened and worked for over six chains in

length, but is traceable for twelve to fifteen chains further. The first workings consisted of small shafts and open cuttings, but afterwards, when some water was struck in the deepest shaft, an adit nearly 400 feet in length was driven in the strike of the reef from the slope towards Conroy's Gully, but starting so shallow that it required an open cutting over two chains in length, and nearly two more of a tramway, to obtain fall for the waste, and principally that it lies only 50 feet beneath the surface at the end. In fact, when it reached so far, a great portion of the backs had already been worked out from the top. If on this account the adit must be pronounced, to say the least of it, a very injudicious piece of work, it appears still more so on considering that not far in advance of where the cutting begins the slope towards the bottom of the gully suddenly becomes very abrupt, and that it (the adit) might, therefore, have been put in from a point in the latter in the line of strike of the reef lying at least 150 feet lower, and not perhaps more than 300 feet farther, than where it now commences. After all the backs above the adit had been worked out, a shaft was commenced in the reef at the far end of the adit, but after sinking ten feet, where water made its appearance, the work was given up, and the reef shortly after deserted. Down the shaft, and left in the bottom, a vein of quartz was followed of six to eight inches in thickness, showing a tendency to widen out, of which the last twenty-five tons crushed yielded over 1 oz. of gold per ton. Touching the aggregate of the returns, it amounted, according to Mr. Poole, to £2,005 from less than 500 tons crushed; whilst the total expenditure on the claim, including crushing machinery, tools, &c., was £3,756. The crushing machinery, which stood in the bottom of Conroy's Gully, close below the line of the reef, was sold to Williams and party, on the Carrick Range, who are there erecting it on a reef claim, to be noticed further on. All accounts agree that a considerable amount of the, in the average, very fine gold, as also of quicksilver, was lost in the tailings, through the crushing and gold-saving process not being at all well understood at the time. Comparing the great waste of money, through injudicious workings, with the total returns, and looking at the above-indicated facility with which it could be opened at a good depth, whilst relying on the information concerning its character as left under-foot at the end of the old adit, I certainly think this reef deserves another systematic trial.

APPENDIX 6.

Auriferous Reefs of the Bendigo District.

In my examination of most of the reefs of this extensive district, I was kindly accompanied by Mr. G. B. Douglas, the manager of the Bendigo Deep Level Company, and I am indebted to him for much of the information about the yields, workings, and other particulars given in the following descriptions:—

Logan's Reef and Cromwell Company.—This celebrated reef, in the possession of Messrs. Thomas Logan, B. R. Baird, and G. W. Goodger, the latter of whom was kind enough to show us through the workings, is without question the richest and best defined in the province, and has been very extensively worked for nearly half a mile in length, but is traceable for perhaps three-quarters of a mile further east in strike. It cuts through nearly horizontal, very quartziferous mica schist, at a strike of E. 5° S., dipping with slight bends for about 100 feet from the surface, close upon vertical, and then bearing gradually to the north, at an angle of 75°. Its walls are especially well defined and even, and there is a clayey ferruginous casing on either. According to Mr. J. Parry, the mining manager, its thickness in the present workings ranged in places from two to six feet, but the average was about three feet. It did not, however, consist of quartz throughout, but there were larger and smaller mullock patches, the larger ones with a step-like outline at the top, of which some carried very good gold. The quartz shows a fine seamy structure, and is of a brownish colour and ferruginous near the surface, but in depth assumes a bluish colour, whilst becoming more and more strongly impregnated with pyrites, galena, and zinc-blende (Black Jack). The gold occurs both in the seams and in the mass of the quartz, but was on the large scale not found evenly distributed through the reef, but to be accumulated in shoots dipping eastward in strike at rather sharp angles. Thus in places the quartz paid hardly a few pennyweights of gold per ton, but was succeeded by such paying over two ounces, and this again by a shoot yielding up to and above six ounces per ton. The average yield from different working places has for some time been over three ounces per ton. In the lowest part of the present workings, a few feet above the bottom of a whim shaft 260 feet in depth (there are two other shafts, 170 feet and 114 feet deep, worked by derricks, besides), one of the rich shoots, paying up to six ounces per ton, has been struck, which dips at an apparently sharp angle eastward into the so-called "Golden Link" ground, where the reef was first opened and most extensively and successfully worked. The deepest shaft on this line of workings, which has for some time been at a standstill, is 330 feet, and excellent gold (three to six ounces per ton) from large quantities of stone, wrought either side, was obtained to about 150 feet in depth. Below that the quartz became gradually poorer, and from near the bottom, where the water grew very troublesome, it paid only seven pennyweights per ton. There is every probability, however, that the rich shoot just noticed as existing at the bottom of the whim-shaft will be struck on further sinking. In parts of these workings the walls of the reef came close together, whilst in others they were up to ten feet apart, both quartz and mullock, which filled these wide places, paying over six ounces per ton throughout. Towards the east the reef deteriorates very much in quality, and there are only a few places—one at about four chains, and another at two to three chains still further on—where it has been superficially worked, and paid up to sixteen pennyweights per ton. Good-looking leaders, running at acute angles towards the reef, have been struck here and there along the line worked, but none have been followed, and not a single prospecting cross-cut has been driven throughout the whole extent of the workings. Whilst showing occasional outcrops through the Golden Link ground, the reef came to a point in the line of the present workings; and whilst sending out two strong branches—one on the north, the other on the south—it itself continues in the centre, but dips rather sharply in strike westwards, as indicated by its disappearance down the pretty steep slope of the hill—on which the workings are situated. This feature has, however, only been properly understood lately; for whilst the workings on the main reef were carried on westward from the Golden Link ground, the northern one of the two branches—which soon assumes

the same strike as the main reef, dips also close upon vertical, and shows a strong outcrop of massive quartz, in places three to four feet thick, down the slope of the hill just noted—was mistaken for its continuation, and worked for some distance eastward into the hill slope—*i.e.*, towards the other workings, and for about 130 feet in depth, paying in the average sixteen pennyweights per ton. The fact of its becoming poor and very thin in the face at that depth, whilst the workings on the main reef, but little in advance, showed the latter rich and strong, and appeared to run gradually more south out of the line, induced Mr. Parry, the manager, to drive a cross-cut south, which at 42 feet struck the main reef, rich, and nearly three feet thick. From this point, which has since been connected with the main workings east, a drive is being carried on westward—the reef continuing of the same thickness and richness—and will soon extend beneath the gully at the foot of the hill. Touching the southern branch of the main reef, it is of a rather mullocky character, and also soon assumes the strike of the latter, with a nearly vertical dip, its thickness ranging from nine inches to two feet. It has been worked up the slope and near the top of the hill in several places—at one rather extensively—by open cuttings, but the returns were not very satisfactory. Still there is chance of its proving, perhaps, very rich near the foot of the hill, whence it is seen disappearing westward underneath the alluvial of the gully, at a point where it would be struck by a cross leader, which has been worked up to within half a chain on the south. This leader, which is from three to six inches thick, and runs rather crookedly towards it at a mean strike of N. 40° E., and dipping N.W. at 65–75°, has been worked for about half a chain in length by a shallow open cutting, and the quartz obtained is said to have been very rich. The mode of exploitation adopted for this mine is by under-hand stoping, some of the steps or stopes being from 20 up to 40 feet high, and there were large places left open overhead, very unsafe for the men working underneath, and which ought, therefore, to be filled with waste, to guard against accidents. As I have already given at another place my opinion on the comparative merits of over-hand and under-hand stoping, I need only remark here that I should certainly advise the owners of the mine to prosecute its future working in depth by the over-hand system of exploitation. The crushing machine of the Cromwell Company (manager, Mr. Edward Rigg) lies at the foot of the range near the mouth of the Bendigo Creek, about one mile and a half from the reef. It consists of ten heads of revolving stamps, in two batteries, fed by hand, and driven by a water-wheel. The coffers are shallow, and the gratings have 122 holes per square inch; formerly such with only 100 holes per square inch were used. As gold-saving appliances, serve common amalgamating tables, and ten feet of blanket-strakes, four for each battery, with an inclination of nearly two inches per foot; for the treatment of the blanket-sand, serve a revolving-barrel and shaking-table. Owing to the large quantity of pyrites and other ores in the quartz, the saving of the gold is very difficult, and though Mr. Rigg carefully superintends the working, I feel convinced of both gold and quicksilver being lost in considerable quantities, and that it would pay well to treat the large heap of tailings accumulated near the battery. Before leaving this splendid mine, I may mention that the fortunate owners have very materially enhanced its value by the late purchase from the Aurora Company of a fine water-race, capable of furnishing sufficient water power, not only for working pumps and hoisting gear for a main shaft, but also for effecting crushing on a more extensive scale direct at the reef, and thereby saving the heavy expenses at present entailed by the carting of the quartz so far to the mill over a difficult road.

The Reliance Company.—This company, managed by Mr. J. Mitchinson, of Bendigo, to whom I am indebted for information about it and the district generally, holds the ground westward of the Cromwell Company, in the line of Logan's Reef, commencing at foot of the hill repeatedly mentioned in the foregoing description. Misled by the workings of the neighbouring company, before the true position of the main reef was discovered, a fine whim-shaft was sunk to a depth of 170 feet on the line of the northern branch of Logan's Reef, close to the eastern boundary of the company's lease, and right at foot of a high vertical precipice of mica schist. The upper 50 feet sunk through consist of drift; below that the reef branch was struck, but the quartz proved not payably auriferous, and also soon pinched out, the walls coming close together. There was water coming in at the bottom, but not very strong. When afterwards understanding how Logan's main reef really ran, the company abandoned this shaft, and sunk another southward abreast in the supposed line round the foot of the high rock precipice; but this, according to a subsequent mining survey, seems to lie a few feet beyond the correct line. When I saw this shaft, it had penetrated to a depth of 110 feet, and, curiously enough, through nothing but small, angular, and washed drift from top down, whilst a very strong influx of water had made its appearance—features which, considering the vicinity of the rock, clearly indicate the existence at that place of a deep kind of pot-hole or gulch. As the water was too strong for further hand-bailing, Mr. Mitchinson intended to shift the whim from the other shaft to this one, and he may by this time already have ascertained whether, what seems not unlikely from the close neighbourhood of Logan's Reef, a deposit of rich washdirt exists at the bottom of the lode.

Regarding the chance of the existence of that reef in the ground, I think it is very good, judging from the strength of the reef in the nearest part of the Cromwell Company's workings; but touching the striking of it by the shaft, all depends upon its angle of dip westward in strike; for the deeper this is, the deeper will the shaft require to be sunk, though, should it be flat, the reef might actually exist at the bottom of the gravel hole. The northern branch of the reef, on which the first shaft has been sunk, crops out on the top of the precipice, and is traceable for a a good distance down the smooth western slope, where several old shafts from 50 to 75 feet in depth are said to have followed good quartz, whilst numerous auriferous specimens have been found along the line on the slope. Considering this, it would, no doubt, be advisable to prospect that reef-branch systematically along its line, and more extensively near that one of the old shafts in which the best indications are said to have been obtained. The southern branch of the reef looks not at all unpromising, where it crops out at the foot of the hill, and would also, in my opinion, deserve to be well prospected.

The Aurora Reef.—This reef, which has been abandoned for the last two years, but, from its really good prospects, certainly deserves another trial, runs about a quarter-mile north of Logan's, at a strike of E. 5° N., and dipping northward at 75-80°. The only accessible portion of the old workings is an adit driven in the strike of the reef, though in a rather irregular and crooked manner, a length of 700 feet,

from a gully in which the crushing machine also stands, near by. Similar to that on the Conroy's Gully Reef, this adit was also a very injudicious undertaking; for it lies only about 70 feet beneath the highest part of the hill into which it penetrates, and the greater portion of the reef had been worked out by shafts and open cuttings when it came to the end. Had it been continued about another 400 feet, there would have been a prospect of some 200 feet of backs to work up to a place at the surface, where in a superficial opening the reef was found 12 to 14 inches thick, and paid, according to Mr. Douglas, 22 dwts. per ton. In the adit, the reef was first struck on the left-hand side at 500 feet in, but the adit runs up to that point in such a manner—curving in and out—as to render it probable that along the whole or part of the above distance the reef exists still undiscovered in the left-hand wall—a supposition that might easily be proved by small cross-cuts. At the point in the adit where it first appears it is very thin, but very quickly increases to five feet in thickness, and a shaft sunk on it from the adit, 58 feet deep, proved it to continue regularly downward, and to gradually widen to six feet at the bottom. Adjoining the shaft, is a cutting 20 feet long, and 15 feet deep, in which it is also left nearly five feet thick underfoot throughout. The quartz from both these working paid from 7 to 9 dwts. of gold per ton; but as it is indeed very rich in mostly arsenical pyrites, and the gold-saving appliances of the machine are of the usual imperfect kind, and were, as it is said, very badly superintended, I feel quite convinced that a great deal of gold and quicksilver was lost in the tailings. Beyond the just-mentioned cutting, the reef has not any more been prospected under foot in the adit, but some distance further on it has been seen five inches thick in the roof of the latter, and continues of that thickness right to the face, the hanging wall being especially well defined. Judging from this behaviour on the whole, I strongly suppose that the stone followed in the shaft and cutting represents a good and strong shoot, which dips at a rather sharp angle eastward in strike. As regards the old workings, they extend for a length of 280 feet, and the reef has been taken out right down to the adit. The stone was there of a very ferruginous character, and ranged in thickness from one to five feet—average about 2½ feet. Extremely rich patches of golden quartz were found in places, and some of the crushings produced 2 oz. 16 dwts. of gold per ton; the average yields varied, however, from 16 dwts. to 1 oz. per ton. At the eastern end of the workings, the reef splits into two branches, and a tributers' party, who worked there last, followed the northern branch for some distance, and realised from 8 to 13 dwts. of gold per ton. Further east, on the opposite rise of a little gully, intersecting the line of the reef, they sunk two shafts—one about 75 feet in depth—for prospecting the branch, but, strangely enough, though the line of the latter across the gully is clearly apparent, neither of the shafts lies on it, but one too far north, the other south, and a cross-cut between the two has still good chance of discovering it. Some five or six chains further along the line from this point are the last workings of the tributers, consisting of several shafts ranging up to 60 feet in depth, from which the yields varied from 8 to 12 dwts. of gold per ton. Beyond these, there are no workings on the same line for the distance of over a quarter of a mile, where we came to those of the Victoria Company—an open cutting—from which 38 tons of stone were raised that produced at the rate of 14 dwts. of gold per ton. This yield of gold being too low to pay for working, carting, and crushing combined, the place was deserted. Touching the southern branch of the reef, it has been superficially prospected in several places for over a quarter of a mile in length, and proved to be auriferous, but not payably so. The, through long neglect, somewhat dilapidated crushing machinery of the old Aurora Company consists of two batteries of five heads of revolving stamps each, driven by a water-wheel; common amalgamated copper-plate tables and blanketst-rakes 14 feet in length, lying at a pitch of nearly two inches per foot. Small remnants of blanket sand near the tail-race proved, on examination, to be rich in finely divided quicksilver and amalgam.

The Lucknow Reef and Company.—The strike of this reef is nearly E. and W., its dip close upon vertical, and the walls are well defined. It has been opened along the surface for about 300 feet in length, the main workings lying on top of a spur, which it crosses nearly at right angles. As these workings were inaccessible, Mr. Ch. Colclough, the original discoverer of the reef and present legal manager of the company, kindly afforded me information about them, and gave me other particulars concerning the reef. The latter has been worked out to depths ranging from a few feet to 60 feet, and yielded from 8 dwts. to over 3 oz. of gold per ton. In the main shaft the reef, which proved about one foot thick, was followed vertically down to a depth of about 100 feet, but there a body of stone made its appearance, rich in gold and arsenical pyrites, and showing a thickness of 3 feet—*i.e.*, one foot of quartz on either wall, and one foot of mullock in the centre—and which was found to dip, flat, southward. The shaft was therefore turned on the underlay of this body, which was supposed to represent the main reef, and for a length of 14 feet followed it down to a depth of about 146 feet, where water was met with. A crushing from this underlay portion greatly disappointed, however, all expectations; for, instead of several ounces, it paid only from 8 to 11 dwts. of gold per ton. As it was thought that the water would give too much trouble in further sinking, and also in order to provide an easy road for the stuff to the machinery standing in the gully at the foot of the spur, an adit was at once projected and started from near the machine, without considering that the length it would have to be driven through hard, nearly horizontal, mica schist to strike the reef, and, consequently, its large expense was greatly disproportionate to the small height of backs—estimated at hardly 40 feet—to be rendered available by it. Irrespective of that—in which most opinions agree—closer examination would have shown that the water in the shaft was mostly due to surface percolation, and might have been easily beaten by a horse-whim. At the time of my visit, this adit, which makes two strong angles in direction, had progressed to a point which Mr. Besanko, the mining manager, considered, from rough measurements—(the want of a proper mining survey and working-plans is here painfully apparent)—to lie south abreast, or already a little beyond, beneath the bottom of the previously mentioned shaft—the last 100 feet having, at the rate of £8 to £10 per foot, been driven E., in the line of a flat slide which he took, from its position, to represent the continuation of the flat reef left in the shaft; and in this supposition he seemed, to all appearances, to be correct. But if so—considering that only few small pockets of rich gold-bearing quartz had been met with in the slide along the whole distance, and that, moreover, but a comparatively small stream of water had made sit appearance in the face, though there were nearly 60 feet of water standing in the shaft above—the prospects of the flat reef at that depth appeared to me far from cheering. On the supposition of its forming a block dipping from the shaft

eastward in strike, there was no doubt still the chance of its being found of some thickness further a-head; however, on looking at the uncertainty and the expense of further work, I advised the manager to discontinue driving on the slide altogether, and, instead, to open out eastward on a quartz reef, 9 inches thick and dipping vertical, which crosses the adit E. and W. some distance from its mouth, and in which gold is said to have been found when penetrated. In fact, there can hardly be a doubt that this reef represents the continuation of the main reef, worked at the surface; for, besides having the same strike and dip, its position in the adit—as ascertained by tape measurement—agrees tolerably well with that of the main reef, as given on a plan prepared by Mr. Evans, mining engineer, on which also a good length of the adit is marked. As regards the prospects of the proposed workings, I think they are very fair, judging from the character of the reef at the surface, and that gold has already been found in the portion crossing the adit; but it must not be forgotten that as soon as the available backs are worked out, opening of the reef in depth will have to be effected by shaft, and requires pumping and hoisting machinery. The flat reef may either be a so-called "dropper," or represent a reef parallel in strike to the main reef, which, on crossing the latter in depth, shifted it a little southward; still, whatever its nature, I take it to be uncertain in extent and auriferous character. The portion left in the shaft might perhaps be easiest opened by a rise from the end of the adit. Touching the crushing machine of the company, it consists of five heads of revolving stamps, driven by a turbine, copper-plate table, and blanket-strakes; a rippled tailing-race forming not a bad addition.

Golden Crown Reef.—This is apparently a continuation of Logan's Reef, from which it lies about one and a-half miles distant to the east. The discoverers, J. Wrightson and Co., have not done much work on it as yet; but from what it disclosed, it seems to be of a mullocky character, and from 9 to 16 inches thick. A crushing of 17 tons yielded about 8 dwts. of gold per ton.

Claim No. 10.—This lies also in the line of, and about two miles distant from, Logan's Reef. It contains a well-defined quartz reef, from 2 to 4 feet wide, in which superficial prospecting has not disclosed any gold as yet; but near to this reef, on the south, and dipping towards it, runs a parallel leader from 6 to 10 inches thick, from which a crushing of 26 tons produced at the rate of 26 dwts. of gold per ton. The reef deserves, in my opinion, to be properly prospected.

The Bendigo Deep Level Company: Managed by Mr. G. B. Douglas.—This is a spirited, and, in my opinion, highly promising prospecting enterprise. The adit, which at the time of my visit was only 10 to 12 feet in, starts from the Bendigo Creek, southward, into the high precipitous mountain side, in a direction nearly at right angles to several reefs presently to be mentioned, and also to the lines of the main reefs previously described, though at more or less considerable distances east of their workings. Thus, according to Mr. Douglas's survey, it would intersect, at 60 feet in and 100 feet beneath the surface, the line of a reef 1 foot wide, which has proved auriferous; at 160 feet in and 300 feet below the surface, the line of the *Guano Reef*, a well-formed reef, 2 feet wide, opened right above the line of the adit, and which has yielded from 16 to 26 dwts. of gold per ton from five crushings that ranged from 26 to 48 tons each. Next comes, at 260 feet in and 45 feet beneath the surface workings, the line of *Broadfoot's Reef*, also a tolerably defined reef of 2 feet in thickness, from which three crushings, of from 28 to 42 tons each, gave at the rate of 12½ to 14½ dwts. of gold per ton. Beyond this reef, at 400 to 500 feet in and about 560 feet beneath the surface, come two leaders, or small reefs, from which crushings have yielded 7½ to 9 dwts. of gold per ton. The line of the Lucknow Reef would be intersected at 700 feet in and 550 feet beneath the surface, that of the Aurora Reef at 1,400 feet in and 700 feet beneath, and that of Logan's Reef at 1,900 feet in and 1,000 feet below the surface; also two leaders, each about 12 inches wide—one between the Lucknow and Aurora, the other between the latter and Logan's Reef, of which crushings yielded respectively 9 dwts. and 13 dwts. of gold per ton. A great collateral advantage the site of the adit has is, that from the Bendigo Creek running past its mouth a never-failing supply of water could be procured for crushing purposes, native power included. The adit has been commenced only wide enough for single tramway, though I think double tramway width would have been far more advisable. What I would specially recommend to the company is to start as soon as possible work with a good boring machine driven by compressed air, which would save special ventilation of the adit, and to use gun cotton, or better still, Nobel's dynamite, for blasting.

The Alta Reef.—This reef has been deserted for a long time, though its prospects seemed encouraging enough, up to the last, for an extended trial. It lies about three miles E.N.E. of Logan's mine, and seems, from what could be seen in some of the old workings, to run in a rather crooked way, at a mean strike of E. 3° to 5° W., and to dip nearly vertical; walls apparently not very well defined. Its thickness seems to have ranged from 2 feet to 6 to 8 feet in places. Eight crushings realized at the rate of from 3½ to 19 dwts. of gold per ton.

A peculiar feature in the reef was the occurrence on the south wall of masses of a very heavy, yellowish-white mineral, which proved very troublesome during crushing; and on examination of the spoil heaps from the workings, I discovered specimens and recognized it as "scheelite," or tungstate of lime. As this is a mineral that most frequently accompanies bismuth ores, there might be a chance of the reef carrying these ores in depth, or of their occurring in the immediate vicinity. The reef has, not very judiciously, been opened by two adits of 90 and 140 feet in length, and at the respective depths of 64 and 80 feet, whilst, according to Mr. Douglas, an adit from the opposite side of the range, where the machinery stands, would at a length of about 680 feet have struck it at a depth of 280 feet, and crossed besides four other reefs, of which one yielded 14 dwt. per ton, from a trial crushing of 12 tons.

The crushing machine, connected by a long tramway and shoot with the mine, consists of ten heads of revolving stamps, in two batteries, driven by turbine; amalgamating tables of the usual pattern, and blanket-strakes. Not being housed in, it is suffering much from exposure to the weather.

The Rise and Shine Reef.—This peculiar occurrence of auriferous stone—for it cannot be called a reef—lies about three-quarters of a mile east of the Alta machine. Judging from three small shafts, the only workings as yet executed—one 18 feet deep lying in the bottom of a gully, the other two shallower, sunk several chains apart on the slope of the southern range—it consists of a zone of highly mineralized mica schist of considerable width, and apparently striking north and south; dip uncertain. The stone worked out of the gully shaft—amounting to about 30 tons—is densely traversed with

quartz veins in all directions, in which fine gold can freely be seen; and there is besides a considerable quantity of iron and arsenical pyrites present. Good prospects of fine gold can also be washed out of a streak of loose stuff, resembling a casing, on one side of the shaft, whilst the fact that from below the line of the formation down the gully, and on the slope of the range, the alluvial drift has furnished rich returns of angular or not waterworn gold, is a clear proof of the richly auriferous character of the portion of the outcrop removed by denudation. In reviewing all these different points, I think that the proper opening and working of this singular formation—which may likely represent a so-called "blow" leading to a defined lode in depth—would be a very profitable undertaking, more especially as there is a fine water-race near at hand to furnish the necessary supply of water, motive power included, for crushing purposes. If found to extend from the gully into the southern bounding range, it could there be opened and worked by an adit, lying at a vertical depth of perhaps near 400 feet below the top of the range.

APPENDIX 7.

Auriferous Reefs and Companies of the Carrick Range.

Besides the managers of the mines subsequently mentioned, the gentlemen who kindly afforded me information about the reefs were Mr. James Marshall, Mr. Charles Colclough, Mr. William Grant, and Mr. James Stuart, of Cromwell; and Mr. Buchan, of Carricktown. Progressing upward from the foot of the range, the reefs I visited are:—

New Royal Standard Company's Reef.—This strikes N. 20° W., and dips easterly at an angle of about 75°, but runs very irregular and is not well defined. It cuts apparently through the disturbed-looking country rock—a rather soft phyllite—both in strike and dip. In parts of the old workings, which consisted of an open cutting and irregular short drives, extending over several chains in length, it was formed of nothing but leaders of quartziferous mullock, from 15 to 16 feet thick, which yielded on crushing from 6 to 12 dwts. of gold per ton. Several small crushings from narrow places produced, however, up to 2 oz. per ton. As it may likely become more defined, and perhaps richer in depth, it would be advisable to prospect it by an adit from the steep slope of the spur which it crosses.

Crown and Cross Claim.—This is owned by Watson, Herbert, and Co. The reef (worked by a shaft 47 feet deep, which will soon be in connection with an adit, driven from the bottom of the adjoining gully) strikes N. 20° W. with an easterly underlay at 75–80°, cutting through much disturbed phyllite, and ranges in thickness from 6 inches to 3 feet, and over 4 feet in bunches. Its hanging wall is defined and smooth, the foot wall rather uneven. It consists of quartziferous mullock, traversed by occasional small quartz veins, with gold fairly distributed throughout. 200 tons crushed paid at the rate of about 1 oz. per ton. The prospects under-foot and in strike south are very encouraging: a prospect of the mullock from the bottom, washed in my presence, gave a fair quantity of very fine gold, besides several small quartz specimens. At the northern end of the workings, which—small prospecting shafts included—extend about three chains along the reef, the latter was found faulted 10 feet eastward by a clay slide 15 feet in thickness. In a small claim, next adjoining the Crown and Cross on the south, owned by Robert Scott and John Myers, the reef was just struck by a small adit, during the presence of our party on the ground.

This reef is considered to be the continuation of the "White Horse" or "Try Again" Reef, next to be mentioned; but as it runs some distance—about one and a-half chains—sideways of the latter, this can only be the case on its representing a faulted portion of it—a supposition not unlikely to prove correct, judging from the identity in strike, dip, and character of the two reefs, and the frequency of faults in the district.

White Horse and Try Again Reef: Worked by Saltoun, Campbell, McKersie, and Co.—This reef strikes N. 20° W., and dips eastward at an angle of about 75°, cutting through alternating harder and softer beds of phyllite—a feature which renders its course rather irregular; strong turns, both in strike and dip, being very frequent. The walls are in places well, in others badly defined; where well defined, they mostly show polished and striated casings. Its thickness ranges from 9 inches to over 4 feet, and it consists of quartziferous mullock, traversed by broken quartz veins, generally rich in arsenical pyrites, and sometimes pretty thick, carrying good gold, though the latter occurs also finely impregnated throughout the mullock mass.

Touching the occurrence of the gold on the large scale, it seems to be accumulated in shoots, which have a decided dip in strike southward. The average yield of gold has hitherto been about 1 oz. per ton from several hundred tons crushed, and there is no sign of the reef becoming poorer under-foot. The main workings consist of an adit, extending about 300 feet along the reef, from which stoping is being extensively carried on, the height of backs available up to the crown of the hill amounting to nearly 100 feet. Another adit could be put in in the strike of the reef over 100 feet lower down the slope of the range; and this work it would be wise soon to enter upon.

Caledonian Company: Managed by Mr. G. T. Stephenson.—This company is at present engaged in driving from the bottom of a deep gully an adit, which is intended to open the Caledonian Reef 180 to 200 feet beneath the level of the first adit, in which work has been stopped, on account of what was considered payable of the available backs—about 70 feet high—having been worked out. According to the direction of this upper adit, which followed the reef southward a length of 400 feet, the latter runs in a wavy line at a mean strike of S. 30-35° W., whilst several shafts sunk on it from the adit show it to dip very close upon vertical. Its walls seem very well defined, and show thin clay casings. Touching the behaviour of the reef in the old workings, yields, &c., Mr. Stephenson kindly afforded me the following information:—The reef ranged in thickness from 1 to 7 feet, but was in places pinched to a mere casing; and there were also shelves of hard rock, which frequently altered its course in dip, throwing it, step-like, several feet eastward. At end of adit it runs thin, but still looks promising enough to induce a party of miners to drive a deep adit from the opposite slope of the spur, for the purpose of opening it in depth beyond the company's ground. Above the stopes, towards the surface of the spur, a considerable extent of ground is still unproved. The reef was of a mullocky character, but contained frequently broken veins and bunches of quartz, richer in gold than the rest. There

have been close upon 800 tons crushed, at an average yield of about 1 oz. of gold per ton. Along and from the adit five shafts have been sunk on the reef, ranging from 12 to 100 feet in depth, in all of which it (the reef) has proved to be auriferous, though, with the exception of one, not so rich as in the old workings. In the two deepest ones (70 feet and 100 feet) the reef was rather irregular towards the bottom. Outside the adit there is a sixth shaft of 80 feet in length, in which the reef has also proved not unpromising. The new deep adit, which is about 170 feet in, is driven in the direction of this latter shaft, and will soon reach the reef, provided the latter has not suffered any change in strike and dip. Considering, however, the frequent occurrences of this kind, viz., the eastward jumps in the worked-out ground, it must be apprehended that they exist likewise in depth, and it would therefore have been wise to cross eastward for the reef before proceeding much farther with the adit. Mr. Stephenson is very sanguine of the reef proving payable down to the level of the latter, and, if so, looking at the height of available backs to rise upon, the company would be in a prosperous condition for a considerable time to come.

Proposed Long Tunnel Company.—On the high spur (the "Long Ridge") between two branches of Smith's Creek, west, opposite the Caledonian Company's mine, a number of small mullock reefs have been superficially worked, one of which, the so-called Border Chief Reef, is about six inches thick, and is said to have paid 6 oz. of gold per ton. The topographical features being very favourable, a company is projected, so Mr. Colclough informed me, for driving a deep adit from the bottom of the spur, to test these reefs and the Caledonian reef in depth, perhaps at 500 to 600 feet, and also to extend it towards the group of rich reefs lying at more than 1,000 yards horizontal distance, and about 1,000 feet higher up the range; the stretch of ground intermediate, though no reefs have as yet been discovered in it, presenting also rather favourable indications of their existence. All I can say about this expensive project is, that it is a legitimate one, but it seems considerably more risky than the Bendigo Deep Level, irrespective of its not having the advantages of the latter—touching a ready supply of water for crushing purposes.

The Star of the East Company: Managed by Mr. Archibald Cameron.—The old Star of the East Reef strikes E. 20° to 25° S., and dips northward at 50° to 56°. It was opened by an adit in strike a length of 480 feet, which rendered a height of 108 feet of backs available beneath the top of the hill, into which the adit penetrates. These backs have been worked out for 250 feet in length to near the boundary of the company's ground, whilst also a large portion of the reef has been removed from under-foot, between two shafts, 60 feet apart and 60 feet deep on the underlay, which workings produced about 1,200 tons of crushing stuff—all quartziferous mullock—which yielded in the average 12 dwt. of gold per ton, the reef becoming more solid and improving in depth. In the backs the reef ranged in thickness from 2 to 8 feet, average 4 feet, and paid about 14 dwts. per ton. As its farther working under-foot from the upper adit proved too expensive, the company started a deeper adit from the other slope of the range, at nearly right angles towards the reef. This adit had, at the time of my visit, advanced a length of 440 feet, and Mr. Cameron expected to strike the reef at another 40 to 50 feet, provided it preserved the same underlay as where last worked under-foot from the upper adit. The height of backs to rise to these old workings would be about 250 feet. At a distance of 386 feet from the adit mouth the company had, however, the luck of intersecting a new mullock reef, which proved payably auriferous, and was at once opened up, and has been extensively and properly worked since. A main drive along its strike is 230 feet in length, and the stopes extend on the west side of the adit for about 70 feet in length and 90 feet in height, on the east side respectively 60 feet and 80 feet, and prospecting rises are opened some 80 feet higher on either side. The height of backs still available for stoping is estimated at 200 feet. Two prospecting winzes, 30 feet apart, have also been sunk from the drive to the underlay of the reef—one, 40 feet deep on the east, the other 60 feet deep on the west side of the adit. The reef strikes, according to these workings, E. 15° to 20° S., and dips northward at an angle of 50° to 56°, a course nearly parallel to that of the old reef. It was found to range from a mere string to, in places, over three feet in thickness, the mean being about two feet. It twists and turns, in strike and dip, in places in a most perplexing manner, and Mr. Cameron deserves great credit for having persevered and succeeded in following it in its tortuous course. The average yield of the crushings has hitherto been 28 dwts. of gold per ton, and there is at present no apprehension of a falling off. Both in strike, at the two faces of the main drive, and in dip, in the winzes under-foot, the thickness of the reef was, however, below the average. As far as Mr. Cameron has observed, the best paying stuff dips at a rather sharp angle in strike eastward. Of further particulars about this reef, I learned that its existence was long ago surmised, and it was originally searched for by the Black Horse Company, by two deep shafts, sunk in a mullock slide on top of the range, in about the line of the present deep adit, and which would hake struck it if continued not many feet deeper. There is a possibility, though by no means a strong one, of this reef and the old reef being identical, *i.e.*, that the latter represents a faulted portion of the former, in which case it would of course be found suddenly cut off in depth. The deep adit will, for the sake of the company, I hope, soon dispel any apprehensions in this respect, by striking it at the calculated distance. As regards the crushing machine of which this company and the Heart of Oak Company, next adjoining, are co-proprietors, it is managed by Mr. W. Menzies, and consists of 10 heads of revolving stamps in two batteries, driven by a steam engine—brown coal serving as fuel. Hot water is introduced into the stamper boxes. As gold saving appliances are used, amalgamating tables and blanket strakes of 14 feet in length, laid at an inclination of 1½ inches per foot. The blanket-sand is treated in the barrel, and a shaking table serves for concentration of the amalgam. Mr. Menzies, who evidently understands his work well, is aware of a loss of fine gold, which is frequently increased by too limited a supply of water. The serious want which affected all the companies on top of the range from the commencement, will shortly, however, be removed, and the gold mining interests of the district generally will be greatly benefited by the completion of an extensive race, carrying a powerful steam of water, constructed by the Carrick Range Water Supply Company.

The Heart of Oak Company: Managed by Mr. Thomas Scott.—The prospects of this company are of a high order; for its ground, which is west, adjoining that of the Star of the East Company, encloses three proved auriferous reefs, viz., the Old Star of the East Reef, the Old Heart of Oak Reef,

and the so-called North Reef, whilst a fourth, viz. the new reef of the Star of the East Company, just described, is worked up to within a short distance of its boundary. The Old Star of the East Reef has been worked with good results from the old adit of the Star Company up to and a good distance along the surface, and looks promising ahead; and, besides, what appears like a continuation of it, though called the *New Reef*, has a short distance higher up the range been taken out for about 30 feet in length and 30 feet in depth, and proved payable, though only six inches thick. The Old Heart of Oak Reef, one of if not the richest in the district, strikes W. 25° S., and dips northward at an angle of 56°. It joins the Old Star of the East Reef, and has been worked, both from the upper adit of the Star Company and from the surface, a length of about 120 feet, and 160 feet in depth on the underlay. Its thickness varied from a few inches to over three feet; average, about two and a half feet. There have been from 2,000 to 3,000 tons of stuff raised and crushed from these workings, which realized at the rate of 1¾ oz. of gold per ton. Prospects where left off working still very good.

The North Reef, which has been opened on top of the spur several chains west of the previously mentioned workings, strikes W. 15° S., and underlays southward at an angle of 70°; but frequent jumps render the underlay much flatter in the average. From its outcrop at the surface it shows an endlong dip in strike westward. It has been opened by a shaft 100 feet deep, and worked to a depth of 70 feet and 70 feet in length, proving from six to eighteen inches in thickness, and yielding from 1¾ to 4 oz. of gold per ton. Pressure of water in the shaft prevented further working. As the same difficulty attached also to the deeper working of the other reefs, the company have lately started on the same slope as, but considerably lower than, that of the Star of the East Company, a deep adit, which, according to Mr. Scott's survey and calculation, would intersect the reef farther off, viz. the Old Heart of Oak, in dip, at a distance of 800 feet vertical, or 500 feet depth on the underlay.

The Elizabeth Company: Managed by Mr. John Towan.—This company is, like the previous ones, engaged in driving an adit for the purpose of opening the Elizabeth Reef in depth, the backs from an upper adit towards the surface having been worked out. This lower adit, which runs nearly at right angles towards the reef, had, when I saw it, according to Mr. Towan's measurements, advanced to within 100 feet of the point of intersection with the reef, from where a main level in the strike of the latter would render a height of backs of about 215 feet available for rising upon towards the main drive from the upper adit. The reef, which consists of quartziferous mullock, strikes S. 20° E., and dips eastward at an angle of about 40°. In the worked-out portion, which is about 270 feet long, and extends from the surface down to the level—a depth of about 180 feet beneath the highest point of the hill which the reef crosses—the thickness of the latter has ranged from 18 inches to, in places, 3 and 4 feet—average, about 2 feet—and its walls were well defined. The yields have been from 8 dwts. up to 25 dwts., or close upon 13 dwts. of gold per ton in the average. About three and a half chains from the point where the main drive starts from the adit, which latter has been driven at nearly right angles towards the reef, a shaft has been sunk on the underlay of the latter to a depth of 65 feet, and a level extends southward from the bottom of a length of 90 feet, all along which distance and down the shaft the reef has proved highly payable—a point which augurs very well for the prospects of the deep adit. In fact, judging from the mode of occurrence of the best stuff in the old workings, as shown on a small plan prepared by Mr. Towan, there can hardly be a doubt that it forms a pretty wide shoot, which, whilst passing the just-mentioned shaft and level, dips steep southward in strike, and would be struck by the adit pretty near the centre of its width. In its course northward the reef —being 2 feet thick—is suddenly cut off by a mullocky cross reef, striking W. 15° S., and dipping southward at an angle of 65°. The line of this unmistakable fault runs across the upper main drive about 40 feet southward from the upper adit, which has been continued about 200 feet farther westward in search of the faulted portion of the reef, but intersected only the faulted cross reef and a thin gold-bearing leader; whilst a cross-cut northward from near the end penetrated the former a second time, without any sign of the reef being apparent beyond. If these workings, in view of the distance driven, furnish already nearly certain proof that the reef has not been faulted in that direction (westward), the mode of fault itself (angles and line of intersection of the two reefs) would also, according to an old mining rule, indicate that the throw has been the reverse way, or eastward; and as the adit has, within about 70 feet eastward from the line of the reef, intersected a thin mullock reef, showing apparently the same strike and underlay as the latter, I think it highly probable that this represents the faulted portion. A drive on it southward in strike to its point of intersection with the cross reef would, whilst proving its auriferous character, soon dispel any doubts on the question. The cross reef, which is from 1 to 1½ feet thick, and looks much like the main reef in character, would also, in my opinion, deserve a trial crushing. Mr. Towan came across a second fault in the reef in its line of dip during sinking the underlay shaft from the main drive; but in this instance he soon recovered the faulted portion by intelligently applying and working according to the main mining rule, viz., that the part of the country with the enclosed lode, forming the hanging wall of the faulter, slid down in the line of dip of the latter.

The crushing machine of the Elizabeth Company consists of two batteries, each of four heads of revolving stamps, of about 4 cwt. each, driven by a steam engine, and having front and back escapes. The front escape of each battery passes in succession a large amalgamated copper-plate, an improved amalgamated copper-plate table (similar in construction to that described of the machine at the Saddle Hill Reef), and 10 feet of blanket-strakes, having an inclination of 1½ inch per foot. The back-escape of both batteries runs over a common amalgamating table, and 14 feet of blanket-strakes, laid at the same inclination as the others. For the treatment of the blanket-sand, serves a small Berdan machine. This elaborate system of appliances is carefully superintended by Mr. Towan, but having to use the frequently limited supply of rather muddy water leaving the United Star and Oak Battery, he has no doubt of a great deal of fine gold being lost in the tailings.

The Young Australian Reef.—This lies close upon 1,000 feet higher up the range than Carricktown, near the head of Adam's Gully, and the claim worked on it is owned by Messrs. Williams and Edwards. It strikes about S.E. and N.W., and dips N.E. into the hill at the very small angle of 18°. Walls pretty well defined. Its thickness ranges from 1½ to 6 feet in places, and it consists of quartziferous mullock, so fine in grain that on washing prospects pieces of quartz the size of a bean

are very rarely observed. An adit of 150 feet in length cut it about 85 feet from the surface, on its underlay, and it has at this level been followed by a drive a distance of 250 feet, and worked out about 140 feet in length, by 30 feet high; its flat dip, combined with the soft nature of the hanging wall, having given Mr. Williams some trouble, and taxed his ingenuity in securing the workings in an economic manner, by timbering and walling up with waste combined. From the drive two shafts have been sunk 93 feet on the underlay of the reef to the water level, and proved it to be down to that depth of the same character as in the upper workings. About 160 feet S.E. from the end of the latter, the reef has also been struck, of a very promising character, by a shaft at a depth of 60 feet from the surface. The quantity of stuff hitherto crushed from all parts of the mine amounts to between 800 and 900 tons, which realized at the rate of 21½ to nearly 25 dwts. of gold per ton. The gold, judging from a good prospect washed in my presence from a tin dishful of the mullock, seems to be pretty evenly distributed throughout the latter, Mr. Williams having observed neither shoots nor patches throughout the extent of the above workings. There have also been two other reefs discovered in the claim, viz. one of about 2 feet in thickness, running parallel to, and at a distance of 40 feet from, the one described. This has been opened for some distance, and the stuff obtained from it—none of which has as yet been crushed—would, according to prospects washed, yield about 10 to 12 dwts. of gold per ton. The second new reef is a cross reef, striking N. and S., and dipping E. at an angle of about 18°. It is from ½ to 2 feet thick, and would according to Mr. Williams's trial-washings, pay from 1 to 1½ oz. of gold per ton. From all I have seen of this mine, and considering that the ground lower down the gully offers facility for putting in an adit at a considerably lower level than the present workings, and more in the direction of the strike of the main reef, I think it represents one of the most prominent ones in the district. In anticipation of obtaining the necessary supply of water from the large race of the Carrick Range Water Supply Company, the proprietors had a fine crushing plant (purchased from the Conroy's Gully Reef Company) in course of erection by Mr. Reid, the well-known mining engineer. This plant consists of two batteries, each of five heads of revolving stamps, to be driven by an iron water-wheel, common amalgamating tables, and 14 feet of blanket-strakes. On my representation, they seemed inclined to add deep quicksilver troughs, or to substitute them for the amalgamating tables.

The Leader.—This is a mullock reef worked by E. Jones and Company, a short distance from the Young Australian, higher up the gully. It has been opened by adit, and proved for about 150 feet in length, showing a rather irregular course at a mean strike of S. 15° W., and an eastward dip at 35–40°, whilst its thickness varied from a few inches to several feet. The yields from three crushings have been at the rate of 11 dwts., 22 dwts., and from the last 22 dwts. of gold per ton. The gold is very fine, and hardly ever visible in the mullock, Prospects of the reef still good.

The Stanley Reef.—This crosses the range a short distance west of the Leader, and is being opened by Buchan and Company. It is also a mullock reef, about 1½ feet thick, striking W. 15–20° S., and dipping northward at 60–65°. None of the stuff has been crushed as yet, but the prospects washed from it are satisfactory.

The Robert Burns Reef.—This lies about a mile west of Carricktown, low down the north slope of a steep spur, near the head of Pipeclay Gully. It is about two feet thick, strikes E. 20° S., and dips northward at 55°. Its walls appear pretty well defined. Crushings have yielded 25 dwts. of gold per ton. The gold ran out in depth, but may likely have dipped eastward in strike.

The Nil Desperandum Reef.—It lies nearly in a line with, and only a few chains S.E. from the former, but strikes S.E. and dips vertically. Some satisfactory returns have been obtained from it, but it became also unpayable in depth.

The John Bull Reef.—This runs about 9 chains higher up the slope, near the top of the spur, south abreast of, and parallel to the Nil Desperandum, and dips N.E., *i.e.* towards it at an angle of 45°. Some crushings have given very fair returns. These last three reefs, which have been deserted for some time, ought, according to their strikes and dips and mutual position, to unite not far up the range; and to test the junction of the John Bull and Robert Burns reefs in depth, Griffiths and party are at present engaged in continuing the adit of the old Golden Gate Company (who originally worked the reefs) in the calculated direction. This is, no doubt, a very promising undertaking, for the junction of the reefs may likely prove richer than each reef proved by itself. That one reef should have faulted the other, I see no reason to apprehend. There have been three other small reefs opened in this neighbourhood, on the range towards Adam's Gully, which I did not visit, namely, the *Marquis of Lorne*, the *Enterprise*, and one in Wilson and Tupker's claim. Mr. Buchan informed me that pretty good yields had been obtained from them; and they had still fair prospects. Not far from the Robert Burns Reef, in the gully, stands a small public crushing machine, owned by Logan and Company. This consists of a battery of five heads of revolving stamps, of about 6 cwts. each, driven by a steam engine, with arrangement for introducing hot water into the coffers. The saving of the gold is effected on a common amalgamating table, and 14 feet of blanket-strakes, with 2-inch fall per foot. For the treatment of the blanket-sand, serve a revolving barrel and a shaking table. I have also to notice another public crushing machine, viz. that of the Old Royal Standard Company, standing near Quartsville, at the foot of the Carrick Range. This consists of two batteries, each of four heads of revolving stamps, fed by hand and driven by a steam-engine. As gold-saving appliances are used common amalgamating tables, and 10 feet of blanket strakes, laid at an inclination of about two inches per foot. From what I could see, there seemed to be danger of grease from the stampers dropping into the coffers. This should most carefully be guarded against; for grease not only prevents the quicksilver from acting upon the gold, but has also a strong tendency of flouring it.

APPENDIX 8.

Reefs and Companies of Arrow.

In this district there have not been any reef workings carried on for a long time past. I collected, however, some information on the principal quartz mine once worked, and examined also, conducted by

Mr. Innes, the Mayor, Mr. McDougall, and other gentlemen interested in quartz mining, two promising reefs formerly prospected.

The Old Criterion Company's Reef.—This reef, which had once a high reputation in the district, runs in the flat close along the Arrow River near Arrowtown. Judging from the old surface workings, extending for about 5 chains in length, it strikes W. 35° N., and dips at 80 to 90° eastward towards the river, crossing the country—a soft mica schist—both in strike and dip. There have been rich drift workings close alongside of it. The following particulars about the reef and the operations of the old company were kindly furnished to me by Mr. H. J. Cope :—The reef was discovered in 1864 by a Victorian quartz miner, and is the one first opened in the province. It consists of a clayey mica-schist mullock, enclosing veins and bunches of quartz. Besides being worked for a good length from the surface, a shaft was sunk on it to a depth of 120 feet, from which it was worked out from 90 feet down, and up to the surface, and 70 feet in length. There was not much water coming in at the bottom of this deep shaft. Another shaft was sunk on the reef, at the south-east end of the open workings, about 40 feet deep, and it was followed from this for 80 feet in length. In the main workings it was at first taken out from one to four feet in width, but another manager subsequently broke into what has been considered the foot wall, and worked several feet of it, which paid nearly as well as what had been previously taken. A leader was found joining the reef which also contained good gold. The yields from the crushings ranged at first from ½ to 1½ oz. of gold per ton, average about 1 oz., but gradually fell off to ½ oz., which would not pay at the time, and the mine was therefore given up. The gold was nowhere completely lost in the workings; but the best seemed to occur in a shoot, dipping westward in strike. The company had a small battery of five heads of stamps, with a common amalgamating table and blanket-strakes in front, the whole poorly constructed. Much difficulty was experienced in clearing the boxes on account of the mullock being of a very clayey nature, and all accounts agree that a great deal of the fine gold was lost. The management was altogether very bad, for it took about twenty men to keep the small battery going. The shares of the company were at one time at a very high premium, and the coming to grief of the mine subsequently has been the principal cause of destroying confidence in quartz mining in the district, and that prevented the latter from being properly prospected since. Considering all the different points relating to the auriferous character of the reef, the workings, management, &c., in connection, I cannot help coming to the conclusion that the reef certainly deserves another trial, and that this, if effected in an economic and systematic manner, and with the use of good crushing machinery, might likely prove a very profitable speculation.

The Cornish Reef.—This lies on the Crown Terrace, about a mile eastward of Arrowtown, and has lately been taken up by McWhirter and party. It strikes S. 40° E., and dips very nearly vertical, *i.e.* south-westward, at about 85°, showing well-defined walls with thin clay casings, and crossing the country—a fissile, nearly flat-bedded mica schist—both in strike and dip. Its thickness is nearly five feet, of which one and a half feet along one wall consist of good-looking quartz, full of pyrites, the remainder of quartziferous mica schist mullock. The prospectors found good gold in the quartz, and opened the reef by a small shaft, since collapsed, and a small drive; but none of the stuff has been crushed. Running at nearly right angles across a steep gully, the reef could be easily opened in strike by adits, either side, attaining, at but a short distance in, a depth of at least 150 feet beneath the surface of the bounding hills: and this trial it decidedly deserves. There is a good fall for the waste down the gully, and from a race higher up on the Crown Range a sufficient supply of water might, perhaps, be secured for a small crushing machine. About 15 feet above the reef a good-looking, well-defined leader, about 1 foot thick, is exposed in the gully, which strikes E. 15° to 20° S., and dips at an angle of 80° southward—a course according to which it ought to join the reef at a short distance towards the west. To prospect this leader would also be advisable.

The Columbia Reef.—It lies about a quarter of a mile from the former reef higher up the gully, near the top of the terrace, being exposed in a narrow rift in the southern hill slope. It strikes S. 25° E., and dips close upon vertical. Thickness, from 6 to 8 feet, mostly composed of solid, rather hungry-looking quartz. It has been prospected by a shallow trench about 40 feet in length, and gold is said to have been seen in the quartz; none of the stone has, however, been crushed. This reef is not as promising-looking as the foregoing; yet, as it could be easily opened by a small adit in strike, it might not be unadvisable to give it this trial.

Alluvial Companies.

Arrow Flat Deep Lead Company.—This company, of which Mr. Elliot is the manager, obtained very rich prospects from what appears to be an old channel of the Arrow River, trending across the present river flat towards the old lake basin beyond Arrowtown. In trying to work the ground a large amount of water was, however, encountered, issuing from a loose shingle bed about 10 feet beneath the surface, and being fed, as examination proved, by a strong creek which joins the valley a short distance higher up. The erection of strong pumping machinery was therefore resorted to, but even this, though consisting of two 12-inch drawing lifts, driven by turbine, and working incessantly day and night, has hitherto failed to make any sensible impression upon the water in the shaft. A dry season would no doubt greatly assist the company, but as this might be hope too long deferred, I see no other way of quickly beating the water than the erection of additional or more powerful pumps. A Victorian plan, in such cases of emergency, might also deserve consideration, viz. to sink a good shaft in the rock near outside the water-bearing drift-bed, drive from this a rock-level underneath and in the course of the lead, and to open and work the latter by means of rises from it. The putting down of a number of bore-holes, for the purpose of ascertaining the depth and trend of the lead, would of course be a necessary preliminary.

Sons of Fortune Gold Mining Company.—This company, under the management of Mr. Miller, is at present engaged in a highly promising enterprise, viz. in driving an adit into an enormous land-slip, which backs up the Arrow River, considerably over 100 feet in height, at a place lying about four miles up the river from Arrowtown. Judging from the workings higher up, there is no doubt rich washdirt existing at the bottom of the valley above the landslip; but all attempts to reach it by shafts, one of which is 42 feet deep, have hitherto failed, on account of too strong a pressure of water. The adit is

intended for draining the little basin, and thus affording access to the washdirt, and it might also afterwards be made use of as a tail-race. It was, at the time I saw it, about 70 feet in, and would, according to Mr. Miller's calculation, have to become about 300 feet longer. The working requires very great care, on account of the uncertain nature of the ground—large boulders, dangerous to remove, impeding the way frequently.

APPENDIX 9.

REEFS AND COMPANIES OF SKIPPER'S CREEK.

Nugget and Cornish Company's Mine.—This mine lies on the N.W. side of the Shotover River and is managed by J. F. Roskruge, who readily furnished me with all the required information. The Nugget and Cornish Reef strikes W. 43° N., and dips south-westerly at angles varying from 70° to 80°. It has well-defined walls, with clay casings, and crosses the country—a very fissile argillaceous mica schist—both in strike and dip. The present workings of the company, of which Mr. Roskruge prepared a detailed plan, are carried on from an adit, in an enormous slip, and are, on that account, of an intricate nature, and require great care in rendering them secure, as the reef varies there in thickness from 12 to over 20 feet in places. The adit is in a distance of 197 feet, of which the last 144 feet are on the line of the reef. The latter consists of quartziferous mica schist—mullock, with veins and bunches of quartz, sometimes several feet thick. Both the mullock and the quartz are very abundantly impregnated with iron and arsenical pyrites, and contain gold, but the quartz is generally the richest. The average yield has hitherto been 11 dwts. to 12 dwts. of gold per ton. The reef is traceable for a very long distance. High up the steep mountain side, N.W., a strong leader was worked in its line by another party, and paid 4½ oz. of gold per ton. Down the steep slope towards the Shotover River, below the slipped ground, it is plainly exposed, from 8 to 10 feet thick, and from there—some 180 feet perpendicular below present workings—Mr. Roskruge is putting in an adit, which will give about 250 to 270 feet of backs to rise upon. Beyond the river, up the opposite high and steep range, it has also been opened at several places and proved auriferous. There is another reef about 200 feet distant from the above described, higher up the mountain side, which strikes W. 35° N., and dips at an angle of about 50° towards it—the line of junction of both reefs in dip—lying, according to Mr. Roskruge's calculation, perhaps close to the end of the working adit. This reef is from 10 to 12 feet thick, and has been worked down from the surface, also in the slipped ground, a depth of 100 feet, but there is still a good height of backs available above the adit. The yields from it have in the average been about 16 dwts. of gold per ton. As regards the whole quantity of stuff crushed from the mine, it amounts to 6,958 tons, which have realized 3,624½ oz. of gold. The crushing machinery of the company, which stands close to the Shotover River, consists of three batteries, each of four heads of revolving stamps, of about 6 cwts. each, fed by hand, and driven by a turbine. As gold-saving are used amalgamated plate-boxes with three drop-ripples, similar in construction to those of the Elizabeth Company's machine, Carrick Range, but improved by the addition of splash-boards for the ripples. From these boxes, of which there are three—one for each battery—the stuff runs over only 6 blanket-strakes of 12 feet in length, and with a fall of 1½ inch per foot. The blanket-sand is treated in the revolving barrel, and the amalgam cencentrated on a strake, covered with amalgamated copper-plates. A similar, though longer strake, with a ripple at the end, serves for washing the stuff from the stamper boxes. On account of the great amount of pyrites in the stone, much quicksilver is lost through becoming floured, and Mr. Roskruge is also convinced of a considerable loss of fine gold. He intends soon to entirely rebuild the machinery, which is old and liable to frequent breaks, so much so that only about 50 tons can be crushed per week, and he took notice of my recommendation to adopt the Clunes system of appliances. In reviewing my observations on this mine, I feel convinced that, if worked on the extensive scale which the size of the reefs and facilities of the ground permit, and with adequate good crushing machinery, it would become one of the best paying ones in the province.

Southberg's Reef, Otago Company: Managed by Mr. Southberg.—This reef which is traceable for several miles in length, crosses the country both in strike and dip, striking E. and W. and dripping N. at angles varying from 35° to 60°. It has been opened from Skipper's Creek both ways by adits, but the most extensive workings have been executed on the east side. The western adit is about 200 feet in length, and the reef, where broken into by a small cross-cut near the end, is 22 feet wide, representing in fact an enormous fissure, with well-defined walls and clay casings, filled with the country rock—a fissile, quartziferous mullock, not very much altered or displaced, but richly impregnated with pyrites. Of veins and bunches of quartz, independent of the interlaminations of the latter, in which the country in this district is very rich, there are but a few observable, and the mass, as such, is altogether too poor to pay for working. On the east side of the creek the reef carried rich gold (1 to 9 oz. per ton) for a considerable distance along the surface, ranging in thickness from 8 to 16 feet; but on working downwards it was found to run poor at depths increasing towards the east, and the present low adit, though a considerable distance in, has not as yet struck it of a payable character. At some of the places opened it is from 12 to 14 feet thick. There are several drives branching off this adit, which have been wrought for the purpose of prospecting a strong spur, or dropper, which dips flat away from the reef, and has produced good gold in the upper workings higher up the range. As far as this spur has been opened by the drives it has not, however, proved payable as yet, though Mr. Southberg does not despair of finding it so on further exploration. It is in places from 2 to 3 feet thick, but thins gradually to a mere string as it approaches the reef. Considering the run of the good portion of the reef worked on this side, there can be no doubt that it represents a shoot dipping at a rather flat angle eastward in strike out of the company's lease; and on this account, I fear, Mr. Southberg has no chance of finding payable ground—a new make—except in sinking from the present eastern adit. On the west side the prospects are, in my opinion, far more favourable; for the adit, if continued along the reef, has there a good chance of striking a new auriferous shoot, the existence of which is clearly indicated by good specimens and prospects having been obtained from the outcrop of the reef higher up the range. The present productive workings of the company are carried

on in another claim high up the eastern range, in a large landslip enclosing the reef, similar as in the case of the Nugget and Cornish.

The crushing stuff from these workings contains abundance of vein quartz, and is very ferruginous, resulting from decomposed pyrites, though the latter occurs also intact in pretty considerable quantity. The exact yield of the crushings was not given, but from what I could gather it does not amount to much above 5 dwts. of gold per ton.

The crushing plant of the Otago Company consists of sixteen heads of revolving stamps, in four batteries, fed by hand, and driven by a turbine at a speed of about 60 blows per minute; weight of stamps, 6 cwt.; lift, only 5 to 6 inches; gauge of gratings, which are punched, 122 holes per square inch. The arrangements for gold-saving for each battery are as follow:—The stuff passes in succession a shallow mercury ripple, two and a half feet of copper plate; two blanket-strakes, four feet long; a rather narrow mercury ripple, with a five-inch drop; and two blanket-strakes of six feet in length. Both the lower and upper strakes are two feet wide, and lie, in front of two batteries, at an inclination of one inch and a half per foot; in front of the other two, at one inch and a quarter per foot. The blanket-sand, which is very rich in pyrites, after being merely washed by tin-dish and in a strake, is left to decompose by exposure to the atmosphere, and is then passed again through one of the batteries, with gratings of 225 holes per square inch. Mr. Southberg knew that on account of the large quantity of pyrites much quicksilver was being floured and a great deal of fine gold lost, and he seemed inclined to adopt the Clunes system of appliances I recommended.

Phœnix, late Scandinavian, Company.—The ground of this company, also on Southberg's Reef, adjoins that of the Otago Company on the east, and, according to a plan and sections prepared by Mr. F. Evans, the consulting engineer of the company, has been extensively worked by and from several adits, driven from the steep slope of the range. As these workings were inaccessible, I could not examine them; but from what I learned from Mr. Evans, the reef, which averages in them eight feet in thickness, contains what appear like two large payable shoots (the yields varied from 6 to 25 dwts. of gold per ton), dipping eastward in strike, and there is besides the chance of the rich shoot coming from the Otago Company's ground, above mentioned. The quartz—and this is the case in the latter company's ground also—changes in character from crystalline and brown ferruginous in the higher to dense and bluish-grey in the lower parts of the workings—in fact, the latter quality represents a so-called "new," or "second make." On examination of specimens, I found it densely impregnated throughout (the cause of its dark colour) with extremely fine particles of pyrites (iron pyrites with much arsenical and copper pyrites), and showing gold in very fine specks. It looks in texture more brecciated than seamy. The reef will in future be worked by and from a new deep adit, which, at the advice of Mr. Evans, has been driven from Skipper's Creek, and struck the reef at a distance of 347 feet, from which level there would be about 160 feet height of backs available to rise upon. As regards the crushing machine of this company, erected about eight years ago, and at present much out of repair through long disuse, it is the largest in the province, and its system of gold-saving appliances resembles most closely that of the Port Phillip Company, Clunes. It consists of thirty heads of revolving stamps in six batteries, each of five heads, supplied with self-feeding hoppers and driven by a powerful turbine in the centre. The coffers are of the Clunes pattern; weight of stamps, over 6 cwt.; lift, 6 to 8 inches; gratings punched with 122 holes per square inch: at one time gratings of wire gauze were used, with only 81 holes per square inch. The stuff passes from each battery through three connected quicksilver troughs, with 8 inches drop, and supplied with splash-boards, and afterwards over blanket strakes of 14, 16, and 18 feet in length for different batteries; some with 1, others with 1½-inch fall per foot. The quicksilver troughs are rather narrow, and concave at the bottom, which is not as good as if they were flat, as the quicksilver is more liable to be splashed over in front. The stuff from the stamper-boxes is washed in a large tie. For the treatment of the blanket sand, which is very rich in pyrites, serve a large revolving barrel with a broad shaking table and rippled ties attached; and after passing these appliances, it is put aside to be ultimately ground with quicksilver in a large arrastra, for the purpose of extracting the gold from the pyrites. The yield of the sand by this latter process has varied from 3 to 12 oz. of gold per ton; loss of quicksilver not ascertained. There is also a reverberatory furnace built, after the old Cornish model, within the mill-house; but this has not been in action for the last six years, on account of the fumes being unbearable and dangerous to the men working in the building. According to what Mr. Evans told me, he understands the process of the extraction of the gold from the pyrites well, and intends to build and work another furnace after the Victorian model, outside the mill. Besides this, he purposes erecting in front of the batteries several Borlase's buddles, to insure a more satisfactory saving of the pyrites. With these contemplated improvements executed—considering the capabilittes of the mine, as stated by Mr. Evans—it ought to rank soon amongst the dividend-paying ones of the province, more especially if the occasional short supply of water for the crushing works is obviated by the construction of the proposed new race. There have been a number of other claims and reefs worked in the district, of which Mr. Evans kindly gave me the following particulars:

British American Claim.—It lies on Southberg's Reef 600 feet east, up the range. The reef, being there 3 to 4 feet thick, was opened by a shaft, and the stuff obtained paid 11½ dwts. of gold per ton. The party then drove an adit to strike the reef about the site of the shaft; but having had no survey for guidance, went nearly 300 feet out of the line, and never reached the reef. There has been nothing done since in the claim. Between 300 to 400 tons of stone were crushed by the machine of the Nugget and Cornish Company, which once belonged to the party.

Prince of Wales Reef is a continuance of Southberg's Reef, westward, high up the range. It was from 15 to 20 feet thick where opened, and paid from 7 dwts. up to 1 oz. of gold per ton; but the stone crushed was mostly picked.

Pactolus Reef.—It lies north of the Prince of Wales Reef, is about 6 feet thick, and has a north and south strike. The prospectors opened it for 20 feet in length, and had a trial crushing which yielded at the rate of 6 dwts. of gold per ton. As this did not pay for working, it was abandoned, and has not been further tried.

Sawyer's Gully Reef.—It was 3 to 4 feet thick on the surface, but pinched in depth. Three tons were crushed, which yielded 4 oz. 12 dwts. of gold. There has been nothing done on it since.

Butcher's Gully Reef.—This was 20 feet wide where opened, and a trial crushing paid 7 dwts. of gold per ton. After this it was not further tried. The gold it carries is very fine.

Ophir Reef.—This lies about half a mile from the Nugget and Cornish Reef, up the Shotover River. It is plainly exposed in a landslip, and carries fair gold. The prospectors spent £600 to £700 in trying to find it in undisturbed ground, but without success. The mode and manner of conducting the search has not, however, been the most judicious, according to most opinions.

Hercules Reef.—This is a continuation of the Nugget and Cornish Reef. Where opened, it was 5 to 6 feet thick, and a trial crushing paid 5 to 6 dwts. of gold per ton. Although better stone was known to exist, it was given up, and has not received any further trial.

Southland Reef.—This lies about one mile south of the Hercules Reef, nearly 600 feet above the Shotover River. It is a mullock reef with bunches of quartz, which are more or less rich in gold. A yield of 45 oz. was obtained from 14 tons crushed. One of the prospectors was killed during working, and when afterwards a shaft, sunk on it to a depth of 50 feet, struck much water, it was deserted, and nothing has been done on it since.

APPENDIX 10.

Reefs of the Rough Ridge.

In visiting this district we were accompanied by Mr. James Hazlett, M.P.C., who kindly afforded me some information about the drift workings of Tinker's and Drybread, passed on the road. At the Rough Ridge we found only one enterprising man, Mr. Withers, employing labour in re-opening a reef once worked by the old Ida Valley Company, though over twenty other auriferous reefs are said to have at one time been worked in the district. The reef Mr. Withers is engaged re-opening, and about the history of which, and a number of others—the principal ones formerly worked—he kindly afforded me the subsequently given particulars, is the *Homeward Bound Reef.* The old main openings, from which exploitation has been carried on, consist of an adit 770 feet in length, driven from a gully in the strike of the reef; and of a shaft sunk from the hill slope a depth of 110 feet, passing the adit at about 50 feet from the surface. The reef is not a solid and defined one, but consists of a series of quartz leaders, of varying length and thickness, running close together in a defined line of strike, viz. 30° S., and dipping steeply towards each other. Some join also in strike, and, whilst one ceases, another generally commences sideways, or a few feet further on. This band of leaders, which is traceable for a considerable distance S.E. up the range, traverses a fine blue phyllite, which dips slightly westward, and looks much disturbed by joints and faults, which also affect the leaders. A fault of several feet in one of the strongest of the latter is, for instance, observed in the vertical shaft, where this passes the adit. It is not at all unlikely that the country becomes more settled, and some of the main leaders join and form a defined reef in depth. This seems to be indicated by a body of fine-looking quartz—4 feet thick and carrying payable gold—having been struck and left at the bottom of the shaft. Mr. Withers, who is at present engaged in taking out some payable stone from what appears to be the main leader, left by the old company under-foot of the adit, intends soon to try his chance—and it is, I think, a very good one—in depth by sinking a main shaft near the mouth of the adit. For, irrespective of the probability of finding there a strong defined reef, from what he observed about the run of the gold it seems to dip in shoots north-westward, *i.e.* from the hill towards the gully, where the adit commences. The quartz of the leader worked, which is but slightly mixed with mullock, shows a fine seamy structure, and is abundantly impregnated with iron and arsenical pyrites, whilst the richer gold-bearing stone is characterized by additional impregnated particles of zinc-blende and bournonite. The old Ida Valley Company had a fine crushing machine—the one bought by the Alta Company, Bendigo, noticed at another place—but they worked it very badly, and lost, besides gold, a large quantity of quicksilver, some say nearly a ton weight, in a short time. Mr. Withers's crushing machine consists of a battery of five heads of revolving stamps of 5¾ cwts. each, fed by hand, and driven by a small steam-engine. He uses gratings with 122 and 144 holes per square inch, but generally the former. The crushed material on leaving the battery passes first through three shallow quicksilver ripples, then over a common copper-plate table, and ultimately over three blanket-strakes, about 16 feet long, and laid at an inclination of 1½ inch per foot. For the treatment of the blanket-sand are used a revolving barrel and a shaking table. As Mr. Withers knows from small experiments that the pyrites, which form a large percentage of the sand, is richly auriferous, he preserves the latter for future re-treatment. The Clunes system of appliances, which I described to him, seemed much to please him, and he may likely give it a trial.

Lloyd's Reef.—This runs at a distance of about 100 feet south-westward from, and parallel to, the Homeward Bound Reef. Besides having been worked—also by the old Ida Valley Company—by small shafts here and there along the surface, it was opened by a cross-cut from near the southern end of the adit on the above reef, and proved, where struck, to be about six feet thick. On driving on it, a fault was found to cut it off close to this point north-westward in strike, and the faulted portion was not recovered; south-eastward it continued, however, well defined, though gradually thinning to about one foot, and was followed a distance of about 300 feet, and stoped out from the level to very near the surface, the quartz paying very satisfactorily. Mr. Withers intends prospecting for this reef—the above-noted faulted portion—by a cross-cut from his contemplated new main shaft, and is not at all unlikely to discover it, judging from indications of the reef on the surface abreast of the mouth of the adit.

Great Eastern Reef.—This lies about a quarter-mile north abreast of the Homeward Bound Reef, and strikes S.E. with a dip N.E. at an angle of 85°, traversing very flat-bedded phyllite, and showing well-defined walls. It has been worked for several hundred feet in length, and 40 to 60 feet in depth, partly by an open cutting, partly by and from an adit about 200 feet long. At the mouth of the adit a shaft was sunk on it a depth of 70 feet, when a strong pressure of water prevented further sinking without pumping machinery. At the bottom of the shaft the reef is said to be left 18 inches thick, and carrying better gold than found in the main workings. In these, its thickness ranged from a few

inches to 3 feet—average, about 1½ feet—and it consisted of quartz and mullock, the former much predominating. The gold occurred in shoots, dipping north-westward in strike, similar as in the Homeward Bound Reef. There have been several hundred tons of stone crushed, with an average yield of about 1 oz. of gold per ton—the yields having ranged from 7 dwts. to 2 oz., and, from some narrow parts of the reefs, even to 3 oz. of gold per ton. About three chains N.W. from the mouth of the adit, on a low rise, bounding the gully which runs up to the above workings, some open workings have been carried on, and small shafts sunk on what appears to be the continuation of this reef, and from these also some good gold is said to have been obtained. The cause of the desertion of the reef by the Great Eastern party, who worked it first, and by the Energetic Company, who worked it subsequently, is said to have been partly bad management, partly want of enterprise in erecting the necessary pumping machinery for opening it in depth—a trial which it, in my opinion, certainly deserves.

West of England Reef.—This was formerly worked by the Sons of Temperance Company by an adit, open cuttings, and shafts about eight chains northward from the mouth of the adit, on the Homeward Bound Reef. It strikes E. 15° S., and dips northward at an angle of 56°. Its thickness ranged in the old workings from 6 inches to 18 inches, and it pinched and expanded at very short distances. The gold occurred in a shoot that dipped westward in strike. A considerable quantity of stone was crushed, which yielded from 6 dwts. to 1½ oz. of gold per ton. The reef has been traced by shafts several chains westward under the alluvial of a flat adjoining the workings; and as the gold struck was found to dip in that direction, it might not turn out a bad speculation to properly prospect it there, though on account of the water, no doubt to be met with, a horse-whim would likely be required in sinking below a shallow depth.

Surprise Reef.—This is a small reef only about one foot thick, and has not been much opened. 63 to 80 tons of stone crushed yielded from 14 dwts. to 1¼ oz. of gold per ton—a return which did not pay, as the expenses were too high at the time.

Queen of the Isles Reef.—It lies between the Great Eastern and the Homeward Bound Reef, near the line of former, and was worked several years ago by the Ida Valley Company to a depth of about 40 feet. Its thickness ranged from 1 to 2½ feet, and about 100 tons crushed from it paid from 10 to 17 dwts. of gold per ton. There has been nothing done on it since the company broke up.

New Reef.—This has lately been discovered by Mr. Withers, who is sinking a shaft on it. Its position is about three-fourths of a mile northward from the Homeward Bound Reef. Whilst dipping nearly vertical it runs N.E., a course crossing the lines of all the other reefs. It consists of coarsely crystalline quartz, is about 7 inches thick, and has one good wall. A crushing of 28 tons gave the handsome return of 1½ oz. of gold per ton. This reef crops out within a zone of country perhaps over a mile in width, which is full of a number of small reefs or spurs, 40 feet and less apart, running more or less parallel, of which many have been opened and proved auriferous.

Before leaving this district, I may mention what Mr. H. J. Cope informed me of, namely, that at Sutton, Strath Taieri, a large reef has some time ago been worked by McIvor and Co., called the Recassoli Reef. This was about 7½ feet thick, and consisted of 6 feet of white quartz, with 18 inches of mullock running alongside. The first crushing paid 2 oz. 9 dwts.; the second, 1 oz. 13 dwts.; and a third of 20 tons, 13 dwts. of gold per ton, which latter did not cover expenses. The crushing machine used consisted of an atmospheric two-stamp battery, driven by steam. The mullock vein, which was the gold-bearing portion, ran out in depth; of the white quartz, none was tried. From the fact that the gold, after retorting, turned out black, it is, no doubt with truth, surmised that some bad metal was in the stone, which caused a loss of gold during crushing.

APPENDIX 11.

Reefs of Macrae's Flat.

To this locality I was kindly conducted by Mr. Warden Robinson, of Naseby. At the head of Macrae's Flat, there have been at one time several so-called reefs prospected and proved auriferous (Golden Bar Reef, Moonlight Reef, &c.); but according to description, they seemed to have only formed bunches, or "blows," between the beds of the country, running out in strike and dip. The only reef on which some extensive workings have been carried on is the Duke of Edinburgh Reef, and about the history of this and the old company who once worked it I received every information from Mr. A. Simpson, a former employé of the company. The reef, where exposed, in a small cutting from a gully near the old main workings, is 3 feet thick, strikes W. 20° N., and dips northward at an angle of 35° to 40°, lying between the beds of a rather soft blue phyllite that forms the country rock. The foot wall, or underlying rock-bed, is well defined and smooth, but the hanging one is broken and traversed by small quartz leaders, dipping towards the reef, which latter is composed of about 15 or 18 inches of quartz on the foot wall, and nearly 2 feet of mullock, traversed by quartz strings, on the hanging wall. The quartz is good-looking, and abundantly impregnated with pyrites. As regards the old workings, which consist of open cuttings and shafts, now more or less collapsed, they extend, with a few interruptions, for 12 to 15 chains in length; but the greatest depth reached at any point was, according to Mr. Simpson, only 40 feet. The quartz, which was principally selected for crushing, ran from 10 to 18 inches in thickness, and paid from 7 dwts. up to 2 oz. of gold per ton. It was nowhere lost in depth. The reef, as such, is traceable for more than a mile in strike, and crosses two small gullies, which, from the crossing line downward, have proved very rich in gold, a clear proof that the denuded portion of the reef must have been richly auriferous also, and indicating the chance of the latter being there payable in depth. The company's crushing mill was a very good one, but, judging from the coarseness and pyritous nature of the tailings, and that, according to Mr. Simpson, a large quantity of quicksilver was lost, a great deal of the gold, which was very fine, must have been lost also. On account of the scarcity of water in the locality, the company had a fine reservoir constructed in the gully below the reef, from which an adit led the water to a shaft, 50 feet deep, sunk close to the machine, and furnished with pumps for supplying the batteries. Considering the nature, extent, and auriferous character of this reef, and the no doubt considerable loss of gold during former crushing, there is, I think, some

chance that, if economically worked, and with improved gold saving appliances, it might leave a profit, notwithstanding the great expense connected with the procuring of fuel (brown coal from Shag Point) for a steam engine.

APPENDIX 12.

REEFS OF SHAG VALLEY.

In visiting this locality, Mr. Rich, of Bushy Park, and Mr. Harvey, of Dunedin, kindly acted as my guides and informants. The first reef I saw has been worked on both sides of a steep gully; on the one side, the most extensively, by Duncan, Glover, Reed, and Company; on the other side by the Shag Valley Lease and Freehold Company. It consists of irregular larger and smaller bunches of quartz, ranging from less than an inch to several feet in thickness, lying between the beds of the country, a hard, bluish-grey phyllite, which strikes N. 30° W., and shows an undulating dip north-eastward, at a mean angle of about 15°. Work was suspended on account of the uncertain thickness and auriferous character of the reef. A few chains higher up the gully a similar reef, or rather a succession of interlaminated bunches of quartz, has been worked by adits and open cuttings at several places on the eastern hill-slope; but here also work had to be given up for the same reason as in the former case. Some of the quartz bunches paid very well, but ran quickly out, and it took all the profit made, and more, to prospect for others. In the neighbourhood of this plain there are the ruins of a small battery of five heads of revolving stamps.

The Shamrock Reef.—This lies half a mile north-eastward from the last-mentioned workings, up the range, and consists of a bunch of rather good-looking quartz, 2 to 3 feet thick at the surface, but running out at 4 feet in depth: as proved by a small shaft sunk on it. In strike it is traceable either side of the shaft for some distance, though apparently growing thinner. A trial crushing of two tons of the quartz is said to have paid 1 oz. 18 dwts. of gold. As this return must no doubt have left a good profit over working expenses, it seems strange that the reef has not been opened farther.

Main Reef of the Shag Valley Lease and Freehold Company.—This is the most important reef opened in the district. It lies not far from the Shamrock Reef, and has been worked by large open cuttings, extending, with few interruptions, for 6 to 7 chains in length, along the slope of a steep range. It lies between the beds of the country, striking N. 40° W., and dipping north-eastward into the range, at angles varying from 25–35°. Its thickness ranges from 2 feet to (in places) over 4 feet, and it has the foot wall pretty well defined throughout, but its hanging wall is broken and full of small leaders. It consists mainly of quartz, which in large, solid bunches and veins lies mostly along the foot wall, whilst towards the hanging wall there is a deal of mullock intermixed. The quartz is good-looking, seamy, and slightly impregnated with pyrites. Regarding the yields from this reef, and the operations of the company, Mr. Harvey gave me the following particulars:—After auriferous stone was discovered in the reef, and satisfactory prospects obtained by tin-dish trials from several places along the outcrop, as far as the workings at present extend, 4 tons of the stone were sent to Ballarat, Victoria, and crushed at a good machine, with a result of 16½ dwts. of gold per ton. Another trial crushing of 1½ ton, executed at the Government battery, Dunedin, gave 1 oz. 6 dwts. of gold. Encouraged by these satisfactory results, the company erected crushing machinery, and gave the supply of 1,000 tons of stone from the reef in contract; but the first 500 tons paid at the rate of 4 dwts., the second at the rate of only 3 dwts. of gold per ton. These low returns did not, of course, by far cover the expenses, and the working of the mine was stopped in consequence.

The crushing machine of the company stands in the gully, near the first-mentioned workings, about half a mile away from those last noted, and is very well constructed. It consists of two batteries, each of five heads of revolving stamps, supplied with self-feeding hoppers, and driven by a steam-engine, the necessary supply of water being obtained from a good-sized reservoir, constructed a little higher up the gully. In front of the batteries lie common amalgamated copper-plate tables, and below these follow the blanket-strakes 14 feet in length, with a fall of three-quarters of an inch per foot. A revolving barrel is provided for the treatment of the blanket-sand.

Whilst considering the company to have acted very unwisely in erecting expensive machinery before the reef had properly been opened and prospected, to say 50–80 feet in depth, I am of opinion that it certainly deserves this trial, now that the machinery for testing the quartz is available. For, as regards the great discrepancy between the gold returns of the last and those of the trial crushings, it seems likely in a great measure to have arisen through the contract for the provision of the 1,000 tons of quartz to the mill, inasmuch as the old workings plainly show that far more mullock (from the hanging wall) was taken than quartz. And from what Mr. Harvey told me, it seems also doubtful whether these quarry-like openings are actually at those places which furnished the stone for the trial crushings.

No. 1.

STATEMENT showing the REVENUE of the GOLD FIELDS collected in the several Districts, and the GOLD DUTY of the COLONY of NEW ZEALAND, for the period from 1st JANUARY to 31st DECEMBER, 1874.

PROVINCE OF AUCKLAND.

—	Miners' Rights.	Business Licenses.	Water Races, Sluices, &c.	Gold Mining Leases, Rents and Royalties.	Registration.	Fees and Fines, Wardens' Courts.	Survey Fees.	Memorial Deposits of Companies.	Depasturing Licenses and Assessments.	Timber and other Licenses.	Withdrawals of Leases.	Miscellaneous.	Net Amount Gold Fields Revenue.	Total Received, including Publicans' Licenses.
	£ s. d.	£. s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
GRAHAMSTOWN	1,188 0 0	...	43 0 0	2,438 19 5	43 16 6	99 7 0	...	...	17 12 6	147 4 0 3 0 0*	4 4 0	205 19 6	4,188 2 11	4,191 2 11
COROMANDEL ...	231 0 0	30 0 0	63 0 0	932 13 6	23 18 6	9 8 0	...	...	...	16 10 0	...	144 13 0	1,451 3 0	1,451 3 0
	1,419 0 0	30 0 0	106 0 0	3,371 12 11	67 15 0	108 15 0	...	...	17 12 6	163 14 0 3 0 0*	4 4 0	350 12 6	5,639 5 11	5,642 5 11

Gold duty received in the province during the year, £7,519 1s. 5d.

PROVINCE OF NELSON.

COLLINGWOOD	152 0 0	3 0 0	...	89 15 0	26 7 6	8 17 0	...	...	...	...	...	16 4 6	296 4 0	296 4 0
WESTPORT ...	278 0 0	46 0 0	21 17 6	813 12 0	45 12 6	11 0 0	...	...	...	...	...	43 1 6	1,259 3 6	1,259 3 6
BRIGHTON AND CHARLESTON	397 2 6	65 0 0	53 10 0	383 12 3	169 7 6	18 18 0	...	...	...	220 10 0*	...	36 7 6	1,123 17 9	1,344 7 9
COBDEN ...	131 0 0	32 0 0	12 5 0	4 7 6	13 2 6	5 12 0	...	...	...	17 0 0*	...	0 19 6	199 6 6	216 6 6
AHAURA ...	1,129 0 0	719 0 0	68 0 0	1,152 13 9	165 7 6	30 12 0	...	...	...	...	...	14 5 6	3,278 18 9	3,278 18 9
REEFTON ...	404 0 0	1,062 0 0	17 10 0	1,923 4 5	88 0 0	31 16 0	...	...	...	...	10 0 0	151 14 9	3,688 5 2	3,688 5 2
WANGAPEKA ...	18 0 0	...	...	125 0 0	2 2 6	...	...	...	...	...	...	1 1 0	146 3 6	146 3 6
	2,509 2 6	1,927 0 0	173 2 6	4,492 4 11	510 0 0	106 15 0	...	...	...	237 10 0*	10 0 0	263 14 3	9,991 19 2	10,229 9 2

Gold duty received in the province during the year, £8,570 18s.

PROVINCE OF MARLBOROUGH.

HAVELOCK ...	49 0 0	5 0 0	...	19 8 0	4 10 0	...	...	...	...	...	...	5 13 6	83 11 6	...
WAIRAU ...	...	...	...	40 3 2	...	...	...	...	...	...	...	...	40 3 2	...
BLENHEIM ...	...	...	...	35 3 2	...	...	...	...	...	...	...	...	35 3 2	...
	49 0 0	5 0 0	...	94 14 4	4 10 0	...	...	...	...	...	...	5 13 6	158 17 10	158 17 10

Gold duty received in the province during the year, £119 16s. 2d.

NOTE.—The items marked thus * represent fees on publicans' licenses, and are excluded from last column but one, and included in the "Total" column.

No. 1—*continued.*

STATEMENT showing the REVENUE of the GOLD FIELDS collected in the several Districts, and the GOLD DUTY of the COLONY of NEW ZEALAND, for the period from 1st JANUARY to 31st DECEMBER, 1874.

PROVINCE OF WESTLAND.

—	Miners' Rights.	Business Licenses.	Water Races, Sluices, &c.	Gold Mining Leases, Rents and Royalties.	Registration.	Fees and Fines, Wardens' Courts.	Survey Fees.	Memorial Deposits of Companies.	Depasturing Licenses and Assessments.	Timber and other Licenses.	Withdrawals of Leases.	Miscellaneous.	Net Amount Gold Fields Revenue.	Total Received, including Publicans' Licenses.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
HOKITIKA ...	56 0 0	8 0 0	...	4 6 0	...	...	...	...	...	...	...	0 6 0	68 12 0	68 12 0
KANIERI ...	475 0 0	78 0 0	30 10 0	7 8 0	34 18 0	21 16 0	...	...	...	205 0 0*	5 0 0	1 0 0	653 12 0	858 12 0
GREYMOUTH ...	334 0 0	87 0 0	82 15 0	18 7 0	52 14 0	13 5 0	...	...	...	160 0 0*	...	1 2 0	589 3 0	749 3 0
ROSS ...	318 0 0	333 0 0	35 15 0	6 11 0	13 2 6	24 6 0	...	...	...	182 15 0*	5 0 0	0 19 0	736 13 6	919 8 6
STAFFORD ...	815 0 0	115 0 0	97 15 0	5 0 0	46 1 0	103 8 0	...	...	...	245 0 0*	...	0 1 0	1,182 5 0	1,427 5 0
OKARITO ...	93 0 0	116 0 0	...	6 0 0	15 16 0	6 5 0	5 0 0	...	...	150 0 0*	...	0 6 0	242 7 0	392 7 0
POUNAMU ...	491 0 0	187 0 0	18 10 0	1 2 6	22 5 6	24 1 0	...	...	...	106 0 0*	...	6 16 0	750 15 0	856 15 0
MAORI GULLY ...	250 0 0	127 0 0	...	...	...	16 7 6	...	...	...	42 10 0*	...	0 8 0	393 15 6	436 5 6
CLIFTON ...	357 0 0	86 0 0	...	...	...	16 15 0	...	...	...	120 0 0*	...	0 8 0	460 3 0	580 3 0
HAAST ...	...	...	...	...	0 6 0	...	...	...	...	...	...	...	0 6 0	0 6 0
	3,189 0 0	1,137 0 0	265 5 0	48 14 6	185 3 0	226 3 6	5 0 0	...	...	1,211 5 0*	10 0 0	11 6 0	5,077 12 0	6,288 17 0

Gold duty received in the province during the year, £7,785 11s. 4d.

PROVINCE OF OTAGO.

DUNEDIN ...	44 0 0	5 0 0	0 7 6	41 5 0	1 5 0	...	...	...	...	...	...	223 17 6	315 15 0	...
NASEBY ...	708 0 0	276 5 0	44 15 0	1,272 19 8	49 17 6	61 14 6	...	...	...	...	...	3 14 9	2,417 6 5	...
BLACK'S AND ST. BATHAN'S ...	196 0 0	50 0 0	8 10 0	128 3 10	15 5 0	3 19 0	...	...	...	...	...	3 0 0	404 17 10	...
MANUHERIKIA ...	131 0 0	29 0 0	5 5 0	155 4 8	7 10 0	4 10 0	...	...	0 7 0	...	...	4 1 0	336 17 8	...
CLYDE ...	112 0 0	27 0 0	7 2 6	723 0 5	2 10 0	7 14 0	...	...	24 3 6	...	...	0 7 0	903 17 5	...
MOUNT BENGER	158 0 0	53 0 0	8 12 6	968 15 1	10 7 6	2 0 0	...	...	35 15 9	0 17 6	...	15 1 0	1,252 9 4	...
CROMWELL ...	674 0 0	199 0 0	25 15 0	356 18 4	52 2 6	34 15 6	...	...	...	...	...	1 7 0	1,343 18 4	...
QUEENSTOWN ...	389 0 0	52 0 0	16 0 0	7,251 2 0	27 2 6	10 3 0	...	...	153 9 0	...	...	775 0 0	8,673 16 6	...
ARROWTOWN ...	336 0 0	125 0 0	6 7 6	1,872 15 11	48 1 0	20 14 0	...	...	60 10 5	...	...	19 13 0	2,489 1 10	...
LAWRENCE ...	858 0 0	253 0 0	25 7 6	3,706 10 1	31 5 0	40 11 0	...	...	976 0 0	...	...	38 19 6	5,929 13 1	...
SWITZERS ...	402 0 0	179 0 0	7 0 0	266 5 7	21 2 6	5 5 6	...	...	17 10 0	...	...	2 0 0	900 3 7	...
OREPUKI ...	139 0 0	5 0 0	5 17 6	10 12 6	13 15 0	7 10 0	...	...	24 10 0	...	...	...	206 5 0	...
	4,147 0 0	1,253 5 0	161 0 0	16,753 13 1	280 3 6	198 16 6	...	...	1,292 5 8	0 17 6	...	1,087 0 9	25,174 2 0	25,174 2 0

Gold duty received in the province during the year, £13,504 0s. 3d.

NOTE.—The items marked thus * represent fees on publicans' licenses, and are excluded from the last column but one, and included in the "Total" column.

C. T. BATKIN, Receiver-General.

No. 2.

STATEMENT showing the REVENUE of the GOLD FIELDS collected in the several Districts, and the GOLD DUTY of the COLONY of NEW ZEALAND, for the period from 1st JANUARY to 31st MARCH, 1875.

PROVINCE OF AUCKLAND.

—	Miners' Rights.	Business Licenses.	Water Races, Sluices, &c.	Gold Mining Leases, Rents and Royalties.	Registration.	Fees and Fines, Wardens' Courts.	Survey Fees.	Memorial Deposits of Companies.	Depasturing Licenses and Assessments.	Timber and other Licenses.	Withdrawals of Leases.	Miscellaneous.	Net Amount Gold Fields Revenue.	Total received, including Publicans' Licenses.
	£ s. d.	£ s. d.	£. s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
GRAHAMSTOWN ...	178 0 0	...	10 0 0	256 10 11	6 6 0	7 16 0	...	...	1 17 6	10 0 0	...	13 9 0	483 19 5	...
COROMANDEL ...	14 0 0	...	5 0 0	111 2 5	4 9 6	...	...	...	...	5 0 0	...	26 1 0	165 12 11	...
OHINEMURI ...	1,072 0 0	21 0 0	...	...	33 18 6	20 19 6	...	...	...	...	...	20 3 0	1,168 1 0	...
	1,264 0 0	21 0 0	15 0 0	367 13 4	44 14 0	28 15 6	...	...	1 17 6	15 0 0	...	59 13 0	1,817 13 4	1,817 13 4

Gold duty received in the province during the quarter, £1,321 18s. 9d.

PROVINCE OF NELSON.

COLLINGWOOD ...	21 0 0	13 0 0	...	13 6 3	2 0 6	7 7 0	5 0 0	10 0 0	...	...	...	0 15 0	72 8 9	72 8 9
WESTPORT ...	83 0 0	10 0 0	2 4 0	200 3 6	7 4 6	1 4 0	...	...	...	...	...	2 13 0	306 9 0	306 9 0
BRIGHTON AND CHARLESTON ...	68 0 0	4 0 0	5 13 6	49 6 0	19 19 0	5 16 0	...	...	...	42 10 0*	...	5 19 0	158 13 6	201 3 6
COBDEN ...	28 0 0	...	1 1 0	20 2 6	1 0 6	...	...	...	...	...	...	3 3 0	50 7 0	50 7 0
AHAURA ...	333 0 0	145 0 0	6 14 0	105 15 9	11 19 0	11 12 0	35 10 0	...	...	...	...	0 19 0	650 9 9	650 9 9
REEFTON ...	70 0 0	63 0 0	2 7 6	549 5 9	4 19 0	0 12 0	...	...	...	...	...	3 14 6	693 18 9	693 18 9
WANGAPEKA ...	2 0 0	...	...	8 0 0	0 17 6	...	...	...	...	...	...	0 1 0	10 18 6	10 18 6
WEST WANGANUI	14 0 0	3 0 0	...	...	0 7 6	...	...	...	...	...	...	...	17 7 6	17 7 6
	619 0 0	238 0 0	18 0 0	945 19 9	48 7 6	26 11 0	40 10 0	10 0 0		42 10 0*	...	14 4 6	1,960 12 9	2,003 2 9

Gold duty received in the province during the quarter, £2,520 14s. 5d.

PROVINCE OF MARLBOROUGH.

HAVELOCK ...	17 0 0	...	...	35 3 2	0 10 0	...	...	...	...	...	...	1 12 0	54 5 2	...
WAIRAU ...	...	...	...	..	...	...	...	...	...	...	...	...	...	...
BLENHEIM ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	17 0 0	...	...	35 3 2	0 10 0	...	...	...	...	...	...	1 12 0	54 5 2	54 5 2

Gold duty received in the province during the quarter, £69 2s. 9d.

Note.—The items marked thus * represent fees on publicans' licenses, and are excluded from the last column but one, and included in the "Total" column.

No. 2—*continued.*

STATEMENT showing the REVENUE of the GOLD FIELDS collected in the several Districts, and the GOLD DUTY of the COLONY of NEW ZEALAND, for the period from 1st JANUARY to 31st MARCH, 1875.

PROVINCE OF WESTLAND.

—	Miners' Rights.	Business Licenses.	Water Races, Sluices, &c.	Gold Mining Leases Rents and Royalties.	Registration.	Fees and Fines, Wardens' Courts.	Survey Fees.	Memorial Deposits of Companies.	Depasturing Licenses and Assessments.	Timber and other Licenses.	Withdrawals of Leases.	Miscellaneous.	Net Amount Gold Fields Revenue.	Total Received, including Publicans' Licenses.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
HOKITIKA ...	5 0 0	...	...	1 8 0	...	...	...	...	...	...	...	...	6 8 0	...
KANIERI ...	103 0 0	28 0 0	8 15 0	0 8 0	8 6 0	3 16 0	...	...	...	...	...	0 4 0	152 9 0	...
GREYMOUTH ...	45 0 0	19 0 0	18 5 0	5 8 0	13 8 6	0 8 0	...	...	...	...	...	0 1 0	101 10 6	...
ROSS ...	83 0 0	9 0 0	5 10 0	...	2 15 0	4 9 0	...	...	...	...	...	0 1 0	104 15 0	...
STAFFORD ...	140 0 0	15 0 0	26 10 0	5 0 0	12 0 0	17 15 0	...	...	...	...	...	...	216 5 0	...
OKARITO ...	10 0 0	25 0 0	0 8 0	3 0 0	1 13 0	...	...	...	...	...	...	0 2 0	40 3 0	...
POUNAMU ...	68 0 0	33 0 0	5 5 0	...	4 8 6	2 11 0	...	...	...	...	...	0 5 0	113 9 6	...
MAORI GULLY ...	27 0 0	28 0 0	...	...	...	1 10 0	...	...	...	...	...	...	56 10 0	...
CLIFTON ...	88 0 0	16 0 0	...	...	...	3 19 0	...	...	...	...	...	0 1 0	108 0 0	...
	569 0 0	173 0 0	64 13 0	15 4 0	42 11 0	34 8 0	...	...	...	...	...	0 14 0	899 10 0	899 10 0

Gold duty received in the province during the quarter, £1,961 17s. 6d.

PROVINCE OF OTAGO.

DUNEDIN ...	6 0 0	...	...	...	0 2 6	...	...	...	...	...	...	142 10 0	148 12 6	...
NASEBY ...	173 0 0	35 0 0	10 12 6	559 1 6	15 0 0	17 0 0	...	...	...	...	...	1 10 0	811 4 0	...
BLACK'S AND ST. BATHAN'S ...	39 0 0	10 0 0	0 15 0	28 15 0	3 12 6	0 11 0	...	...	...	...	...	...	82 13 6	...
MANUHERIKIA ...	103 0 0	5 0 0	1 12 6	45 10 11	2 0 0	4 14 0	...	...	...	...	...	0 1 0	161 18 5	...
CLYDE ...	30 0 0	3 0 0	1 5 0	187 18 6	1 2 6	0 5 0	...	...	3 3 0	...	...	0 1 0	226 15 0	...
MOUNT BENGER ...	44 0 0	...	2 2 6	268 12 11	3 2 6	0 5 0	...	...	2 0 3	...	...	3 10 0	323 13 2	...
CROMWELL ...	146 0 0	70 0 0	5 10 0	279 13 9	17 12 6	4 8 0	...	...	...	...	...	0 16 0	524 0 3	...
QUEENSTOWN ...	52 0 0	...	3 7 6	585 15 8	2 12 6	12 0 0	...	...	58 17 5	...	...	4 17 0	719 10 1	...
ARROWTOWN ...	115 0 0	55 0 0	1 10 0	316 12 10	12 10 0	34 8 6	...	...	43 0 9	...	...	0 9 0	578 11 1	...
LAWRENCE ...	161 0 0	63 0 0	6 5 0	1,092 3 4	5 2 6	10 0 0	...	...	46 11 0	...	...	17 11 0	1,401 12 10	...
SWITZERS ...	38 0 0	52 0 0	1 5 0	71 8 9	4 2 6	1 7 0	...	...	1 18 6	...	...	...	170 1 9	...
OREPUKI ...	27 0 0	5 0 0	1 0 0	...	1 15 0	0 11 0	...	...	...	...	...	...	35 6 0	...
	934 0 0	298 0 0	35 5 0	3,435 13 2	68 15 0	85 9 6	...	...	155 10 11	...	...	171 5 0	5,183 18 7	5,183 18 7

Gold duty received in the province during the quarter, £3,342 4s. 6d.

C. T. BATKIN, Receiver-General.

No. 3.

COMPARATIVE RETURN of Revenue derived from the Gold Fields in the several Provinces of New Zealand, during the Years 1873 and 1874, showing Increase or Decrease under each head of Revenue.

Heads of Revenue.	Auckland.				Nelson.				Marlborough.				Westland.				Otago.			
	1873.	1874.	Increase.	Decrease.	1873.	1874.	Increase.	Decrease.	1873.	1874.	Increase.	Decrease.	1873.	1874.	Increase.	Decrease.	1873.	1874.	Increase.	Decrease.
	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£
Miners' Rights	2,751	1,419	...	1,332	3,110	2,509	...	601	47	49	2	...	2,925 12*	3,189	252	...	4,911	4,147	...	764
Business Licenses	25	30	5	...	1,996	1,927	...	69	...	5	5	...	1,583 2*	1,137	...	448	1,495	1,253	...	242
Water-races, Sluices, &c.	130	106	...	24	196	173	...	23	...	...	...	...	293	265	...	28	181	161	...	20
Gold Mining Leases, Rents, and Royalties ...	3,349	3,372	23	...	3,110	4,492	1,382	...	93	95	2	...	221	49	...	172	9,218	16,754	7,536	...
Registration	97	68	...	29	633	510	...	123	6	4	...	2	196 1*	185	...	12	388	280	...	108
Fees and Fines, Wardens' Courts	42	109	67	...	99	107	8	...	...	...	...	...	163	226	63	...	215	199	...	16
Survey Fees	...	...	...	...	...	...	...	...	...	...	...	...	156	5	...	151	7	...	...	7
Memorial Deposits of Companies	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Depasturing Licenses and Assessments ...	20	18	...	2	...	...	...	...	...	...	...	...	...	...	...	...	2,062	1,292	...	770
Timber and other Licenses	159	164	5	...	...	...	...	...	...	...	...	...	...	...	...	...	5	1	...	4
Withdrawals of Leases	...	4	4	...	115	10	...	105	17	...	...	17	12	10	...	2	34	...	...	34
Miscellaneous	406	351	...	55	142	264	122	...	3	6	3	...	37	11	...	26	294	1,087	793	...
Gold Duty	10,977	7,519	...	3,458	9,958	8,571	...	1,387	127	120	...	7	10,252	7,786	...	2,466	18,245	13,504	...	4,741
Totals	17,956	13,160	...	Net 4,796	19,359	18,563	...	Net 796	293	279	...	Net 14	15,853	12,863	...	Net 2,990	37,055	38,678	Net 1,623	...

* Note.—These figures have been added in consequence of a return having been received subsequent to the date on which last year's Statements were completed.

C. T. Batkin, Receiver-General.

No. 4.

COMPARATIVE RETURN of the TOTAL AMOUNTS of GOLD FIELDS REVENUE (exclusive of Gold Duty) collected in the several Districts during the YEARS 1873 and 1874, and the QUARTERS ended 31st March, 1874 and 1875, showing the INCREASE or DECREASE in respect of each District.

PROVINCE.	DISTRICT.	1873.	1874.	INCREASE.	DECREASE.
		£	£	£	£
AUCKLAND	Grahamstown	5,228	4,188	...	1,040
	Coromandel	1,753	1,451	...	302
NELSON	Collingwood	350	296	...	54
	Westport	1,137	1,259	122	...
	Brighton and Charleston ...	1,613	1,124	...	489
	Cobden	264	199	...	65
	Ahaura	2,723	3,279	556	...
	Reefton	3,141	3,688	547	...
	Wangapeka	173	146	...	27
MARLBOROUGH ...	Havelock	77	84	7	...
	Wairau	35	40	5	...
	Blenheim	53	35	...	18
WESTLAND	Hokitika	99	69	...	30
	Kanieri	757	654	...	103
	Greymouth	1,061	589	...	472
	Ross	1,229	737	...	492
	Stafford	1,159	1,182	23	...
	Okarito	319	242	...	77
	Pounamu	568	751	183	...
	Maori Gully	149	394	245	...
	Clifton	128	460	332	...
	Haast	15* / 116	...	...	131
OTAGO	Dunedin	386	316	...	70
	Naseby	1,975	2,417	442	...
	Black's and St. Bathan's ...	837	405	...	432
	Manuherikia	362	337	...	25
	Clyde	556	904	348	...
	Mount Benger	1,106	1,252	146	...
	Cromwell	1,200	1,344	144	...
	Queenstown	3,815	8,674	4,859	...
	Arrowtown	2,090	2,489	399	...
	Lawrence	5,180	5,930	750	...
	Switzers	1,090	900	...	190
	Orepuki	213	206	...	7
	Totals	40,957	46,041	9,108	4,024
	Deduct decrease ...	...	...	4,024	...
	Total increase ...	...	...	£5,084	...

1st JANUARY to 31st MARCH, 1873 and 1874.

AUCKLAND	Grahamstown	1,028	484	...	544
	Coromandel	355	166	...	189
	Ohinemuri	...	1,168	1,168	...
NELSON	Collingwood	16 / 33*	72	23	...
	Westport	294	306	12	...
	Brighton and Charleston ...	336	159	...	177
	Cobden	59	50	...	9
	Ahaura	834	650	...	184
	Reefton	935	694	...	241
	Wangapeka	22	11	...	11
	West Wanganui	...	17	17	...
MARLBOROUGH ...	Havelock	25	54	29	...
	Wairau	...	...	...	...
	Blenheim	35	...	...	35
WESTLAND	Hokitika	9	6	...	3
	Kanieri	162	152	...	10
	Greymouth	136	102	...	34
	Ross	228	105	...	123
	Stafford	323	216	...	107
	Okarito	50	40	...	10
	Pounamu	148	113	...	35
	Maori Gully	77	56	...	21
	Clifton	136	108	...	28
OTAGO	Dunedin	67	149	82	...
	Naseby	668	811	143	...
	Black's and St. Bathan's ...	103	83	...	20
	Manuherikia	59	162	103	...
	Clyde	196	227	31	...
	Mount Benger	441	324	...	117
	Cromwell	349	524	175	...
	Queenstown	1,674	720	...	954
	Arrowtown	426	579	153	...
	Lawrence	1,244	1,402	158	...
	Switzers	263	170	...	93
	Orepuki	65	35	...	30
	Totals	10,796	9,915	2,094	2,975
	Deduct increase ...	...	...	...	2,094
	Total decrease ...	...	...	...	£ 881

* These amounts were received subsequent to the date on which last year's Statements were completed.

C. T. BATKIN, Receiver-General.

No. 5.

RETURN of the QUANTITY and VALUE of GOLD EXPORTED from NEW ZEALAND during the YEAR ended 31st DECEMBER, 1874.

PRODUCE OF THE GOLD FIELDS IN THE	PORT OF EXPORT.	To Great Britain.	To New South Wales.	To Victoria.	To China.	Totals.	
						Quantity.	Declared Value.
		Oz.	Oz.	Oz.	Oz.	Oz.	£
Province of Auckland ...	Auckland ...	15,213	28,009	33,680	...	76,902	305,039
	Thames ...	...	...	8	...	8	29
Province of Marlborough	Wellington ...	...	...	223	...	223	852
	Picton ...	...	...	975	...	975	3,896
Province of Nelson ...	Nelson ...	2	2,948	2,692	...	5,642	22,158
	Westport ...	9,121	...	24,562	...	33,683	134,840
	Greymouth ...	7,330	1,261	37,698	113	46,402	185,613
Province of Westland ...	Greymouth ...	104	458	25,533	1,035	27,130	108,515
	Hokitika ...	1,294	...	48,165	...	49,459	198,806
	Okarito ...	...	...	857	...	857	3,429
Province of Otago ...	Dunedin ...	79,671	...	43,180	7,893	130,744	524,622
	Invercargill ...	...	1,946	2,351	...	4,297	17,302
	Riverton ...	...	...	66	...	66	230
Totals		112,735	34,622	219,990	9,041	376,388	1,505,331

Customs Department,
26th April, 1875.

H. S. McKELLAR,
(for the Secretary of Customs).

No. 6.

RETURN of the QUANTITY and VALUE of GOLD EXPORTED from NEW ZEALAND during the QUARTER ended 31st MARCH, 1875.

PORT OF EXPORT.	PRODUCE OF THE GOLD FIELDS IN THE PROVINCE OF	DURING THE QUARTER ENDED 31ST MARCH, 1875.					
		To Great Britain.	To New South Wales.	To Victoria.	To other Places.	Totals.	
						Quantity.	Declared Value.
		Oz.	Oz.	Oz.	Oz.	Oz.	£
Auckland	Auckland	2,946	2,337	13,344	...	18,627	73,991
Wellington	Wellington	...	...	...	...	...	...
Picton	Marlborough	691	...	...	...	691	2,766
Nelson	Nelson	...	...	133	...	133	487
Westport	"	1,436	...	4,887	...	6,323	25,294
Greymouth	"	...	...	18,629	43	18,672	74,690
						25,128	100,471
Greymouth	Westland	...	...	5,878	844	6,722	26,886
Hokitika	"	...	...	13,057	...	13,057	52,228
						19,779	79,114
Dunedin	Otago	16,783	...	14,714	3	31,500	126,923
Invercargill	"	...	...	1,956	...	1,956	7,912
						33,456	134,835
Totals		21,856	2,337	72,598	890	97,681	391,177

Customs Department,
Wellington, 19th April, 1875.

H. S. McKELLAR,
(for the Secretary of Customs).

No. 7.

RETURN showing the QUANTITY of SILVER EXPORTED during the YEAR 1874, and MARCH QUARTER, 1875.

PRODUCE OF THE GOLD FIELDS IN THE PROVINCE OF	PORT OF EXPORT.	DURING THE YEAR 1874.			DURING THE QUARTER ENDED 31ST MARCH, 1875.		
		To Great Britain.	Quantity.	Value.	To Great Britain.	Quantity.	Value.
		Oz.	Oz.	£	Oz.	Oz.	£
Auckland	Auckland ...	40,566	40,566	10,380	...	...	...

H. S. MCKELLAR,
(for the Secretary of Customs).

No. 8.

RETURN of the QUANTITY and VALUE of GOLD EXPORTED from NEW ZEALAND, from 1st APRIL, 1857, to 31st MARCH, 1875.

PORT OF EXPORT.	PRODUCE OF THE GOLD FIELDS IN THE PROVINCE OF	DURING THE QUARTER ENDED 31ST MARCH, 1875.						EXPORTED PREVIOUS TO THE 31ST DECEMBER, 1874.		TOTAL EXPORTED FROM NEW ZEALAND TO THE 31ST MARCH, 1875.	
		To Great Britain.	To New South Wales.	To Victoria.	To other Places.	TOTALS. Quantity.	TOTALS. Declared Value.	Quantity.	Value.	Quantity.	Value.
		Oz.	Oz.	Oz.	Oz.	Oz.	£	Oz.	£	Oz.	£
Auckland	Auckland ...	2,946	2,337	13,344	...	18,627	73,991	930,598	3,305,478	949,225	3,379,469
Wellington	Wellington	...	...	...	...	...	...	30	120	30	120
Picton ...	Marlborough	691	...	...	...	691	2,766	43,078	167,024	43,769	169,790
Nelson ...	Nelson ...	...	...	133	...	133	487				
Westport	,, ...	1,436	...	4,887	...	6,323	25,294	1,394,059	5,530,692	1,419,187	5,631,163
Greymouth	,, ...	...	...	18,629	43	18,672	74,690				
						25,128	100,471				
Greymouth	Westland ...	...	...	5,878	844	6,722	26,886				
Hokitika...	,, ...	...	...	13,057	...	13,057	52,228	1,887,930	7,459,068	1,907,709	7,538,182
						19,779	79,114				
Dunedin ...	Otago ...	16,783	...	14,714	3	31,500	126,923				
Invercargill	,, ...	...	...	1,956	...	1,956	7,912	3,344,278	13,114,634	3,377,734	13,249,469
						33,456	134,835				
Totals		21,856	2,337	72,598	890	97,681	391,177	7,599,973	29,577,016	7,697,654	29,968,193

Customs Department,
Wellington, 19th April, 1875.

H. S. MCKELLAR,
(for the Secretary of Customs).

No. 9.

COMPARATIVE RETURN of the QUANTITY and VALUE of GOLD EXPORTED from the several Provinces of NEW ZEALAND, for the QUARTERS ended 31st MARCH, 1875, and 31st MARCH, 1874.

PROVINCES.	QUARTER ENDED 31ST MARCH, 1875.		QUARTER ENDED 31ST MARCH, 1874.	
	Quantity.	Declared Value.	Quantity.	Declared Value.
	Oz.	£	Oz.	£
Auckland	18,627	73,991	15,566	61,585
Marlborough	691	2,766	307	1,228
Nelson	25,128	100,471	23,839	95,358
Westland	19,779	79,114	20,542	83,140
Otago	33,456	134,835	48,693	194,028
Totals	97 681	391,177	108,947	435,339

Customs Department,
Wellington, 19th April, 1875.

H. S. MCKELLAR,
(for the Secretary of Customs).

No. 10.

TABLE showing the AVERAGE RATE of WAGES per WEEK for the YEAR ending 31st MARCH, 1875.

MINING DISTRICTS.	General Manager.	Legal Manager.	Mining Manager.	Engineer.	Engine Driver.	Stoker.	Blacksmith.	Carpenter.	Miners.	Labourers.	Boys.	Chinese.	Agricultural Labourers.	Domestic Servants.	REMARKS.
AUCKLAND—	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
North Hauraki	£5 to £10	£1 to £2	£5 to £8	£3 to £6	£2 10 to £3	2 10 0	3 0 0	£3 to £3 12	£2 to £3 10	2 0 0	none	employed.	2 0 0	10s. to 18s.	
South Hauraki	...	1 0 0	£3 to £10	£3 to £4 16	£2 10 to £3	£2 5 to £3	£3 to £3 12	£2 14 to £3	£2 5 to £3	£1 16–£2 2	4s. to £1 10	...	...	...	
MARLBOROUGH—															
Ravenscliff	...	1 0 0	5 0 0	5 0 0	5 0 0	5 0 0	4 0 0	4 0 0	3 0 0	...	...	...	...	...	
Wairau	...	...	no	labour	em-	ployed	...	...	...	...	...	...	...	...	
NELSON—															
Collingwood	...	...	6 0 0	...	...	...	£3 to £3 12	£3 to £3 12	3 0 0	2 8 0	0 18 0	...	2 2 0	5s. to 12s.	
Takaka	...	...	...	...	...	...	£3 to £3 12	£3 to £3 12	3 0 0	2 8 0	0 18 0	...	2 2 0	5s. to 12s.	
Inangahua	...	1 15 0	6 0 0	5 0 0	4 0 0	4 0 0	5 0 0	5 0 0	3 10 0	3 10 0	2 0 0	...	2 0 0	1 10 0	
Greenstone	...	...	5 0 0	...	...	...	4 10 0	4 10 0	3 12 0	3 12 0	1 15 0	...	...	1 5 0	
Westport	...	...	...	...	...	...	4 0 0	4 0 0	3 10 0	3 12 0	1 10 0	...	3 0 0	1 0 0	
Charleston	4 0 0	2 0 0	4 0 0	...	...	...	4 0 0	5 0 0	3 10 0	3 10 0	1 10 0	...	3 0 0	1 0 0	
Lyell	...	1 0 0	6 0 0	...	...	...	6 0 0	6 0 0	4 0 0	3 10 0	1 10 0	...	3 0 0	1 0 0	
WESTLAND—															
Waimea	...	...	...	...	...	...	4 0 0	4 16 0	3 0 0	2 0 0	1 10 0	2 0 0	3 0 0	1 0 0	
Okarito	5 0 0	...	...	...	...	...	4 10 0	4 10 0	3 0 0	3 18 0	...	...	2 0 0	1 10 0	
Totara	5 0 0	2 0 0	5 0 0	5 0 0	3 10 0	3 0 0	4 0 0	4 0 0	3 0 0	2 10 0	1 10 0	2 0 0	2 10 0	1 10 0	
Greymouth	6 0 0	6 0 0	5 0 0	...	...	...	4 4 0	4 4 0	3 12 0	3 12 0	15s. to £1 5	2 0 0	3 0 0	£1 to £2	
Clifton	...	none	em-	ployed	...	...	4 10 0	4 10 0	3 10 0	3 0 0	1 5 0	1 15 0	...	1 10 0	
Arnold	...	...	...	...	...	...	4 10 0	4 10 0	3 10 0	2 10 0	1 0 0	none	employed	1 10 0	
Grey	...	2 0 0	5 0 0	...	...	...	4 10 0	5 0 0	3 10 0	3 0 0	1 10 0	2 10 0	1 10 0	1 5 0	
Kanieri	...	...	4 0 0	...	...	...	3 10 0	3 10 0	3 0 0	2 15 0	1 0 0	1 15 0	1 5 0	1 0 0	
OTAGO—															
Dunedin	...	...	...	...	...	...	...	...	3 0 0	2 0 0	1 5 0	...	...	...	
Tuapeka	...	2 0 0	4 10 0	4 10 0	...	...	3 0 0	4 10 0	3 0 0	3 0 0	0 15 0	2 0 0	1 5 0	0 15 0	
Mount Ida	...	...	3 12 0	...	...	...	3 12 0	3 12 0	3 0 0	2 14 0	0 15 0	2 8 0	1 0 0	0 15 0	
Queenstown	7 0 0	...	7 0 0	3 0 0	3 0 0	2 10 0	3 0 0	3 10 0	£2 10 to £3	1 5 0	0 15 0	...	1 5 0	...	
Dunstan	...	1 0 0	5 0 0	5 0 0	3 0 0	3 0 0	4 10 0	4 10 0	£3 to £3 12	3 0 0	1 0 0	0 7 0	1 10 0	15s. to £1	
Switzers	...	...	...	...	...	...	2 10 0	4 10 0	3 10 0	1 5 0	1 0 0	1 10 0	2 0 0	1 0 0	
Orepuke	...	...	...	...	...	...	...	4 10 0	3 0 0	2 8 0	0 5 0	2 5 0	2 8 0	1 0 0	
Arrow	...	...	6 0 0	...	...	...	4 0 0	4 0 0	3 0 0	2 0 0	1 0 0	1 10 0	2 0 0	0 15 0	

No. 11

RETURN showing the Average Prices of Provisions and Live Stock, for the Year ending 31st March, 1875.

Mining District.	Beer. per hhd.	Brandy. per gallon	Wheaten Bread. per lb.	Fresh Butter. per lb.	Salt Butter. per lb.	Cheese. per lb.	Coffee. per lb.	Flour. per 100lb	Grain—Wheat. per imperial bhl.	Live Stock. Cattle—Horned. per head.	Goats. per head.	Horses. per head.	Sheep. per head.	Swine. per head.	Meat. Beef. per lb.	Mutton. per lb.	Pork. per lb.	Milk. per qt.	Rice. per lb.	Salt. per lb.	Sugar. per lb.	Tea. per lb.	Tobacco. per lb.	Wine. p'r gallon
	£ s. d.	£ s. d.	d.	s. d.	s. d.	s. d.	s. d.	£ s. d.	s. d.	£ s. d.	£ s. d.	£	£ s. d.	£ s. d.	d	d.	d.	d.	d.	d.	d.	s. d.	s. d.	£ s.
Auckland—																								
North Hauraki ...	6 0 0	1 5 0	2½	1 9	1 6	1 0	1 10	0 18 0	6 0	10 0 0	0 12 6	£5 to £50	1 2 6	2 0 0	7	7	7	6	5	2	6	3 0	5 6	1 2
South Hauraki ...	5 0 0	1 3 0	2	1 3	1 0	0 8	1 8	0 17 0	5 0	9 0 0	0 6 0	£12 hacks	1 0 0	1 15 0	5	5	5	6	4	1	6	2 6	5 0	0 15
Marlborough—																								
Pelorus	...	...	...	1 6	1 6	1 4	2 0	1 0 0	...	...	...	...	...	...	6	4½	...	1/	6	4	8	3 6	7 0	...
Queen Charlotte Sd	Supplies received from outside gold fields.																							
Ravenscliff																								
Wairau ...																								
Nelson and Westland																								
Golden Bay ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Collingwood and Takaka ...	5 5 0	1 4 6	3	1 2	1 0	1 0	1/10 to 1/2	17/–18/	...	1 5 0 per 100 lb.	...	£10–£40	15/–18/	1 10 0 ₱ 100lb	6	6	6	6	5	1	6	3/–3/6	5/to6/	15/–20/
Waimea	6 0 0	1 2 0	3	1 6	1 6	8 0	1 6	1 1 0	7 0	10 0 0	2 0 0	30 0 0	0 14 0	2 5 0	6	6	9	6	6	3	7	3 0	8 0	18/
Grey	6 0 0	1 5 0	3	2 0	1 8	1 3	1 9	1 4 0	8 0	10 0 0	1 0 0	20 0 0	0 12 0	3 0 0	8	8	9	1/	6	4	7½	3 6	6 0	20/
Okarito	9 0 0	26/–28/	4½ – 6	2/–2/6	1/6–1/9	1/3–1/6	1/6–1/9	28/–36/	14 0	£10 to £12	£2 to £3	£20–£40	1 5 0	1 10 0	6 to 9	9	1/–1/6	6 to 7	8 to 9	4 to 6	7 to 8	3 6	6/ to 8/	18/–22/
Greymouth	£5 to £6	1 2 0	2¼–2½	2/–2/6	1/3–1/6	1 0	1/9–2/	1 0 0	7 0	13 0 0	1 10 0	£15–£90	1 2 6	3 10 0	8	8	10	7	6	3	6	3 6	6/–10/	16/
Inangahua	7 10 0	1 5 0	4½	2 6	1 9	1 3	2 0	1 10 0	15 0	10 0 0	1 10 0	20 0 0	1 0 0	1 10 0	9	9	1/	1/	6	4	8	3 6	6 0	18/
Totara	6 0 0	1 3 0	3	2 0	1 6	1 0	1/6–1/9	1 5 0	8 6	£8 to £12	1 0 0	£10–£30	10/–20/	0 15 0	7	6	8	6	4½	4	7	3 6	6 0	16/
Clifton	7 0 0	1 4 0	3¾	2 6	2 0	1 0	1 9	1 4 0	10 0	No sales.					6	6	1/	1/	6	4	7	3 6	6 0	20/
Kanieri	5 0 0	1 4 0	3	2 0	1 6	1 2	1 9	1 0 0	7 0	10 0 0	1 10 0	30 0 0	0 18 0	2 10 0	8	8	9	6	5	3	6	3 6	6 6	17/
Arnold	6 10 0	1 5 0	3	2 3	1 9	1 6	2 0	1 5 0	10 0	No sales.					6	6	10	6	6	4	8	3 6	6 0	17/
Westport	5 0 0	1 2 0	3	1 6	1 6	0 10	1 9	0 18 0	6 6	12 10 0	1 10 0	25 0 0	1 2 6	3 0 0	8	8	8	1/	3	1	6	3 0	6 0	15/
Greenstone	6 0 0	1 5 0	3	2 0	1 6	1 3	1 9	1 10 0	11 0	15 0 0	2 0 0	30 0 0	0 15 0	5 0 0	7	7	9	6	5	5	8	3 0	7 0	17/
Charleston and Brighton ...	7 0 0	1 5 0	3	2 0	1 9	1 0	2 0	1 2 0	8 0	16 0 0	1 10 0	25 0 0	1 7 0	4 0 0	10	9	1/	1/	6	3	6	3 3	6 0	15/
Lyell	...	1 8 0	5	2 0	2 0	1 6	2 0	1 10 0	...	10 0 0	...	25 0 0	1 5 0	3 0 0	8	8	1/	1/6	7	6	8	3 6	7 0	20/
Otago—																								
Dunedin	4 10 0	0 18 0	2½	1 0	1 0	0 10	1 8	0 15 0	4 3	6 0 0	...	15 0 0	0 10 0	3 10 0	4	4	8	6	4	2	6	3 6	5 0	18/
Tuapeka	5 0 0	1 4 0	2¼	1 9	1 6	1 0	1 9	0 16 0	4 6	20/–25/ per 100 lb.	0 10 0	£10–£60	7/ – 15/	20/–50/	4 to 6	4 to 5	6 to 8	4	5	1	6	1 9	4 6	25/
Mount Ida	6 10 0	25/–27/	3	2 0	1/9–2/	1/ – 1/3	1/1–2/	18/–19/	5/6–6/6	£3 to £5	7/6 to 50/	£10–£25	10/–12/	25/–35/	5 to 8	3 to 5	5 to 10	6 to 8	5 to 6	3 to 4	6 to 8	3/–3/6	5/6–7/	18/–24/
Queenstown... ...	7 0 0	1 6 0	2½	2 0	1 6	1 3	1 10	0 13 0	...	£5 to £11	5/ to 30/	£5 – £50	10/–16/	10/–16/	4 to 8	4 to 6	8	6	6	4	7	3/9	7/	24/
Dunstan	6 10 0	1 4 0	1	2 0	2 0	1 0	2 0	0 14 0	5/–6/	£3 10/–£10	Unsaleable	£12–£50	6/ – 8/	30/–40/	8 to 9	6 to 7	8	9 to 1/	4	4	8	3/–3/6	6/	18/–30/
Switzers	9 9 0	1 10 0	3¾	1 6	1 6	1 0	2 0	0 18 0	6 0	£6 0 0	1 0 0	£10–£60	0 12· 0	2 10 0	6	4	7	4	5	3	7½	3/6	6/	30/
Orepuke	9 9 0	...	...	1 6	1 6	1 0	2 0	1 1 0	...	...	...	...	...	...	4½–6	4½–6	8	6	6	3	6 to 7	3/6	6/	...
Arrow	6 10 0	22/6–25/	1¾	2 0	1 9	1 0	2 0	0 11 0	4 0	£4 to £18	5/ to 50/	£10–£35	6/ to 8/	6d p'r lb.	4 to 5	4 to 5	8 to 9	6	6	3	5½–8	3/–4/6	5/6–6/	15/

No. 12.

PRICE of Gold per Ounce in the several Mining Districts during the Year ending 31st March, 1875.

Mining Districts.	From	To	Mining Districts.	From	To
	£ s. d.	£ s. d.		£ s. d.	£ s. d.
Auckland—			Westland *(continued)*—		
North Hauraki	2 5 0	3 5 0	Greymouth	3 16 0	...
South	2 13 9	2 14 0	Clifton	3 16 0	...
Marlborough—			Arnold	3 16 0	...
Ravenscliff	3 17 10½	...	Grey	3 16 6	...
Pelorus	3 13 0	...	Kanieri	3 16 0	...
Wairau	3 13 0	...	Otago—		
Nelson—			Dunedin	3 15 0	...
Collingwood	3 12 6	3 13 0	Tuapeka	3 15 6	...
Inangahua	3 16 0	3 17 0	Mount Ida	3 15 0	...
Greenstone	3 16 0	...	Queenstown	3 16 0	...
Westport	3 16 0	...	Dunstan	3 15 6	...
Westland—			Switzers	3 15 6	...
Waimea	3 16 0	3 17 0	Orepuki	3 16 6	...
Okarito	3 14 6	3 16 0	Arrow	3 15 6	...
Totara	3 16 0	...			

No. 13.

SUMMARY.—Number of Miners Employed during the Year ending 31st March, 1875.

Mining Districts.	Alluvial Miners.		Quartz Miners.		Totals.		Grand Totals.
	European.	Chinese.	European.	Chinese.	European.	Chinese.	
Auckland	...	...	1,768	...	1,768	...	1,768
Marlborough	85	...	30	...	115	...	115
Nelson	2,960	720	670	...	3,630	720	4,350
Westland	2,895	1,323	...	...	2,755	693	3,588
Otago	3,718	2,650	235	...	3,660	2,225	6,603
Total ...	9,658	4,693	2,703	...	11,928	3,638	16,424

No. 14.

NUMBER of Miners Employed during the Year ending 31st March, 1875.

Mining Districts.	Alluvial Miners.		Quartz Miners.		Totals.		Grand Totals.
	European.	Chinese.	European.	Chinese.	European.	Chinese.	
Auckland—							
North Hauraki	...	...	350	...	350	...	350
South Hauraki	...	...	1,418	...	1,418	...	1,418
Marlborough—							
Pelorus	45	...	...	...	45	...	45
Ravenscliff	...	...	30	...	30	...	30
Wairau	40	...	...	...	40	...	40
Nelson—							
Collingwood	127	...	...	...	127	...	127
Takaka	30	...	...	...	30	...	30
Inangahua	45	55	600	...	645	55	700
Greenstone	300	200	...	...	300	200	500
Westport	350	...	10	...	360	...	360
Charleston	400	...	...	...	400	...	400
Brighton	100	...	...	...	100	...	100
Lyell	230	30	60	...	290	30	320
Matahitahi	70	...	...	...	70	...	70
Cobden	100	12	...	...	100	12	112
No Town	280	210	...	...	280	210	490
Ahaura	928	213	...	...	928	213	1,141
Westland—							
Waimea	1,150	250	...	...	1,150	250	1,400
Okarito	140	...	...	...	...	...	140
Totara	500	70	...	...	500	70	570
Greymouth	170	120	...	...	170	120	290
Clifton	240	120	...	...	240	120	360
Arnold	220	108	...	...	220	108	328
Kanieri	475	25	...	...	475	25	500
Otago—							
Dunedin	59	...	...	...	59	...	59
Tuapeka	440	450	10	...	450	450	900
Mount Ida	1,095	295	15	...	1,110	295	1,405
Queenstown	450	450	60	...	510	450	960
Clyde	70	30	...	...	70	30	100
Cromwell	400	100	150	...	550	100	650
Alexandria	140	200	...	...	140	200	340
Nevis	100	130	...	...	100	130	230
Teviot	200	100	...	...	200	100	300
Black's	150	150	...	...	150	150	300
Switzers	100	220	...	...	100	220	320
Nokomai	20	80	...	...	20	80	100
Waikaka	20	90	...	...	20	90	110
Orepuki	153	35	...	...	153	35	188
Arrow	321	320	...	...	321	320	641
Total	9,658	4,693	2,703	...	11,928	3,638	16,424

No. 15.

SUMMARY.

NUMBER of MACHINES employed in ALLUVIAL and QUARTZ MINING for the Year ending 31st March, 1875.

MINING DISTRICT.	MACHINERY EMPLOYED IN ALLUVIAL MINING.														MACHINERY EMPLOYED IN QUARTZ MINING.									
	Steam Engines employed Winding, Pumping, &c.		Puddling Machines.	Whims.	Whips or Pulleys.	Sluices, Toms, and Sluice Boxes.	Water Wheels.	Hydraulic Hose.	Pumps.	Dredges.	Quicksilver and Compound Cradles.	Derricks.	Stamp Heads, Crushing Cement.	Boring Machines.	Steam Engines employed Winding, Crushing, &c.		Crushing Machines.	Stamp Heads.	Water Wheels.	Whims.	Whips or Pulleys.	Derricks.	Buddles.	Approximate Value of all Mining Plant included in this Return.
	No.	Aggregate Horse-power.													No.	Aggregate Horse-power.								
																								£
AUCKLAND	...	...	...	...	...	...	...	...	...	...	...	...	...	...	55	1,561	54	938	19	3	...	...	...	252,000
MARLBOROUGH	...	...	...	...	...	330	3	1	10	...	...	...	...	...	1	16	1	10	...	...	...	1	...	3,025
NELSON	...	...	...	2	...	3,190	31	145	12	2	...	...	106	...	3	70	10	138	7	1	1	...	...	55,025
WESTLAND	...	...	...	13	16	11,702	56	726	86	...	47	6	1	1	...	...	...	...	...	...	...	...	...	54,520
OTAGO	1	8	1	7	1	5,819	68	1,099	182	13	30	1	31	1	9	140	22	239	13	5	5	...	...	143,502
Total	1	8	1	22	17	21,041	158	1,971	290	15	77	7	138	2	68	1,787	87	1,325	39	9	6	1	...	508,072

No. 16.

NUMBER of MACHINES EMPLOYED in ALLUVIAL and QUARTZ MINING, for the YEAR ending 31ST MARCH, 1875.

Mining Districts.	Machinery employed in Alluvial Mining.														Machinery employed in Quartz Mining.									Approximate Value of all Mining Plant included in this Return.	Price charged per ton for Crushing Quartz or Cements.
	Steam Engines, employed Winding, Pumping, &c.		Puddling Machines.	Whims.	Whips or Pulleys.	Toms, Sluice Sluices, and Boxes.	Water Wheels.	Hydraulic Hose.	Pumps.	Dredges.	Quicksilver and Compound Cradles.	Derricks.	Stamp Heads, Crushing Cement.	Boring Machines.	Steam Engines employed Winding, Crushing, &c.		Crushing Machines.	Stamp Heads.	Water Wheels.	Whims.	Whips or Pulleys.	Derricks.	Buddles.		
	No.	Aggregate Horse-power.													No.	Aggregate Horse-power.									
																								£	
AUCKLAND—																									
North Hauraki	...	...	...	...	...	...	...	...	...	...	...	...	...	...	8	262	12	126	7	...	...	...	...	60,000	No returns.
South Hauraki	...	...	...	...	...	...	...	...	...	...	...	...	...	...	47	1,299	42	812	12	3	...	...	...	192,000	
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	55	1,561	54	938	19	3	...	...	...	252,000	
MARLBOROUGH—																									
Pelorus	...	...	...	...	...	300	3	1	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,000	
Ravenscliff...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	16	1	10	...	...	...	1	...	2,000	
Wairau	...	...	...	...	...	30	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	25	
	...	...	...	...	...	330	3	1	10	...	...	...	...	...	1	16	1	10	...	...	...	1	...	3,025	
NELSON—																									
Collingwood	...	...	...	...	...	53	1	2	10	2	...	...	6	...	...	...	...	...	...	...	...	...	...	750	
Takaka	...	...	...	...	...	7	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	25	
Inangahua	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	70	8	120	5	1	1	...	...	50,000	
Greenstone	...	...	...	...	...	3,000	...	13	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4,250	
Westport	...	...	...	2	...	100	30	100	...	...	...	...	100	...	...	...	...	...	...	...	...	...	...	No return	
Lyell	...	...	...	...	...	30	...	30	...	...	...	...	...	...	...	...	2	18	2	...	...	...	...	No return	
	...	...	...	2	...	3,190	31	145	12	2	...	...	106	...	3	70	10	138	7	1	1	...	...	55,025	
WESTLAND—																									
Waimea	...	...	...	...	1	6,590	10	265	32	...	...	...	1	...	...	...	...	...	...	...	...	...	...	7,000	
Okarito	...	...	...	1	...	150	8	3	25	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,500	
Totara	...	...	...	9	5	41	9	22	9	...	...	6	...	1	...	...	...	...	...	...	...	...	...	35,000	
Greymouth	...	...	...	...	...	200	1	40	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,200	
Clifton	...	...	...	...	...	540	...	26	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	610	
Arnold	...	...	...	...	...	296	...	28	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	250	
Grey	...	...	...	2	...	3,750	25	257	17	...	47	...	...	...	...	...	...	...	...	...	...	...	...	5,400	
Kanieri	...	...	...	1	10	135	3	85	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3,560	
	...	...	...	13	16	11,702	56	726	86	...	47	6	1	1	...	...	...	...	...	...	...	...	...	54,520	
OTAGO—																									
Dunedin	...	...	...	...	...	33	...	4	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	182	
Tuapeka	...	...	...	1	1	2,000	25	15	60	...	...	...	30	...	...	...	4	40	4	1	1	...	...	6,000	
Mount Ida...	...	...	...	...	...	285	...	130	...	...	...	...	...	...	5	60	6	80	1	...	...	...	...	11,100	
Queenstown	...	...	...	...	...	321	5	57	50	3	1	...	...	...	...	...	3	59	3	...	...	...	...	58,100	
Dunstan	...	...	1	5	...	1,000	25	800	35	9	25	1	1	1	4	80	9	60	5	4	4	...	...	60,000	
Switzers	1	8	...	1	...	1,620	6	23	17	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4,700	
Orepuki	...	...	...	...	...	160	...	30	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	420	
Arrow	...	...	...	...	...	400	7	40	20	1	...	...	...	...	...	...	...	...	...	...	...	...	...	3,000	
	1	8	1	7	1	5,819	68	1,099	182	13	30	1	31	1	9	140	22	239	13	5	5	...	...	143,502	
Gross Total ...	1	8	1	22	17	21,041	158	1,971	290	15	77	7	138	2	68	1,787	87	1,325	39	9	6	1	...	508,072	

No. 17.

TABLE showing approximately the NUMBER, DESCRIPTION, and VALUE of the WATER-RACES, TAIL-RACES, DAMS, RESERVOIRS, &c., for the YEAR ending 31st MARCH, 1875.

MINING DISTRICTS.	WATER-RACES.				TAIL-RACES.		DAMS.		RESERVOIRS.		GROUND SLUICES.		PRICE CHARGED FOR WATER PER SLUICE HEAD, PER WEEK.
	Number.	Length in Miles.	Number of Sluice Heads.	Approximate Cost.	Number.	Approximate Cost.	Number.	Approximate Cost.	Number.	Approximate Cost.	Number.	Approximate Cost.	
				£		£		£		£		£	
AUCKLAND—													
North Hauraki ...	14	10	45	3,850	...	...	...	...	...	...	...	...	
South Hauraki ...	40	10	122½	9,000	2	102	4	400	...	...	...	...	10/ to 20/ per week per stamp head.
MARLBOROUGH—													
Pelorus	2	12	40	1,300	15	1,000	2	50	...	...	...	...	
NELSON—													
Collingwood	56	35	95	5,200	11	500	36	2,290	...	...	46	370	20/ for 40 inches.
Takaka	8	7	16	820	4	140	8	460	...	...	5	40	£3 10/ for 40 inches.
Inangahua	153	72	...	47,252	76	8,524	42	1,918	27	160	...	...	
Greenstone	70	64	200	17,216	58	3,800	23	2,585	...	...	50	7,500	£2 10/
Westport	138	102	114	no means of knowing	45	no means of knowing	83	no means of knowing	18	no means of knowing	Do not understand what is wanted under this head		£3 for 40 inches.
Charleston	172	70	60	„	53	„	230	„	12	„	„	„	
Lyell	87	136	98	„	26	„	18	„	...	„	„	„	
WESTLAND—													
Waimea	600	270	740	45,000	600	18,400	800	9,000	300	8,400	700	3,500	£1 to £1 10/ for 40 inches.
Okarito	35	50	125	9,000	25	800	18	700	2	350	3	250	£8 for 40 inches.
Totara	200	140	180	21,000	100	5,000	150	3,000	...	...	35	800	£4 to £7 for 36 inches.
Greymouth	297	307	385	21,922	115	3,964	347	9,628	...	...	...	...	£2 for 40 inches.
Grey	631	360½	1,022	34,340	194	9,486	369	11,320	3	500	347	9,437	£1 10/ for 20 inches.
Kanieri	129	108	307	42,505	132	2,335	188	4,658	3	850	55	1,365	£3 for 40 inches.
OTAGO—													
Dunedin	21	22	23	1,020	5	140	54	374	...	...	12	67	
Tuapeka	244	966	799	no information	523	25,000	211	10,000	included Dams.	under	included Tail Races	under	£5 to £6 for 100 inches, 6 days of 8 hours.
Mount Ida	254	1,010	1,006	112,600	304	36,250	134	17,750	...	...	...	...	£4 for 40 inches.
Queenstown	570	862	920	80,000	860	8,600	72	7,200	26	2,600	impossible to say.		No return.
Dunstan	200	600	600	100,000	150	30,000	45	3,000	...	...	350	3,000	£2 10/ to £3 for 40 inches, 6 days of 10 hours.
Switzers	107	180	240	19,000	...	...	...	...	...	...	...	...	£3 for 50 inches.
Orepuki	87	130	54	7,530	112	4,320	30	150	...	...	...	...	£2 for 40 inches.
Arrow	250	300	350	80,000	200	15,000	28	1,500	15	1,500	See Tail Races.		£2 for 40 inches.
Totals	4,365	5,823½	7,541½	658,555	3,610	173,361	2,892	86,053	406	14,360	1,603	26,329	

No. 18.

RETURN of the NUMBER of MINING LEASES in force on the 31st MARCH, 1875, the EXTENT of GROUND LEASED, and RENTAL per ANNUM.

MINING DISTRICTS.	NUMBER.	GROSS ACREAGE.	RENTAL PER ANNUM.
		A. R. P.	£ s. d.
AUCKLAND—			
North Hauraki	8	55 0 0	162 5 10
South Hauraki	24	83 0 0	165 13 10
MARLBOROUGH—			
Queen Charlotte Sound	1	5 0 0	10 0 0
Ravenscliff	7	67 2 38	135 9 6
Wairau	1	16 0 0	32 0 0
NELSON—			
Collingwood	38	208 2 57	263 10 0
Takaka	...	...	...
Inangahua and Lyell	86	863 3 12	2,053 10 0
Greenstone	1	9 0 0	1 2 6
Westport	27	237 0 36	405 16 2
Charleston and Brighton	77	383 3 21	843 19 0
WESTLAND—			
Waimea	3	21 0 0	105 0 0
Totara	6	35 2 18	178 4 11
Grey	13	99 1 9	134 0 0
Kanieri	2	11 0 0	11 0 0
OTAGO—			
Tuapeka	41	229 2 38	598 6 4
Mount Ida	28	160 3 34	407 10 0
Queenstown	105	482 1 33	1,220 0 0
Dunstan	16	192 0 0	479 0 0
Switzers	2	11 2 0	28 15 0
Arrow	5	34 2 0	87 10 0
TOTALS	491	3,207 2 16	7,322 13 1

No. 19.

RETURN of the NUMBER of AGRICULTURAL LEASES in force on the 31st MARCH, 1875, the EXTENT of GROUND LEASED, and RENTAL per ANNUM.

MINING DISTRICTS.	NUMBER.	GROSS ACREAGE.	RENTAL PER ANNUM.
		A. R. P.	£ s. d.
NELSON—			
Collingwood	3	115 0 0	14 7 6
Inangahua, Lyell, and Matakitaki	96	5,724 2 23	718 9 0
Westport	25	1,114 2 19	129 14 0
Charleston and Brighton	34	725 0 26	88 2 0
WESTLAND—			
Waimea	12	40 1 7	11 7 0
Greymouth	6	75 1 20	15 8 0
Arnold	2	6 0 24	1 4 0
Grey	120	6,072 2 23	719 4 6
Kanieri	3	11 0 0	2 8 0
OTAGO—			
Dunedin	19	3,920 0 0	490 0 0
Tuapeka	472	29,634 0 11	3,808 15 6
Mount Ida	41	9,756 1 10	1,221 10 0
Queenstown	321	19,111 2 3	2,388 10 0
Clyde	37	3,598 0 0	449 15 0
Cromwell	10	1,743 0 0	217 17 6
Alexandra	31	1,616 0 0	202 0 0
Teviot	100	7,550 0 0	942 15 0
Black's	31	1,252 0 0	156 10 0
Nevis	...	...	...
Switzers	27	2,543 0 36	317 10 0
Orepuki	2	60 0 0	9 10 0
Arrow	135	9,354 2 3	1,169 5 0
TOTALS	1,527	104,023 2 5	13,074 2 0

No. 20.

RETURN of the NUMBER of LICENSES under "The Gold Mining Districts Act, 1871," for the YEAR ending 31st MARCH, 1875.

MINING DISTRICT.	NUMBER.	GROSS ACREAGE.	RENTAL PER ANNUM.
		A. R. P.	£ s. d.
AUCKLAND—			
North Hauraki	46	325 3 22	918 0 0
South Hauraki	91	752 2 22	2,230 0 0
TOTALS	137	1,078 2 4	3,148 0 0

No. 21.

TABLE showing NUMBER of GOLD MINING COMPANIES REGISTERED under "The Mining Companies Limited Liability Act, 1865," and Amending Acts, the Joint Stock Companies Act, and "The Mining Companies Act, 1872," upon 31st MARCH, 1875.

MINING DISTRICTS.	UNDER "MINING COMPANIES LIMITED LIABILITY ACT, 1865," AND AMENDING ACTS.			UNDER JOINT STOCK ACT.			UNDER "MINING COMPANIES ACT, 1872."			Paid-up Scrip given to Shareholders.
	No.	Nominal Capital.	Paid-up Capital.	No.	Nominal Capital.	Paid-up Capital.	No.	Nominal Capital.	Paid-up Capital.	
AUCKLAND—		£	£ s. d.		£	£		£	£ s. d.	
North Hauraki	No re	cord kept	in Warden's Office	since	1873.					
South Hauraki	160	2,891,950	2,258,756 0 0	32	557,625	300,153	...	...	...	
MARLBOROUGH—										
Ravenscliff ...	3	33,600	4,987 0 0	...	...	...	...	...	...	
NELSON—										
Collingwood	...	...	...	...	...	...	1	2,160	1,620 0 0	
Inangahua ...	16	392,780	285,606 15 4	...	...	...	19	306,660	109,901 6 11	
Lyell ...	1	20,000	4,666 14 4	...	...	...	12	232,000	68,577 0 0	
Greenstone ...	1	5,000	3,900 0 0	...	...	...	...	...	...	
Westport ...	2	Not in	operation. One liquida	defu	nct and th	e other in	2	62,000	28,000 0 0	
				tion.						
Charleston ...	4	15,360	13,410 0 0	...	...	...	...	...	...	
WESTLAND—										
Clifton ...	...	...	...	...	...	...	2	16,000	9,450 0 0	
Grey ...	...	...	...	...	...	...	1	3,000	1,410 0 0	
Kanieri ...	1	1,836	1,836 0 0	...	...	...	...	...	...	
OTAGO—										
Dunedin ...	1	6,000	3,120 0 0	...	Collapsed.					
Tuapeka ...	12	46,975	24,602 0 0	...	...	...	2	10,900	6,090 15 0	
Naseby ...	5	24,620	24,620 0 0	...	...	...	...	...	...	
N. Taieri, &c.	5	38,800	13,925 0 0	...	...	...	...	...	...	
Maerewhenua	2	15,000	1,920 0 0	...	...	...	2	9,600	6,750 0 0	
Other localities	...	...	...	...	...	...	1	5,000	200 0 0	
Queenstown	3	43,995	35,841 2 6	...	...	...	...	...	...	
Dunstan ...	14	86,300	43,450 0 0	...	...	...	9	64,600	20,000 0 0	
Arrow ...	...	...	...	...	...	...	...	15,000	2,700 0 0	
Total ...	230	3,622,216	2,720,640 12 2	32	557,625	300,153	51	726,920	254,699 1 11	

No. 22.

RETURN of CASES in the WARDENS' COURTS, and COSTS AWARDED, for the YEAR ending 31st MARCH, 1875.

MINING DISTRICT.	NUMBER OF MINING DISPUTES ADJUDICATED ON.	AGGREGATE AMOUNT OF VALUE.		AMOUNT OF COSTS AWARDED.	CASES WHEREIN JUDGMENT HAS DECREED SPECIFIC PERFORMANCE.	
		Claimed.	Recovered.		No.	Remarks.
AUCKLAND—		£ s. d.	£. s. d.	£ s. d.		
North Hauraki ...	8	...	...	7 5 0	...	
South Hauraki ...	63	2,282 8 1	1,353 17 7	280 7 6	...	
NELSON—						
Collingwood ...	14	800 14 6	149 14 6	30 8 6	3	One case was appealed against, and the Warden's ruling was refused.
Inangahua	19	110 9 9	49 7 0	23 15 0	2	
Greenstone	42	82 6 0	35 0 0	33 7 0	8	
Westport	15	140 0 0	0 15 0	64 18 0	...	
Charleston	30	343 2 0	18 11 9	23 14 0	...	
Brighton	7	...	...	1 14 0	...	
Lyell	4	120 0 0	...	4 6 6	...	
WESTLAND—						
Waimea	57	394 14 3	74 3 0	38 6 0	10	Exclusive of 38 objection cases heard and determined by the Warden.
Okarito	9	50 0 0	50 0 0	6 5 0	...	
Totara	27	96 0 0	62 14 6	49 19 0	...	
Greymouth... ...	18	11 0 0	...	8 11 0	...	
Clifton	26	42 0 0	...	12 12 0	...	
Arnold	16	20 0 0	...	7 10 0	...	
Grey	84	689 14 0	227 11 6	114 6 0	...	
Kanieri	30	30 1 0	11 2 0	45 2 0	...	
DUNEDIN						
Tuapeka	6	13 0 0	3 0 0	1 14 0	...	
Mount Ida	74	2,085 2 10	547 9 3	135 6 6	...	No cases in which specific performance decreed.
Queenstown ...	16	3,943 5 4	123 17 8	49 9 0	...	
Clyde	8	35 0 0	10 0 0	11 13 0	5	Forfeiture of partnership.
Cromwell	33	615 4 6	50 0 0	40 0 0	9	
Orepuke	13	654 0 0	592 18 0	18 0 0	...	
Alexandra	9	10 0 0	...	8 0 0	5	
Black's	7	50 0 0	15 0 0	5 0 0	2	
Switzers	4	35 0 0	17 10 0	...	...	
Arrow	29	30 0 0	24 7 0	57 2 6	25	

No. 23.

TABLE showing the YIELD of GOLD from VARIOUS PARCELS of QUARTZ CRUSHED during the YEAR ending 31st MARCH, 1875.

AUCKLAND.

Name of Company.	Quartz Crushed.	Average Yield of Gold.	Total Yield of Gold.	Average Value of Gold.	Value of Mining Plant.	Depth of Quartz obtained.	Width of Reef.	No. of Men employed.
	Tons. cwts. qrs.	Oz. dwts. grs.	Oz. dwts. grs.	£ s. d.	£	Feet.	Ft. in.	
Flora McDonald ...	300 0 0	0 2 0	30 0 0	3 3 0	...	200	6 0	7
Bendigo Independent ...	16 0 0	4 17 0	...	2 15 6	...	...	...	6
Cure	29 0 0	0 14 0	22 6 0	2 15 0	...	310	1 3	12
Kapanga	...	...	...	3 0 0	25,000	...	3 0	50
Shotover	180 0 0	0 15 15·4	140 15 0	2 8 0	250	about surface	4 0	...
Moanataiari	16,526 0 0	0 9 20	8,171 14 12	2 14 0	10,000	172	3 0	110
Alburnia	1,016 0 0	0 12 20·2	653 2 0	2 11 0	5,000	60 to 290	3 0	38
City of York		Not yet on gold.			50	...	...	6
Messenger's	27 0 0	4 0 0	110 15 9	2 15 0	...	...	0 6	8
Golden Hill Tribute ...	83 0 0	0 16 12	70 0 0	2 15 0	30	140	2 6	7
Imperial	38 0 0	0 17 11	33 0 0	2 14 6	60	128	2 6	8
Plutus	694 0 0	0 4 11⅔	148 9 0	2 17 0	4,000	150	2 0	20
Old Whau	269 0 0	0 14 0	186 0 0	1 12 4	2,000	120	5 0	20
Do.	817 0 0	0 16 4	662 0 0	1 12 8	2,000	120	5 0	20
Union Beach	511 0 0	...	1,204 0 0	3 0 0	4,000	80	1 6	30
Harbour View	20 0 0	10 0 0	199 12 12	2 16 0	...	50	1 3	10
Pride of Tokatea ...		No gold returns.						6
Long Drive	1,800 0 0	2 0 0	3,593 17 0	2 12 6	280	270	0 6	48
William Horne ...	159 0 0	...	255 0 0	3 0 0	2,000	80	2 0	2
Royal Oak	230 0 0	14 0 0	3,277 0 0	2 13 0	2,000	150	2 6	12
Tokatea	2,500 0 0	2 6 0	5,741 12 21	2 16 0	5,000	350	2 0	40
Crown Princess ...	195 0 0	...	182 18 0	2 17 0	3,000	200	6in. to 6ft.	30
Crown Prince ...	1,725 0 0	...	1,320 17 0	2 17 0	3,000	200	Do.	30
Bismarck	0 3 0	...	132 1 3	2 19 3	...	180	1 0	13
Una Quartz Crushing ...	279 0 0	1 0 0	260 0 0	2 12 6	7,000	80	1 6	20

MARLBOROUGH.

Queen Charlotte ...	No stone crushed yet.				800	...	1 3	4
Turner's	370 0 0	0 11 10	208 3 0	3 17 10½	5,374	100	1 3	20

NELSON.

El Dorado	478 0 0	1 6 0	653 5 0	...	...	50	...	...
Caledonian	103 0 0	4 12 10	463 0 0	3 16 6	900	45	1 to 3	8
The Alexandra ...		Sinking for reef.						6
South Larry's No. 2 ...	950 0 0	0 13 12	645 0 0	3 17 9	9,000	270	8 0	24
United Band of Hope ...	...	...	...	3 17 0	...	...	2 6	6
Golden Ledge ...	...	...	...	...	...	135	3 6	12
Energetic	2,056 18 0	0 17 0	1,802 6 12	3 16 6	8,693	100 & 200	12 0	40
Victoria		No machinery.		None sold.	No plant.	...	2 6	7
Keep it Dark	...	...	...	...	...	...	10 0	10
Phœnix	631 0 0	0 16 17	527 5 0	3 17 0	...	100	3 6	8
Vulcan	None.						4 0	5

OTAGO.

Elizabeth	4,493 0 0	0 10 0	2,296 8 0	3 15 0	5,000	220	1 6	14
New Aurora	2,000 0 0	0 15 0	...	...	...	110	2 0	Nil.
Star of the East ...	1,859 10 0	0 16 12	1,577 16 12	3 17 0	2,000	100 to 300	1 0	10
Heart of Oak	66 10 0	1 5 10	84 6 0	3 17 0	...	70	1 6	4
Young Australian ...	150 0 0	1 5 0	187 2 0	3 16 6	1,500	80	2 0	10
Bendigo Deep Level ...	...	...	...	...	...	...	...	6
Waipori	...	...	...	3 16 0	2,500	...	7 to 8	13

No. 24.

RETURN of the YEARLY EARNINGS of some ALLUVIAL MINES, and other Details.

PROVINCE.	Name of Claim or Owner.	Locality.	Yield of Gold for Year.	Value of Gold per Ounce.	Depth of Lead.	Width of Lead.	Number of Men Employed.	Water Wheels.	Turbines.	Steam Engines.	Number of Stamp Heads.	Horse Power.	Hydraulic Hose.	Number of Sluice Boxes.	Value of Mining Plant.	REMARKS.
			Oz. dwt. gr.	£ s. d.	Feet.	Feet.									£ s. d.	
Westland ...	Shenandoah	Kanieri ...	144 2 4	3 16 0	16	Not known.	...	1	...	...	...	5	...	...	750 0 0	
Nelson ...	Perseverance	Hamilton ...	250 16 18	3 15 6	...	...	...	...	...	...	...	...	...	...	2,000 0 0	
	Argyle	Charleston ...	740 11 9	3 17 0	16	100	...	2	...	...	14	...	60 ft.	600 ft.	5,600 0 0	
	Mulligan and Party's ...	Soldiers' Terrace	400 0 0	3 16 0	80	...	...	...	...	7	...	...	300 ft. iron.	4	250 0 0	
	Nile Cement	Charleston ...	627 12 0	3 17 0	12	200	...	1	...	...	8	12	...	...	500 0 0	
Otago ...	Perseverance	Blue Spur ...	486 7 0	3 15 6	...	...	...	...	...	...	...	...	...	74	250 0 0	
	Stephen Read and Party ...	Tinker's ...	350 18 14	3 16 0	...	...	...	...	...	...	...	...	1	5	4,150 0 0	
	Greenbend and Co. ...	Dunstan ...	800 0 0	3 16 0	...	...	...	...	...	...	...	...	400 and 5,000 ft. iron piping.	...	2,000 0 0	
	Anglo-Swiss Company ...	Upper Waikaia	400 0 0	3 15 6	16	20	4	...	...	...	...	...	1	2	20 0 0	
	Murphy and Party ...	Tinker's ...	226 12 6	3 16 0	...	...	...	...	...	...	...	...	2	...	7,000 0 0	
	Scandinavian Water-race ...	Mount Ida ...	585 10 0	3 16 0	...	...	...	...	...	...	...	...	...	...	850 0 0	
	Nelson Company	Tuapeka ...	750 0 0	3 15 6	80	300	...	...	1	...	10	12	...	...	3,000 0 0	
	Manuka Hill	Waitahuna ...	171 4 0	3 10 6	...	...	...	...	...	...	...	...	1	25	4,320 0 0	
	Morrison and Co.	Tuapeka ...	479 1 12	3 15 6	100	45	...	...	...	...	...	...	...	73	387 10 0	
	Mountain Race	Tinker's ...	750 0 0	3 16 0	35	...	...	...	...	...	...	...	900 iron, 100 india-rubber.	...	450 0 0	
	John Ewing	Mount Ida ...	598 18 11	3 16 0	120	400 yds.	...	...	...	...	...	...	500	1 mile.	1,000 0 0	
	Universal	Arrowtown ...	...	...	40	80	...	...	...	...	...	...	...	...	200 0 0	
	Sons of Fortune	Arrow Falls ...	...	...	70	20	...	...	...	...	...	...	...	...	150 0 0	
	Arrow River United ...	Arrowtown ...	1 0 0	3 15 6	...	...	...	...	1	...	...	...	...	...	1,800 0 0	
	Extended Water-race ...	Mount Ida ...	294 4 0	3 15 6	...	...	...	...	...	...	...	...	2	4	100 0 0	

Price 2s. 9d.]

By Authority: GEORGE DIDSBURY, Government Printer, Wellington.—1875.

[Extracted from *New Zealand Gazette*, 15th July, 1875.]

RETURN of the QUANTITY and VALUE of GOLD EXPORTED from NEW ZEALAND, from 1st APRIL, 1857, to 30th JUNE, 1875.

PORT OF EXPORT.	PRODUCE OF THE GOLD FIELDS IN THE PROVINCE OF	DURING THE QUARTER ENDED 30TH JUNE, 1875.						EXPORTED PREVIOUS TO THE 31ST MARCH, 1875.		TOTAL EXPORTED FROM NEW ZEALAND TO THE 30TH JUNE, 1875.	
		To Great Britain.	To New South Wales.	To Victoria.	To China.	TOTALS. Quantity.	TOTALS. Value.	Quantity.	Value.	Quantity.	Value.
		Oz.	Oz.	Oz.	Oz.	Oz.	£	Oz.	£	Oz.	£
Auckland ...	Auckland ...	9,264	1,702	...	...	10,966	40,778	949,225	3,379,469	960,191	3,420,247
Wellington ...	Wellington	...	...	...	...	...	...	30	120	30	120
Picton ...	Marlborough	...	...	...	...	...	...	43,769	169,790	43,769	169,790
Nelson ...	Nelson ...	577	1,000	2,078	...	3,655	14,419				
Westport ...	Ditto ...	4,786	...	650	...	5,436	21,778	1,419,187	5,631,163	1,440,581	5,716,572
Greymouth ...	Ditto ...	...	...	12,303	...	12,303	49,212				
						21,394	85,409				
Greymouth ...	Westland ...	...	...	4,772	773	5,545	22,182				
Hokitika ...	Ditto ...	3,732	...	6,994	...	10,726	42,905	1,907,709	7,538,182	1,923,980	7,603,269
						16,271	65,087				
Dunedin ...	Otago ...	17,637	...	7,825	4,141	29,603	119,011				
Invercargill ...	Ditto ...	...	...	724	...	724	2,931	3,377,734	13,249,469	3,408,061	13,371,411
						30,327	121,942				
Totals		35,996	2,702	35,346	4,914	78,958	313,216	7,697,654	29,968,193	7,776,612	30,281,409

Customs Department, 12th July, 1875.

H. S. McKELLAR,
(for Secretary and Inspector of Customs).

COMPARATIVE RETURN of the QUANTITY and VALUE of GOLD EXPORTED from the several Provinces of NEW ZEALAND, for the HALF-YEARS ended 30th JUNE, 1875, and 30th JUNE, 1874.

PROVINCES.	HALF-YEAR ENDED 30TH JUNE, 1875. Quantity.	HALF-YEAR ENDED 30TH JUNE, 1875. Value.	HALF-YEAR ENDED 30TH JUNE, 1874. Quantity.	HALF-YEAR ENDED 30TH JUNE, 1874. Value.
	Oz.	£	Oz.	£
Auckland	29,593	114,769	37,161	148,415
Marlborough	691	2,766	307	1,228
Nelson	46,522	185,880	43,481	173,894
Westland	36,050	144,201	42,396	170,557
Otago	63,783	256,777	76,780	307,572
Totals	176,639	704,393	200,125	801,666

Customs Department, 12th July, 1875.

H. S. McKELLAR,
(for Secretary and Inspector of Customs).

[REPORTS RECEIVED SINCE THE FORMER WERE IN TYPE.]

No. 1.

SIR,— Warden's Office, Greymouth, April, 1875.

I have the honor to make the following general report on the district under my charge for the past year ending the 31st March.

During the year there has been a slight depression in mining matters throughout the district, arising partly from the demand for labour on the public works, and partly from the scarcity of water in several localities where payable gold would otherwise be obtainable and pay average wages, and attraction to other gold fields.

The returns of revenue compare most favourably with those of last year, showing a very slight deficiency in the actual revenue and gold duty collected at the different offices in the district.

On the Stony Lead and South Beach there is a small but settled population, carrying on mining operations in connection with agricultural pursuits on a small scale.

The Great Extended and Leviathan Water Race Companies have kept their races in good repair. There being little or no demand for water from their races, the companies use the water for ground sluicing, and have gone over an extensive area of ground on the Lead.

At Rutherglen, the Cornishmen's party are in full work, with a plentiful supply of water. Other small parties settled there, and at Yankee Creek and Welshman's, are also making good wages.

In the Arnold Sub-district there is nothing calling for special report. The population is estimated at 348 Europeans and 108 Chinese. Mining operations have fallen off more than in any other part of the district.

The miners in possession of water-rights have extended many of their races, and brought the water to bear on some of the higher terraces, where they can average good returns.

A horse-track has been constructed from Maori Gully, through the Stillwater Diggings, to the main road at the coal mines, a distance of eight miles, and has proved a great boon to the miners in that locality, for prior to its construction they had to carry all their provisions from Maori Gully over very rough country, crossing and recrossing the creek several times, and often at great risk.

In the Clifton Sub-district the population is estimated at 465 Europeans and 130 Chinese. Mining is principally carried on by ground-sluicing wherever a supply of water can be procured. The majority of those in possession of water-rights are in settled claims making moderate wages. Still, there are several who are barely making a living.

The Hibernian Water Race Company are using their full complement of water, ground-sluicing at Cockey's Creek. £1 per head is the charge made by the company when the water is let.

The New River Water Race Company are making slow progress with the last portion of the race. They are now endeavouring to procure iron piping to cross the Limestone Gorge, 17 chains in length, instead of fluming as originally intended. Five heads of water are let along the line of race at £1 per head.

The road for dray traffic has been constructed from Marsden to Maori Creek township, a distance of seven miles, and the police quarters and Court-house have been removed to Maori Creek from the old township of Clifton.

In the Greenstone District the population is estimated at 500 Europeans and 200 Chinese. Several of the extended claims on Duke's Terrace were abandoned a few months ago, as the ground ran out too shallow, and the men could not afford to pay for ten to fifteen heads of water, or go back and deepen their tail-races some 20 to 30 feet. Since then, one or two parties found they could work the ground to advantage by paddocking, which would take more time but far less water, as they now require only one or two heads of water instead of ten or fifteen as formerly; and several claims have again been taken up to be worked in a similar way.

The Hohonu Water Race Company use about twenty-six heads of water, sluicing in a claim at the upper end of the township. They have completed the extension of the race, three miles, and have secured five additional heads of water. This company have also erected a powerful hydraulic iron sluicing-hose capable of throwing ten heads of water, which enables them to get through a much greater area of ground, besides effecting a saving of £6 per week in labour.

In July last, good payable gold was found in the face of the terrace (now called Revell's Terrace) on the south side of the creek, about two miles above the township. A rush (about 200 men) immediately set in, and the terrace has maintained a population varying from that number down to 140, the present population. The depth of the ground varies from 60 to 100 feet. No rich finds have been made, but fair wages have been obtained in most of the claims. Twenty-seven tunnels, running from 300 to 600 feet in length, were registered and put in, beside several shafts sunk on the back claims. There are a few parties also working at the Junction, Three-Mile Creek, and Maori Point.

The revenue from this part of the district amounts to £1,231 10s., exclusive of gold duty collected in Hokitika, and estimated at £600.

A horse track has been constructed from the Greenstone township to Lake Brunner, a distance of nine miles, which has opened up good country for cattle feed, and brought the runs on the lake within easy distance of a market. A short track has also been made to Revell Terrace through the bush, about 1½ miles in length.

The Chinese population throughout the Greymouth and Greenstone Districts is estimated at 560 all told. They are principally found at work in the river beds and low flats adjoining, or on old workings in the numerous gullies. They have purchased several water-rights, and, in a few instances, bought up the interests in claims at high figures. They are steady, quiet, and industrious, working the claims in a very complete and systematic manner; many of them appear to be doing very well. Several have left for China during the year, taking with them sums from £60 to £200 each, together with other small amounts from friends here to their relatives at home.

Regular sittings of the Resident Magistrate's and Warden's Courts have been held fortnightly at the Greenstone, and monthly at Maori Creek for the Clifton Sub-district, and Maori Gully for the Arnold Sub-District; but the returns show that the number of cases set down for hearing are few, and that there is very little litigation amongst the miners as compared with former years.

The population of the district is estimated at 5,090 souls, and is located as follows:—

—	Greymouth.	Arnold.	Clifton.	Greenstone.	Total.
European	3,201	348	465	500	4,514
Chinese	138	108	130	200	576
Total	3,339	456	595	700	5,090

One thousand and sixty-one cases have been disposed of in the Resident Magistrate's and Warden's Courts, as under:—

—	Civil.	Criminal.	Warden.	Total.
Greymouth	588	212	18	818
Arnold	18	14	16	48
Clifton	20	19	26	65
Greenstone	49	39	42	130
	675	284	102	1,061

The revenue for the twelve months, amounting to £29,679 14s. 4d., is made up as follows:—

—	Greymouth.	Arnold.	Clifton.	Greenstone.	Total.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Warden's Department...	552 19 6	379 1 6	464 3 0	748 19 6	2,145 3 6
Resident Magistrate's Department	629 14 9	35 11 6	37 15 0	63 0 6	766 1 9
Publicans' Licenses to Provincial Treasurer...	1,725 0 0	330 0 0	320 0 0	419 10 0	2,794 10 0
Gold Duty	2,633 18 10	...	...	600 0 0	3,233 18 10
	5,541 15 1	744 13 0	821 18 0	1,931 10 0	8,939 14 1
Customs Duties Half-share	20,740 0 3½	...	...	...	20,740 0 3
Total ...	...	...	...	...	29,679 14 4

RETURN showing the Number of Rights, Licenses, and Registrations issued by the Receivers of Revenue at their respective Offices during the Twelve Months.

—	Greymouth.	Arnold.	Clifton.	Greenstone.	Total.
Miners' Rights, European	246	175	154	287	1,321
Do. Chinese	61	50	172	176	
Business Licenses, yearly	9	14	6	23	52
Do. do. half-yearly	13	16	18	18	65
Do. do. quarterly	2	9	2	5	18
Registrations, 5s.	314	...	...	82	396
Do. 2s. 6d.	31	...	...	56	87
Do. 1s.	956	...	...	300	1,256
Extended claims	1	...	3	8	12

The statistical returns are herewith enclosed in duplicate. They show that 367 head-races (capable of conveying 583 heads of water a distance of 371 miles), 173 tail-races, and 370 dams were registered for construction, at a cost of £59,185, which, together with mining plant and machinery estimated at £6,310, makes the total value of £65,497.

I have, &c.,
W. H. REVELL,
Warden.

The Under Secretary for Gold Fields, Wellington.

No. 2.

Mr. Rice to the Under Secretary for Gold Fields.

Sir,— Superintendent's Office, Auckland, 10th July, 1875.

Adverting to your letter, dated the 21st April last, No. 26, I have the honor to forward the enclosed supplementary report, by Warden Fraser, on the Hauraki South and Ohinemuri Gold Fields, up to the 30th June ultimo.

I have, &c.,
Vincent E. Rice,
(for the Provincial Secretary).

The Under Secretary, Public Works Office (Gold Branch), Wellington.

Supplementary Report on Hauraki South and Ohinemuri Gold Fields.

The reports previously transmitted by me extended to the 31st of March, and, in accordance with request made through His Honor the Superintendent, I now make a supplementary report to the end of June. I am happy to be able to say it is of a favourable nature, the discovery of gold in Tairua presenting indications which would seem to warrant the expectation that a new and important reefing country had been found which would add materially to the wealth of the district. As it is, since the opening of Ohinemuri and Tairua, several hundreds have been added to the population.

Tairua.

For several years past gold has been found in the Tairua district, but it had never been traced to a reef, and no regular workings have been established. A man named John Neves has been the most systematic in his prospecting, and at length he was rewarded by discovering the reef, on which he sank, and obtained excellent prospects.

This was on what is called the fourth branch of the Tairua River, on the Pakirarahi block. Within the last four years the Government have purchased almost all the land in this locality, but this Pakirarahi block unfortunately was not purchased, so that the first difficulty was to make an arrangement with the Natives. On this point I cannot give any information, Mr. James Mackay, jun., agent for the General Government, and Messrs. Preece and Graham having dealt with them, and having induced them to open the block on consideration of obtaining shares in the ground discovered by Neves. I may say, however, that a number of Natives, including Te Moananui and Rawai te Kiore, claiming to be owners of the land, objected to the license applied for by Neves being granted, on the ground that the Native owners of the block had never ceded the right to mine. I felt, however, that as Warden of the Gold Fields I could not go behind the Governor's Proclamation, and so I declined to entertain their objection, leaving them to seek another remedy.

Previous to the Proclamation being issued, a test was made from where Neves had been working. 40 lbs. of stone was taken from the reef; from this, about 2 oz. of loose gold was washed; and the remainder, on being crushed at the Prince Alfred Battery at Grahamston, produced 5 oz. of gold.

On the 8th of April, a Proclamation was issued bringing the Pakirarahi and a number of blocks adjoining within the gold field, or rather extending the Hauraki South Gold Mining District, and within a few days a considerable extent of ground was taken up on the Pakirarahi block.

Section 174 of the Gold Mining Districts Act provides for a "prospecting claim being granted to any *bonâ fide* discoverer of gold;" but Neves, who appears to have been the only one of the party who could have established such a claim, took other means than under that clause to protect his undoubted rights.

The fact of the Proclamation having been issued was notified to the newspapers by the Agent for the General Government, on the evening of the 9th April last. Previously to this, information had been received by Messrs. Preece, Graham, Beeche, and others, who had become connected with the prospector, and they proceeded to peg out a claim of 30 acres on the line of reef. I may say that I consider that this is far too large an extent of ground to allow on a new country, and was only intended to facilitate the occupation of ground and the working of large companies on places like the Thames Gold Field, where the ground had all been occupied, and the leaders in many cases worked out on the surface. The miners would undoubtedly have demanded that the Tairua block should have been opened under the Act of 1866, if it had been known that the place was to have been proclaimed, even although it is surrounded by land previously brought under the operation of the Mining Districts Act.

It appears that some mistake had been made as to the issue of the *Gazette*, for while the Agent of the General Government advertised in the Auckland and Thames papers, "The following extract from the *New Zealand Gazette* of the 9th April, 1875, is published for general information," when the *Gazette* itself was received it was found to bear the date of the 8th April.

When this became known Bergin and party put in a claim for part of the 30 acres which had been pegged out by Neves, Preece, Graham, Jackson, and others, alleging that they pegged on the 8th, after the issue of the Proclamation and before any others. As no ground had been secured as a prospecting claim, such a pegging, if proved, would hold good. Subsequently, plaints were also laid against Neves and party, on the plea that their pegs were not of the proper size, the 17th clause of the Gold Mining District Act stating that "Any person desiring the exclusive occupation of land for mining purposes within any district shall mark out the same by causing to be erected, at every angle thereof, a post not less than three inches square or three inches in diameter, standing not less than two feet above the surface of the ground." Upon these plaints being laid, Mr. Mackay wrote to his Honor the Superintendent, stating that the "prospectors of the Tairua District" had been promised "protection for their rights," contending that the Superintendent had the power to do this under the 174th section.

A considerable amount of correspondence ensued, which I need not take notice of here. The objections to the issue of the license to the Tairua Company came before the Warden's Court on 15th June, and the examination of witnesses continued all day. Next morning the parties were willing to come to a settlement, which was at length arranged; Bergin and party getting the ground claimed by them, and Miller and Wickham getting twenty men's ground, on consideration of withdrawing their objections.

During the continuance of the proceedings in the Warden's Court a considerable extent of ground had been taken up, and a good deal of prospecting carried on in Tairua, notwithstanding the very inclement weather which prevailed. On the 17th April a trial crushing was made from the prospector's claim at Tairua. There were three parcels from different parts of the ground.

No. 1, 16 lbs. stone, produced 8 dwts. gold.
No. 2, 552 lbs. „ „ 13 oz. „
No. 3, 35 lbs. „ „ 3 dwts. „

This splendid return gave great confidence in Tairua, and claims were taken up almost daily. A company was formed to work the ground taken up by Neves and party, with a capital of £5,000, in 10,000 shares of 10s. each. Sales of shares in this company were made at once at £2, and, in consequence of the encouraging show met with in sinking the shaft, the shares rose, and sales have been made as high as £4, at which price the mine is estimated as being worth £40,000. Two tons of quartz from this claim are now being crushed at Grahamstown, which have been brought round in a cutter from Tairua harbour.

In the claims which have been taken up around the ground first occupied, other reefs have been found, and these, on being tested, have given most encouraging prospects.

The following figures show the position of the field at the present time:—

Number of Applications for Licenses	25
Number of Men's Ground in Claims for which Applications have been made for Licenses	754
Number of Men's Ground in Claims not applied for as Licenses	434
Total Men's Ground	1,188

Licenses granted, 11. Applications for business sites, 6; for residence sites, 9; for water rights, 12; for machine sites, 1. Number of claims registered, 43.

In connection with the applications for water rights, I have not yet issued any licenses, as I understand that certain claims are made over the rivers and streams of the district by Messrs. Preece and Graham, in virtue of leases from the Natives. I hope that steps will be taken to have these rights defined, as it will be impossible to carry on gold-mining successfully if the rights claimed are as great as I am led to believe they are.

There is every appearance that Tairua will prove a gold field which will give employment to a large number of men. The site of the discovery is at the summit of the range, about seven miles east from Puriri; the place is difficult of access from either side, and there will be considerable difficulty in getting machinery to the ground. Applications have been made for water-races, comprising together forty sluice-heads of water, from the Tairua River, eight miles distant.

Ohinemuri.

Affairs at Ohinemuri are dull: the reefs that have been found, although yielding results which would be payable, not having shown anything brilliant.

The shareholders of the claims on the Karangahake Spur, where the prospectors' claim is, are confident that the reef will pay, and, with the facilities which they have for crushing, a low average per ton will be remunerative.

At Waitekauri, about a dozen claims have been taken up on what is called the Dan Leahy Reef, which tests have proved payable; and as there is abundance of water power, the claimholders ought to be able to crush cheaply when machinery is erected.

I have, &c.,
W. Fraser,
Warden.

Thames, 5th July, 1875.

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