

1895.  
NEW ZEALAND.

QUARTZ-MINING, REEFTON DISTRICT.  
SUPPLEMENTARY REPORT.

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

H. A. GORDON, F.G.S., Inspecting Engineer, to the Hon. A. J. CADMAN, Minister of Mines.  
SIR,—

Mines Department, Wellington, 16th September, 1895.  
I have the honour to submit a supplementary report on the state of quartz-mining in the Reefton District, as considerable developments have been made since writing my annual report on the goldfields. A deal of attention is at present being given to the mining industry, and mining properties generally have increased in value. The Mining Registrar has compiled a statement showing the results of the quartz-workings in the district from information received from the different managers, taken from their companies' books, which not only shows that a large quantity of gold has been produced, but also that a large sum has been paid in dividends to shareholders.

The table referred to differs in some instances from that published in my last report, but the Mining Registrar having taken a great deal of trouble in collecting reliable information, the following table can be taken as practically correct. However, the totals of the two tables differ so slightly, that either of them is sufficiently correct to show approximately the total yield from the field and the amount of dividends paid:—

RETURNS, &c., from QUARTZ-MINES from opening of District to 31st August, 1895.  
LARRY'S CREEK.

Company, &c.	Quartz.	Gold.	Value.			Dividends.		
	Tons.	Oz.	£	s.	d.	£	s.	d.
Caledonian	566	2,080½	8,065	10	0	2,250	0	0
No. 2 South Larry's	7,514	4,129	13,999	17	6	...	...	...
	8,080	6,209½	22,065	7	6	2,250	0	0

BOATMAN'S.

Alexandra	394	168	651	0	0	...	...	...
Argus	82	105	407	5	4	...	...	...
Boatman's Creek	138	122	472	15	0	...	...	...
Boatman's Tailings	...	617	1,068	19	0	...	...	...
El Dorado	478	653	2,530	7	6	...	...	...
Fiery Cross	27,691	30,476½	119,839	11	9	32,268	0	0
Golden Arch	149	139	538	12	6	...	...	...
Homeward Bound	62	213	859	13	7	...	...	...
Hopeful	12,898	21,129	81,698	0	7	40,425	0	0
Imperial and Reform	1,624	1,020	3,959	16	11	...	...	...
Italian Gully	897	512	1,984	0	0	146	0	0
Just-in-Time	12,489	15,394	59,832	2	10	15,666	0	0
Lady of the Lake	10	3	11	2	6	...	...	...
Lone Star	220	75	291	12	0	...	...	...
Pactolus	108	498	1,929	15	0	1,000	0	0
Southern Cross	21	43	166	12	6	...	...	...
South Hopeful	48	52	207	1	9	...	...	...
Specimen Hill	2,265	1,105	4,222	14	4	...	...	...
Wallhalla Extended	238	354	1,396	5	3	...	...	...
Welcome	27,030	63,784	249,091	4	11	110,250	0	0
	86,842	136,462½	531,158	13	3	199,755	0	0

1—C. 3c.

RETURNS, &c., from QUARTZ-MINES—*continued.*

Company, &c.	Quartz.	Gold.	Value.			Dividends.		
PAINKILLER.								
Sir C. Russell	Tons. 498	Oz. 339½	£ 1,333	s. 3	d. 7	£	s.	d.
MURRAY CREEK AND CRUSHINGTON.								
Ajax	6,890	6,441	24,958	17	6	2,504	0	0
Anderson's Creek	6,791	5,363	20,781	12	6	475	0	0
Band of Hope	390	25	96	5	0	...		
Dauntless	400	44	170	10	0	...		
Energetic	59,080	30,811	119,322	7	8	21,900	0	0
Energy (private company)	4,766	2,375¼	9,358	11	9	...		
Golden Fleece	26,547	32,317	125,326	12	0	55,000	0	0
Golden Hill	526	192	744	0	0	612	10	0
Golden Ledge	1,831	552	2,139	0	0	...		
Golden Treasure	9,217	5,868½	22,815	14	1	3,300	0	0
Hercules	6,646	4,065	16,148	9	2	5,000	0	0
Independent	2,345	1,179	4,568	12	6	...		
Inglewood, Inglewood Extended	10,358	6,304	24,021	7	3	2,700	0	0
Invincible	564	657	2,545	17	6	1,050	0	0
Keep-it-Dark	114,979	60,834	236,958	6	5	109,583	0	0
No. 2 South Keep-it-Dark	9,138	6,187	24,620	19	6	9,200	0	0
Lankey' Creek	680	73	277	19	3	...		
Mammon	15	15	60	0	0	...		
Nil Desperandum	6,858	3,393	13,165	7	7	287	10	0
Pandora	699	664	2,611	3	2	...		
Perseverance	57	19	73	12	6	...		
Phoenix	2,190	2,913	11,272	11	10	4,533	6	0
Royal	918	775¼	3,123	18	10	232	0	0
United Band of Hope	160	49	189	17	6	...		
United Inglewood and North Star	1,591	821	3,181	7	6	...		
Venus and Venus Extended	10,713	6,914	26,842	14	3	3,300	0	0
Victoria	1,943	929	3,626	7	6	...		
Victory	1,155	905	3,506	17	6	...		
Vulcan	919	536	2,077	0	0	400	0	0
Wealth of Nations and Wealth of Nations Extended	58,832	33,024	128,335	4	7	35,912	10	0
Westland	150	40	155	0	0	...		
	347,438	214,285	833,076	4	10	255,989	16	0
DEVIL'S CREEK.								
Globe	73,438	34,848	138,283	0	0	40,050	0	0
Golden Point	1,160½	376	1,468	3	5	...		
Heather Bell	60	10	38	17	6	...		
Oriental	3,360	1,190	4,603	2	6	...		
Progress	55,354	25,870	103,706	15	9	19,200	0	0
Union	600	64	248	0	0	...		
	133,962½	62,358	248,357	19	2	59,250	0	0
RAINY CREEK.								
Rainy Creek	1,782	209	809	17	6	...		
Inkerman	28,492	11,968	46,272	10	10	4,000	0	0
Supreme	400	17	51	0	0	...		
	30,674	12,194	47,133	8	4	4,000	0	0
MERRIJIGS.								
Al	79	692½	2,787	8	6	...		
Cumberland	12,655	11,096	45,420	3	1	13,800	0	0
Gallant	2,036	658½	2,623	7	8	600	0	0
Golden Lead	10,786	2,216	8,885	0	7	...		
Happy Valley	127	29	110	19	1	...		
Hard to Find	60	17	67	0	0	...		
Merrijigs	85	35	167	0	0	...		
Scotia	713	1,301	5,130	17	6	3,000	0	0
Sir F. Drake	7,612	1,728	6,653	19	0	...		
	34,153	17,773	71,845	15	5	17,400	0	0

RETURNS, &c., from QUARTZ-MINES—*continued.*

Company, &c.	Quartz.	Gold.	Value.	Dividends.
BIG RIVER.				
	Tons.	Oz.	£ s. d.	£ s. d.
✓ Big River ... ..	11,255	17,150	68,599 7 9	35,400 0 0
Golden Hill ... ..	39	9	36 7 1	...
Lord Edward ... ..	30	33½	133 12 2	...
National ... ..	66	12	46 13 9	...
St. George ... ..	15	35	140 14 1	...
	11,405	17,239½	68,956 14 10	35,400 0 0
Total ... ..	653,052	466,861	1,823,927 6 11	573,994 16 0

## LARRY'S CREEK.

*Rosebery.*

This is a special claim of 100 acres, and comprises ground formerly held in mining leases, known as Dreadnought, Invincible, Guiding Star, Tasmania, and Ormuz. There are two lines of reefs here carrying gold—namely, the Caledonian and the No. 2 South Larry's, and further to the west there is another leader carrying gold; but there has been very little work done in any portion of this ground.

A shaft was sunk on the north side of Larry's Creek with the view of working the Caledonian and No. 2 South Larry's Reefs, both of which was found on the south side of this creek, striking at a high angle northwards. This shaft was not sunk to any great depth, as water was met with; and, moreover, these reefs having an underlie to eastward of about 50°, the shaft was sunk too far to the westward to strike any of these lodes.

An adit-level has been constructed in the face of the range, on the north side of the creek, in a northerly direction for about 250ft.; but, as this adit is nearly following the course of the lodes, it would be only by mere chance that any lode would be cut. No cross-cutting has been done to try and cut the line of the lode. Besides, from what is known of the strike of the lodes, they are not likely to be found at the level of this adit. Before any prospecting work can be done in this ground at any great depth pumping machinery will have to be erected. There is an ample supply of water to be got as motive-power for all purposes.

*Caledonian.*

This is a special claim, comprising an area of 100 acres, and includes ground formerly held in mining leases known as Larry's Creek, Argyle, and No. 2 South Larry's. There are two lines of reefs running through the grounds in a northerly and southerly direction. These lines should junction on the north side of the river, as they diverge for each other going southward.

The whole of the area comprised in this claim is on the south side of Larry's Creek. A shaft was sunk near the side of this creek and four levels opened out from the shaft, the deepest of which was 183ft.

The ground is partially stoped out between No. 1 and No. 3 level to the south of the shaft, and between No. 3 and No. 4 to the north of the shaft. The lode was found to be striking at a high angle northwards. Very rich auriferous stone was found under the bed of the creek, but in trying to get out this stone they got too near the surface, allowing the water to get into the workings and swamped the mine, the pumping machinery being far too small to lift the water there was to contend with. Some of the stone found in this mine yielded as much as 8½ozs. gold per ton. The lode at the lowest level was, however, small, although the stone was good.

There was a rich leader cutting across the lode near the shaft heavily charged with iron pyrites and galena. Assays from the pyrites showed that it contained 10oz. 6dwt. of gold per ton, and the galena contained 4oz. bullion, of which 2½oz. was gold. The whole of the stone in the lodes in this locality contains a large percentage of pyrites, which is rich in gold.

An adit level was constructed into the face of the range at about 500ft. southward from the shaft, and cut a different lode to that worked in the levels. About 300 tons of stone was stoped from this adit, which was found to be payable for working.

Another adit-level was constructed about 560ft. further to the southward, and at about 40ft. higher than the level previously referred to, from which 7,514 tons was taken out, yielding 4,129oz. gold, giving an average of about 11dwt. of gold per ton. Winzes were sunk from these levels, but the quantity of water in the ground prevented working from being proceeded with, as the company had not sufficient capital to test the ground at deeper levels.

Taking the whole of the quartz obtained from this ground—namely, 8,080 tons—the yield of gold was 6,209½oz., representing a value of £22,065, out of which dividends were paid to the extent of £2,250. This shows the average value of the ore to be about £2 14s. 6d. per ton.

Before any useful work can be done in this ground a large pumping plant and also winding machinery will have to be erected; but, taking the stone obtained from the Caledonian shaft, which was 566 tons, yielding 2,080½oz. gold, having a value of about £8,060, thus showing the average value of the stone to be £14 5s. per ton.

There is a peculiar feature in this locality that is not found in any other part of the Reefton District. There is a certain quantity of gold in the mineralised slate. The same thing occurs in the Phoenix Mine at Skipper's, where gold is actually in the schist; but at Larry's the slate belongs to the Matai series, which is a more recent formation. It is highly carbonaceous, and contains a great deal of pyrites. Duffy Brothers are now crushing the whole of the mullock that came out of the adit levels, and the material yields on an average  $2\frac{1}{2}$  dwt. of gold per ton. From 175 tons of this material put through their crushing battery they obtained 25 $\frac{3}{4}$  oz. of gold. If the pyrites from this material was collected and treated properly a great deal more gold would be obtained.

There are good sites on both sides of Larry's Creek for the erection of machinery, and sufficient water can be obtained from this creek at an elevation capable of producing at least 1,000 horse-power if required.

#### BOATMAN'S.

##### *Cadman.*

This is a special claim of 100 acres, and includes the ground formerly held in mining leases known as the Occidental, Comstock, Garden Gully, Specimen Hill, and Juno. It is on a continuation of the line of the Fiery Cross and Welcome Reefs. There were numerous quartz boulders lying about on the surface of the ground formerly held in the Specimen Hill Lease, some of which were extremely rich in gold. There is, however, a great depth of alluvial drift on surface of the rock that has made prospecting for lodes a very expensive undertaking in this locality.

Several adit-levels have been driven into Specimen Hill ground, from which 2,265 tons of quartz have been taken, yielding 1,105 oz. of gold, representing a value of about £4,223. There are two lines of reef running into this property, one of which contains a percentage of antimony, and in the other, the stone is almost free from base minerals. But although a large amount of work has been done in this ground, the workings have been principally confined to the upper levels, where the country is greatly disturbed; the lodes are broken and intermixed with mullock, and are lying very flat. All the indications show that no solid lode will be found near the surface in this claim.

The large quantity of rich specimen-stone found on the surface clearly indicates that they have come from some lode not yet discovered, and being on the same line of reef where very rich auriferous stone has been worked—striking in a northward direction—there are good reasons to believe that rich stone will yet be found in this ground at a considerable depth from the surface. The character of the lodes in Specimen Hill shows signs of being tilted over since their formation, but this disturbed ground is not likely to be met with in deeper levels. It may be stated that this claim is the highest on the range, being 2,535 ft. above the level of the sea.

A low-level adit was commenced many years ago from Little Boatman's Creek to prospect different claims in this locality, which is constructed for a distance of 2,500 ft., but it requires to be extended for about another 400 ft. to cut the lodes that have been worked on upper levels in this ground. This would cut the lodes at about 600 ft. under the old workings. The strata at the far end of this adit is lying far more uniform and regular, indicating that a solid country will be met with, but even this depth may not prove sufficient to strike the best lodes that should run through the ground.

There are large areas of coal close to the mouth of the low-level adit, which will enable steam machinery to be used very cheaply for winding, air-compressing, or for quartz-crushing, while sufficient water can be obtained from Boatman's Creek to produce 60 horse-power at the site where the late Specimen Hill Company's crushing plant was erected.

##### *Welcome.*

This is a special claim of 68 acres, and includes the ground formerly held by the Homeward Bound, Eureka, and Welcome Extended Companies. The portion of the ground held previously by the Welcome Extended Company has so far proved to be the richest in this district—27,092 tons of stone were crushed which yielded 64,614 oz. of gold, representing a value of £251,020, out of which £110,250 was paid in dividends. This shows the average value of the stone taken out of this ground to be £9 5s. 3d. per ton.

The lode is worked in the Welcome ground for a length of 675 ft., and in this distance there were three breaks of 15 ft., 25 ft., and 45 ft. in length respectively, dividing the lode into three distinct blocks. Two of these breaks were found on all the levels at the same angle as the strike of the lode going northwards. The average thickness of the lode was about 2 ft. 6 in. The lode was first struck in the Welcome about 100 ft. below the surface, and after going through the ground to the boundary of the Homeward Bound claim it was at about 1,000 ft. lower level.

The workings were carried on from nine levels, six of which were adits, constructed from the face of the range, and, as No. 6 level was the lowest that any adit could be constructed, a shaft was sunk in this level at about 2,700 ft. in from its mouth. This shaft was sunk to a depth of 450 ft., and three levels opened from it. A large chamber was constructed alongside the shaft in which steam winding-machinery was erected to haul the stone from the lower workings; but either through carelessness or otherwise a fire occurred in this chamber and destroyed all the machinery, and the timbering of the mine at this place being burnt, it completely closed all communication in this direction.

The late Eureka Company constructed an inclined adit opposite the Welcome ground on the east side. This adit was carried down on an inclination of 1 in 3 for a distance of 1,800 ft., and from the end of this incline a level was constructed for a distance of 800 ft., which brought it near the boundary of the Welcome ground. A monkey-shaft was sunk at this place to a depth of about 230 ft., and a drive taken from the bottom of this shaft, running parallel with the Welcome boundary for a distance of 586 ft. in a northerly direction. Two cross-cuts were constructed to the westward

—one at the end of the drive for a distance of 60ft., and another one at a point 50ft. nearer the shaft for 138ft. A cross-cut was also put in from the end of the drive in an easterly direction for a distance of 56ft., but in none of these was any stone found. The western cross-cuts would be something like 215ft. below the lowest working in the Welcome ground.

The whole of the prospecting-works carried on from the monkey-shaft referred to was in a barren country, and shows that a break or dislocation has taken place. But at deeper levels another block of stone is likely to be found. The lodes occur in this district in shoots and ledges, the same as in many other countries, having blanks between them; and prospecting would be more likely to meet with success in the Homeward Bound ground, near the southern boundary, by continuing on the line of the lode worked on No. 9 level in the Welcome ground. To strike another block of stone below the block already taken out, the character of the country-rock at the bottom of the monkey-shaft shows that a greater depth will have to be reached before stone is likely to be found, but by following on the same line of the lode in a northerly direction there is a likelihood of good stone being found running through the Homeward Bound into the Cadman Special Claim.

To open out this ground and carry on systematic operations will require a considerable capital; but the fact that there is scarcely any water to contend with will permit works being proceeded with expeditiously, and where stone of such richness has been worked on the upper levels, that is sufficient inducement to carry on operations at a greater depth. Many cases can be cited to bear out this in other countries besides New Zealand; and it may be well to mention that at Sandhurst, in Victoria, in Mr. George Landsell's 180ft. shaft, the lode cut out at 750ft., and another 750ft. of barren ground had to be gone through before another lode was struck. There is no doubt but that good stone will be again found in the Welcome if mining operations are carried on in an intelligent manner.

From the Homeward Bound ground 62 tons of stone was crushed, which yielded 213oz. gold, representing a value of £860. This was taken from the continuation of the Welcome lode, and shows that the ground should be opened out so as to allow this line of lode to be followed. The present company, however, has not sufficient capital to undertake any extensive operations to open up the mine in a proper manner.

#### *Fiery Cross.*

This is a special claim of 61 acres, and includes ground formerly held by the Alexandra, Hopeful Extended, and Fiery Cross Extended Companies, who have taken out about 40,983 tons of stone, which yielded 51,773½oz. gold, representing a value of £202,189, out of which £72,693 have been paid in dividends, thus showing the average value of the ore to be about £4 18s. 7d. per ton.

The lode in this claim, as far as at present known, appears to be a continuation on the same line as that worked in the Welcome ground; but, as there is a considerable distance between the workings of the two mines, it has not been proved whether this is the same lode or a parallel one. There are, however, doubts regarding this being the same lode, as the character of the country-rock is entirely different in the Fiery ground to that in the Welcome. Although a great deal of work has been done in the Fiery ground the operations have been chiefly confined to opening up the lode and stopping it out. Comparatively little cross-cutting has ever been done to ascertain whether there is another lode parallel with the one worked going through the ground or not. In the Just-in-Time ground, which adjoins the southern boundary of the Fiery, there are three distinct lodes, but sufficient cross-cutting has not been done in the Fiery ground to prove whether these lodes continue in a northerly direction.

The workings have been on what is termed the north and south blocks of stone, which have about 800ft. of blank ground between them. Both of the blocks strike at a high angle northwards, and have been worked down to a depth of about 800ft. below the surface. The lode was first discovered on the surface, and the first workings were carried on from an adit-level. Afterwards a shaft was sunk to a depth of 450ft., and the stone taken out from this down to that depth, but as the blocks were striking at a high angle to the northwards an incline shaft was constructed from the 450ft. level and the lode partially taken out. This incline shaft is sunk to a depth of 350ft., or to No. 6 level, where there is stone left underfoot, and also in the face of the level going northwards.

There is comparatively no water in the ground at the deep levels; the only water in the workings comes from the surface, which can be dammed back with very little expense. There is a good deal of stone left in the blocks that have been partially stopped, which has been left from time to time as being of too low grade to give sufficient returns for working, and there is a probability of other blocks of stone being found on the upper levels if the ground were prospected.

#### *Seddon.*

This is a special claim of 100 acres, and includes ground formerly belonging to the Just-in-Time, Eldorado, Imperial, Reform, South Hopeful, Walhalla Extended, and Boatman's Creek Companies. These companies crushed 15,015 tons of stone, which yielded 17,595oz. of gold, representing a value of £68,398, out of which £15,666 was paid in dividends; the average value of the ore crushed is therefore £4 9s. 9d. per ton.

There are three distinct lines of reef running through this ground. The Just-in-Time opened out from an adit-level near the surface on the western lode, and took out 308 tons of stone, which yielded gold to the value of £6,285, equal to about £20 8s. per ton. After taking out this stone they laid out a low-level adit to work this lode, but before commencing its construction another lode was discovered about 300ft. further to the eastward, and all the mining operations have been entirely confined to this eastern lode ever since. Two adit-levels were constructed and the stone from this lode stopped out from these levels.

After stoping out the stone from the adit levels on the eastern lode the Just-in-Time, Imperial, and Reform Companies arranged to sink a shaft conjointly on the boundary of their respective claims. This shaft is down to a depth of 200ft., and on opening out from the bottom of the shaft another lode, known as Thomson's, was cut at about 90ft. further to the eastward than the eastern lode, where some good stone was obtained. An uprise was made by the Just-in-Time Company to strike the bottom of a winze which had previously been sunk in the lowest adit-level, and workings were carried on from this towards their northern boundary. A cross-cut was commenced to the westward, to cut the western lode, for a distance of 90ft., but it required to be carried for a further distance of 210ft. before it would cut this lode.

It is likely that a large quantity of stone will be got out of this ground at comparatively shallow depths, and the western lode being left intact below the adit-level, there is a high probability of rich stone being obtained from this lode when a lower level is constructed. A reversible overshot water-wheel is erected at the shaft, with poppet-heads and winding-gear, so that with very little outlay the cross-cut already commenced in a westerly direction can be extended to cut the western lode at least 400ft. under the old workings.

The mines in Boatman's district are well situated for timber and coal. The whole of the country in close proximity to the mines is covered with timber suitable for mining purposes, and water can be obtained from Boatman's main creek capable of producing considerable motive-power, while large coal areas exist within a mile of the workings, with dray-roads for transit, makes the cost of working steam machinery comparatively small.

#### MURRAY CREEK.

##### *Golden Fleece.*

This is a special claim of 66 acres, including the ground formerly held by the Ajax and Golden Fleece Companies. At the present time the mine is let to a party of six tributers. There has been 33,437 tons of stone crushed from this claim, which yielded 38,758oz of gold, representing a value of £150,285, thus showing the average value of the stone to be about £4 10s. per ton; while dividends have been paid to the shareholders to the extent of £57,504.

The mine is situated about 1,900ft. above sea-level. The workings are carried on from a shaft, which has been sunk to a depth of 640ft., and the lode has been worked in blocks here and there for a length of about 1,000ft., that is about 700ft. to the north of the shaft and 300ft. towards the south. There is a very large body of stone intact in this mine. At the place where the tributers are working they have 300ft. of the lode intact for a height of about 500ft. from this level to the surface.

This lode is from 2ft. to 2ft. 6in. in width, with the foot- and hauging-wall extremely well defined, and underlying to the west at almost a uniform angle of about 72 degrees from the horizon. The lode is far more clearly defined than in any other mine in the district, and gives indications that it will live down to a considerable depth. On the northern workings a slide was met with which cut the lode out. Very rich stone was obtained on the southern side of this slide, and, judging from its character, an angle that it made with the horizon, a considerable displacement has taken place downwards to the north, which will not only throw down the lode, but is likely to shift it a considerable distance to the westward.

The place where prospecting operations should be carried on, with a view of striking the lode to the northwards of this slide, is from the lowest level and cross-cutting to the westward. There is a high probability of this rich stone being again found in this direction.

The stone contains a good deal of pyrites, which is very rich in gold. 1 ton 1½cwt. of blanketings was forwarded to the Clyde Smelting and Chlorination Works near Granville, New South Wales, and from the returns that came back in January last it contained over 6oz. 4dwt. of gold, and by the treatment it yielded 5oz. 18dwt., having a value of £23 12s. The smelting and other charges came to about £4 7s., leaving a net profit of £19 5s. The battery returns of gold from the stone that the tributers are crushing gives an average yield of about 8dwt. per ton, while the tailings from the battery that is running to waste gives an assay of 10dwt. per ton, thus showing that only about 40 per cent. of the gold is being extracted.

A low-level adit is being constructed from Black's Point to come into this ground. This adit, when completed to the Golden Fleece shaft, will cut the lode about 600ft. below the lowest workings, and greatly enhance the value of this property, as it will not only open up this mine at greater depths, but it will also be a highway whereby all the quartz can be taken at a minimum cost to a good site where a large crushing battery can be erected, alongside the main road from Reefton to Crushington, with all the modern appliances for saving gold. This is the place where all the crushing machinery will have to be placed to crush the whole of the quartz from the Royal, Venus, Golden Treasure, Salisbury, and other claims on this range.

##### *Lillie.*

This is a special claim of 50 acres, adjoining the Inangahua Low Level Tunnel reserve to the north, the Golden Treasure to the east, and is bounded by the Beaconsfield on the west. It includes ground formerly held in claims known as the Perseverance, Republic, and Adonis. The only record of gold-returns from this ground is from the Perseverance Claim, where 57 tons of stone yielded 19oz. gold, representing a value of £74.

Very little can be said respecting this ground. There are lodes running through the claim, but very little prospecting was ever carried on; the only work done was in the early days of the field.

*Royal.*

This is a claim of 21 acres on the line of the Golden Fleece reef. It is at the present time worked by a party of four tributers from an adit-level going into the range for a distance of 1,300ft. The workings on the lode are carried to within about 18ft. of the boundary of the Golden Fleece, while the workings in the Golden Fleece ground are within 95ft. of the boundary, thus showing that there is only about 113ft. between the workings of these claims, the lowest adit-level in the Royal being about the same level as the No. 4 level in the Golden Fleece ground. The lode is, however, more broken, and not so well defined as it is in the Golden Fleece. The total quantity of quartz crushed from this claim up to the 31st August last has been 918 tons, which yielded 775½oz. gold, representing a value of £3,124, thus making the average value of the stone crushed to be about £3 8s. per ton.

*Inangahua Low Level.*

This comprises two special claims, one of which is known as the Venus, and the other the Inangahua Low Level Claim, having an aggregate area of 134 acres. The total quantity of quartz crushed from this ground has so far been confined to an area of about 32 acres held by the Venus Company, amounting to 10,713 tons, yielding 6,914oz. gold, representing a value of £26,843, which shows the average value of the stone crushed to be about £2 10s. per ton. Dividends have been paid by this company to the extent of £3,300.

A scheme was projected some twelve years ago to construct a low-level tunnel through the hill from Black's Point to the Waitahu River; the line was laid off, which was over two miles in length. This tunnel was to go near the Golden Fleece shaft, and a connection made with it, so as to secure ventilation. A commencement was made to construct this tunnel from the Black's Point end, and a subsidy of £1 was given by the Government for every £1 contributed by the company who undertook its construction. The tunnel is now constructed for a distance of about 2,900ft., still leaving a distance of about 2,300ft. to get to the Golden Fleece shaft. This shaft would have to be sunk an additional 600ft. to get a connection with this tunnel.

All operations have been suspended for many years in the tunnel, but recently a company has been formed and purchased the Venus Company's property, and also the right of the Inangahua Low Level Company's rights and special claim, with a view of extending the tunnel to work the lodes going through the Venus, Royal, and Golden Fleece ground.

This tunnel can only be carried on from one end, and therefore its rate of progress depends on what can be driven from one face. If compressed-air rock-drills are used the distance to the Golden Fleece shaft should be driven in about twelve months. This tunnel will greatly enhance the value of the whole of the mining properties on the range between Black's Point and the Waitahu River, as it will not only be the means of opening up the ground in the different claims at deep levels, but it will also be a main highway, where the whole of the quartz from the different claims can be taken to for treatment. At this place there is a good site for the erection of a large crushing battery, with all the most modern appliances.

*Salisbury.*

This is a special claim of 100 acres, and includes ground formerly held in mining leases, known as Andersou's, United Devonshire, and Invincible. The only work done in this ground was in the early days of the fields, when 7,355 tons of stone was crushed, which yielded 6,020oz. gold, representing a value of £23,328, of which £1,525 was paid in dividends. The average value of the stone crushed was about £3 3s. per ton.

There are two lines of reef running through this ground, the one to the eastward being Auderson's line, and the one to the westward the Invincible line. Each party first drove an independent level, but those levels were constructed in such a serpentine course that it is hard now to say whether they were carried on the line of lode or not. The Auderson's and Invincible Companies combined, and constructed a lower adit-level between them; this adit is about 600ft. in length, and at about 278ft. lower level than where the first drive was put into the Invincible ground.

A winze was sunk from the lowest adit-level to a depth of about 100ft., but the lode cut out in the bottom of this winze, and no effort was made to look for it at deeper levels. The country rock here is favourable for the existence of lodes, but, all working being suspended many years ago, nothing has been done to prospect the ground. Some of the men working in the ground in the early days have a firm belief that there is a good lode of stone to the westward of the Invincible line, but no cross-cutting has been done in this direction.

This ground can be prospected at considerably lower levels, by a cross-cut in a westerly direction from the Inangahua Low Level Tunnel, but, from all that can be learned about the reefs worked in this ground, a large amount of prospecting work will have to be done before the value of this property can be ascertained.

*Energy and Undaunted.*

These are two separate claims on the same line of country, and comprise an area of 54 acres. These claims include the ground formerly held by the Energetic and Dauntless Companies. A large amount of work has been done in this ground; 64,246 tons of stone has been crushed, yielding 33,230½oz. gold, representing a value of £128,951, out of which dividends were paid to the extent of £21,900.

The workings were carried on from an adit-level for the first 150ft., and a shaft was then sunk and to a depth of 350ft., being 200ft. below the adit-level. There are two lines of reef running through the ground. These reefs were about 100ft. apart near the boundary of the Wealth of Nations, but converged as they went north. The eastern lode cut out at the adit-level, but very little prospecting was ever done to see whether it existed at deeper levels. This lode above the adit-level was from 5ft. to 6ft. in thickness.

The west lode was 20ft. in thickness for a length of about 100ft., when it branched in two divisions going to the southward, but still carrying a fair amount of gold. At the No. 5 level, which was carried from the bottom of the shaft, a dislocation occurred similar to that found in the adjoining claim, the Wealth of Nations, on the southern boundary, and very little work was done to ascertain the nature of this dislocation beyond sinking a winze about 59ft. under this level and driving a cross-cut on each side—namely, 50ft. to the eastward and 30ft. to the westward.

There is a considerable quantity of stone still left in this mine below the adit-level, which will pay to work. A large lode was left in the face by the Wealth of Nations Company going into this ground at the boundary, and from the recent developments in that company's ground there is every likelihood of good stone being again found if the shaft were sunk to a deeper level. The present workings in the Wealth of Nations is about 575ft. below the deepest workings in the Energy, and the character of the ground passed through shows clearly that a large dislocation has taken place, which indicates that the Energy will have the same character of ground for a certain depth below the bottom of the shaft.

The average value of the stone crushed from the Energy ground has been about £2 per ton, but when the crushing plant used and appliances for saving gold is taken into consideration there is good reason to believe that not more than 50 per cent. of the gold in the stone was recovered. The property is likely to become one of considerable value when it is properly opened out on deeper levels.

#### *Wealth of Nations.*

This is a special claim of 64 acres, and includes the ground formerly held in mining leases known as the Independent, Vulcan, and Wealth of Nations Extended, from which 62,096 tons of stone was crushed, yielding 34,739oz. gold, representing a value of £134,981, thus showing the average value of the stone crushed to be about £2 3s. per ton; while the amount of dividends paid was £36,312.

The ground was worked from adit-levels from the top of the hill down to the battery-level. Some very good stone was found near the surface, but a dislocation took place on the same level as where it occurred in the Energy Claim, on the northern boundary. An adit-level was constructed on the same level as the crushing battery. This was carried into the hill for a distance of 800ft. to the line of the reef, and thence driven a further distance of 800ft., making a total length of 1,600ft. This level was constructed through barren ground; a chamber was constructed at 800ft. from the mouth of the adit-level, and a shaft sunk at this place to a depth of 200ft., and another level constructed for a distance of 960ft., near the end of which a block of stone was struck, and went up for 50ft. above the 200ft. level. The same block of stone was followed down to the 350ft. level, when the dip or inclination of the block changed entirely, and went away at an opposite angle.

A monkey shaft has been sunk in the 200ft. level at a point about 500ft. distant from the main shaft, and it is from this monkey shaft that the present workings are carried on. A level was driven from this shaft at 150ft. under No. 2 level, and from this a winze was sunk on the lode, which proved to be 15ft. in thickness, and averaging about from 7dwt. to 8dwt. of gold per ton. The monkey shaft has since been sunk to a depth of 300ft., and a level constructed at this depth. A commencement has been made to slope out the lode. At the lowest level the lode is from 8ft. to 10ft. in width, but its length has not yet been determined.

The lowest level in this mine is about 360ft. above the deepest level in the adjoining claim—the Keep It Dark, where very good stone is now being worked. There is now a reasonable prospect of this mine being again placed on the list as a dividend-paying one.

The company has a crushing plant consisting of twenty heads of stamps of the very old type, eight berdans, with the ordinary quicksilver and blanket-tables, which is driven by an over-shot water-wheel 50ft. in diameter. Attached to the crushing plant is a sawmill. There is also a reversible overshot water-wheel, 30ft. in diameter, used for winding purposes. It may be mentioned this is one of the few mines in the district that save the tailings, which have hitherto been treated in berdans, but this process does not extract anything like a fair percentage of the gold the tailings contain.

#### *Keep It Dark.*

This is a special claim of 57 acres, which has been held by the Keep It Dark Company since it was first taken up in the beginning of 1874. There has been 114,979 tons of stone crushed from this ground, which has yielded 60,834oz. of gold, representing a value of £236,958. Of this amount, £109,583 have been paid in dividends, while only £6,208 have been made in calls. The average value of the stone crushed amounts to about £2.1 per ton.

This is the deepest quartz workings in the Reefton district. The lode running through this ground formed almost a right angle, one of the ends being about north and south, and the other nearly east and west. This lode was carried down to a depth of 500ft., when it got greatly broken up. In some places in the upper levels it was about 400ft. in length, having a maximum width of about 20ft. Below the 500ft. level the lode became disturbed and broken, with isolated blocks of stone, which was of low grade; but after going through about 250ft. in depth a new lode was struck about 15ft. in thickness, which is averaging from 11dwt. to 12dwt. of gold per ton.

The main shaft is sunk to a depth of 503ft., and the lowest level from the main shaft is opened out at about 490ft. A monkey shaft was sunk in this level at a distance of 522ft. from the main shaft to a depth of 375ft., and from the bottom of this shaft a level has recently been constructed to work the new block of stone, which is 190ft. distant to the westward, the depth of this level being about 1,090ft. below the surface of the ground, or 860ft. below the top of the main shaft which makes the workings about 200ft. under sea-level, and at this depth there is no water in the ground. The upper workings are carried on from adit-levels to the height of 230ft. above the level of the mouth of the main shaft.



The length of the new block of stone has not yet been proved, but it is known to be at least 70ft. in length, and to go up above the 860ft. level for a distance of 100ft. This new block has an easterly and westerly direction, having a branch in the centre going in a northerly direction. The country rock at this depth is far more favourable for the existence of auriferous lodes than it was for 200ft. below the 500ft. level, and, seeing that this is in a belt of country where large auriferous lodes have been worked, there is every likelihood of a considerable quantity of gold being again obtained from this ground.

The company has a crushing plant of twenty heads of stamps 8cwt. each, and three berdaus, which are driven by two Pelton water-wheels 6ft. in diameter, working under a head of 28ft. A water-race is constructed to the Inangahua River for a distance of  $1\frac{1}{2}$  miles, which has a carrying-capacity of about 20 cubic feet per second. The crushing battery has the ordinary quicksilver and blanket-tables for saving the gold, and the whole of the tailings from the stone crushed from the mine has been allowed to run into the Inangahua River, and has been carried away with the stream.

#### *Gladstone.*

This is a special claim of 100 acres, and includes the ground formerly held in mining leases known as the Golden Bell, Eclipse, and Prince of Wales. Very little is known regarding this ground, as no prospecting has been done. Mr. T. Watson, manager of the Wealth of Nations Company, which is the adjoining claim, is, however, of opinion that there is a good run of stone going through this claim. The recent developments at deeper levels than hitherto worked gives a great incentive to carrying on prospecting operations, as it adjoins the western boundary of the Wealth of Nations, Energy, and Undaunted Claims.

#### *Beaconsfield.*

This is also a special claim, comprising an area of 100 acres, and includes the ground formerly held in mining leases known as the Bannockburn, Victory, Wellington, Band of Hope, and portion of the Formosa. This ground adjoins the eastern boundary of the Undaunted, Energy, Keep It Dark, and Wealth of Nations, and the northern corner of the Hercules. It is, therefore, favourably situated for auriferous lodes to be found. There are lodes running through the ground on which a little prospecting was done in the early days of the field, but no work has been carried on for many years. There were 1,545 tons of quartz crushed from the Victory and Band of Hope ground, which yielded 930oz. of gold, representing a value of £3,603. Of this amount, £400 was paid in dividends.

As the Wealth of Nations, Keep It Dark, and Hercules Companies are all working lodes of a payable character, and also as a large quantity of gold was obtained from the Energy ground, it is reasonable to believe that payable lodes will be found in the Beaconsfield. It may be looked on as ground that is worth expending money to prospect with a fair chance of success. Very little work has, however, been done, with the exception of surface-work and working a lode at shallow levels in the Victory ground.

#### *Hercules.*

This is a special claim of 33 acres, and includes the ground formerly held by the Golden Ledge and Nil Desperandum Companies. There has been 9,335 tons of quartz crushed from this claim, which has yielded 8,010oz. of gold, representing a value of £31,453; of this amount, £5,288 has been paid in dividends. From the 1st April of the present year to the 31st August last, 1,646 tons of stone has been crushed, which yielded 821oz. of gold, representing a value of £3,275, out of which £600 has been paid in dividends.

This ground was worked for many years with poor results, from the surface downwards, by three adit-levels, and from the third adit-level a shaft was sunk for a distance of 420ft., and a large amount of work done for very little gold. The shaft was then sunk to a depth of 560ft., and the lode cut at this level, which gave good results for working, with rich auriferous stone under foot in the level. Recently a commencement has been made to sink a winze on the lode from the bottom level, which is carrying good stone as far as the sinking has proceeded. This shoot of gold-bearing stone is similar in character to that worked in the No. 2 Keep It Dark. It appears to be the same lode, but if so a displacement has taken place, and thrown it considerably to the westward. This, however, has not yet been definitely proved.

#### DEVIL'S CREEK.

##### *Globe.*

This is a special claim of 53 acres, and three mining leases comprising an area of 35 acres, making an aggregate area of 88 acres, including ground formerly held by the Union Company. The Globe Company was formed in 1882, and since then the following statement will show the result of the workings:—

2—C. 3c.

Date and Year ending	Tons of Quartz crushed.	Yield of Gold.	Value.	Value per Ton.	Dividends paid.
	Tons.	Oz. dwt. gr.	£ s. d.	£ s. d.	£
Half-year, Nov., 1883 ...	1,160	341 2 0	1,334 11 0	1 3 0	...
30th May, 1884 ...	4,750	1,430 15 0	5,582 0 7	1 3 6	...
" 1885 ...	4,000	1,022 7 0	3,963 6 5	0 19 10	...
" 1886 ...	606	180 6 9	663 10 5	1 1 10	...
" 1887 ...	1,556	1,185 17 12	4,679 10 2	3 0 1	...
" 1888 ...	6,530	4,831 16 0	19,055 17 6	2 18 4	11,250
" 1889 ...	8,295	4,034 9 18	16,134 14 10	1 18 10	3,600
" 1890 ...	8,242	4,699 12 12	18,532 12 3	2 4 11	4,950
" 1891 ...	7,439	4,458 9 9	17,652 12 0	2 7 5	10,350
" 1892 ...	9,800	5,050 12 12	20,472 13 0	2 1 9	8,100
" 1893 ...	9,292	3,434 18 9	13,857 17 1	1 9 10	1,800
" 1894 ...	6,135	1,965 3 8	7,914 11 10	1 5 10	...
" 1895 ...	4,535	1,411 2 18	5,721 18 0	1 5 2	...
31st August, 1895 ...	1,098	751 7 13	2,717 4 11	2 9 0	...
Total ...	73,438	34,848 0 0	138,283 0 0	1 17 8	40,050

Taking this company's balance-sheet for the year ending the 30th May last, it shows that 72,340 tons of stone had been raised from the mine and crushed, and that the total expenditure in connection with the mine and crushing battery was as follows:—

Mine and battery expenditure (13 years) ...	£	s.	d.	£	s.	d.	per ton.
Rent and taxes ...	88,810	15	5	1	4	6.6	"
Office-expenses ...	2,657	19	10	0	0	8.8	"
	4,162	6	1	0	1	1.8	"
Total ...	95,631	1	4	1	6	5.2	per ton.

For the first four years the company expended nearly £15,000 of its capital without having got any return. A considerable amount of work was done, and gold obtained to the value of £11,543, but this was not sufficient to cover the expense of workings. Mining operations were therefore suspended for a considerable time, and prospecting carried on at the surface, where an outcrop of auriferous stone was found to the west of the ground formerly held in mining leases. A parcel of about 86 tons of stone from this outcrop yielded 175oz. gold. This discovery led to the special claim being taken up, and the workings confined for a time to this portion of the property.

Workings were at first carried on from adit-levels, but after the discovery of the new lode a shaft was sunk, which is now down to a depth of 835ft., and six levels have been opened out from the shaft. The line of lode has been traced for nearly 3,000ft. in length, having several blocks of stone varying in length from 142ft. to nearly 300ft.

At No. 1 level, which is 160ft. below the surface, the block of stone was 179ft. in length, having an average thickness of about 12ft., which has been taken out to the surface. This is termed "the Middle Block." On extending the level 150ft. to the eastward, another block of stone was discovered, which proved to be 200ft. in length, having an average thickness of 6ft. This is only partially taken out.

On the No. 2 level, which is 285ft. below the surface, the middle block of stone was 182ft. in length, having an average width of 12ft., the whole of which has been taken out. This level was extended for a distance of about 500ft. in a westerly direction, when it cut what is termed the Dam Block, which was 180ft. in length, having an average width of 12ft. This has also been taken out to the surface. This lode was underlaying into the Progress, which is the adjoining claim, and work on it was accordingly discontinued.

The No. 3 level is 385ft. below the surface, and the Middle Block is worked from this level to the one above. It was 184ft. in length at this depth, and still retained an average width of 12ft. This level was extended to the East Block, but only a small portion of it was worked.

At the No. 4 level, which is 510ft. below the surface, the Middle Block was 142ft. in length, still retaining its average width of 12ft., and the whole of the stone taken out. There has not been any work done on any other block of stone at this level.

The No. 5 level is 635ft. below the surface from which the whole of the Middle Block has been taken out, it being at this depth 148ft. in length, having an average thickness of 10ft. On extending this level for a distance of 50ft. in an eastward direction another lode was cut, and this has now been driven on for a distance of 40ft., having a width of 10ft. in the face. Its length has not yet been determined, neither is it known what distance it will go upwards.

At the No. 6 level, which is 835ft. below the surface, the first block of stone is 180ft. in length, when it went into the Progress ground, having an average width of 15ft. In extending the level in an easterly direction, the lode referred to in No. 5 level as being newly discovered was cut at 16ft. distant from the east end of the other block, which has an average width of 6ft.; but the length of this block has not yet been determined. It has been driven for a distance of 120ft., and at this level stone still continues in the face. A winze has been commenced from this level on the large block of stone, which shows gold as it goes down, but the sinking here has recently been discontinued owing to the company having placed the mine under offer to Mr. D. Ziman to purchase.

This mine is situated at about 1,869ft. above sea-level, and, although the shaft is already a great depth, there is very little water in the ground. The water, being hauled with tanks, does not exceed 1,050 gallons in twenty-four hours—about 45 gallons of water per hour—which is lifted with the winding-engine at slack time, when no quartz is being sent up.

This company has a crushing plant erected at the foot of the range, facing the Inangahua River, at a distance of about 97 chains from the mine, which is connected by an aerial tramway capable of transmitting about 50 tons of quartz in eight hours. The crushing battery consists of twenty heads of stamps  $7\frac{1}{2}$ cwt. each, with two berdans, one Watson-Denny pan, and six Triumph concentrators. These are driven by a turbine water-wheel, the water being brought in an open conduit from the Inangahua River for a distance of about  $1\frac{3}{4}$  miles. This water-race gives a head when the turbine is erected of about 40ft.

The crushing plant is one of the old type of crushing batteries, having the ordinary quicksilver and blanket tables; but nothing like a fair percentage of the gold is extracted, and no steps appear to be yet taken to stop this waste of gold. Mill-proprietors are content to still adhere to the old system of saving gold, in the happy belief that their appliances for the extraction of the precious metals are all that can be desired, and that they have little to learn in this respect. The company are, however, saving the tailings, which now amount to at least 50,000 tons, and when these tailings come to be properly treated it will be found that a large loss in gold has been made in the first instance; besides, a portion of the gold is carried away with the muddy water from the tables, and conveyed by the stream beyond recovery.

With regard to the value of the ore in the Globe Mine, Mr. P. Q. Caples recently took samples promiscuously from the face of the lodes, and had them assayed at the School of Mines at Reefton, with the following results:—

	Oz.	dwt.	gr.	
(1.) Quartz from East Block, No. 5 level ...	0	17	15	gold per ton
(2.) Quartz from winze East Block, No. 5 level ...	1	15	22	"
(3.) Quartz from Middle Block, No. 6 level ...	1	13	23	"
(4.) Quartz from Middle Block, No. 6 level ...	1	12	0	"

These samples were taken at hap-hazard across the face, but still these assays cannot be taken as the average value of the lode. Merely taking a few samples in this manner gives little idea what the whole of the lode will average. If the ore were all pulverised and mixed, and assays made, the average value would be ascertained.

#### Progress.

This is a special claim of 90 acres, and includes ground formerly held by the Oriental Company and a claim known as the Jupiter. This ground adjoins the western boundary of the Globe special claim, the Globe Company's shaft being about 130ft. east of the Progress boundary. There has been 58,714 tons of quartz crushed from this ground, which yielded 27,060oz. gold, representing a value of £108,310, of which dividends have been paid to the extent of £19,200.

There are two lines of reefs in this ground, one having an easterly and westerly direction, which goes into the Globe, and one running in a northerly and southerly direction. The upper workings were carried on from adit-levels, and the present workings are carried on from a shaft, which is sunk at a point about 1,650ft. in from the mouth of the No. 2 level. This shaft is sunk to a depth of 450ft.

The No. 1 level cuts the eastern and western lode about 130ft. below the surface, and this level was carried to the Globe boundary. The lode in this level was about 20ft. in width, but its length was never determined, as stone was left in the faces at both ends, and it is only partially worked overhead, as the stone at that time was considered to be of too low grade. The north and south block was worked from an intermediate level above No. 1 to the surface, averaging about 7ft. in thickness. 1,000 tons was crushed from this block, which gave an average yield of 14dwt. of gold per ton, but it was not cut in No. 1 level.

The No. 2 level is the deepest adit-level that can be constructed, and is 270ft. under the surface where the east and west lode was cut. This level cut the lode at 1,470ft. in from its mouth, where it was 32ft. in thickness. There are four distinct blocks on this line of reef—namely, the Dam, Black's, Adam's, and Smith's blocks. From No. 1 to No. 2 level a large amount of work has been done on Smith's block, which is the most westerly one, but the whole of this stone has not been taken out, as it was considered of too low grade. The north and south lode was never cut in this level.

The No. 3 level is 400ft. below the surface, but very little work was done on the level. There was a great thickness of lode, but the stone was considered of too low grade, although it averaged  $8\frac{1}{2}$ dwt. of gold per ton. Three distinct blocks of stone were cut in this level, having an aggregate length of 300ft. It may seem strange that such a large lode as that opened up in this level would not pay for working when it gave an average of  $8\frac{1}{2}$ dwt. of gold per ton. In the report submitted by the directors to the annual meeting of shareholders, dated 28th July, 1893, they state "that 4,130 tons of stone was crushed, which yielded 1,761oz. gold, equal to  $8\frac{1}{2}$ dwt. per ton, and the stone was so poor that the directors did not feel justified in working worthless quartz, and left thousands of tons behind." All that can be said with reference to this is, that if this large body of stone was crushed and treated in an intelligent manner there would be a considerable increase in the yield of gold, and leave a large profit to the shareholders.

The No. 4 level is 550ft. below the surface, where there are three distinct blocks of stone on the east and west line of reef. Two of these came all the way down from No. 3 level, and one was found in the foot-wall about midway between No. 3 and No. 4 levels, having a width of about 2ft. 6in., when cut and widened out to 3ft. showing gold freely. The whole of the blocks on this level are not yet taken out.

The No. 5 level is carried from the bottom of the shaft, and is about 700ft. below the level of the surface. The lode here varies from 4ft. to 40ft. in width, and would average about 25ft. thick for 118ft. long. The stone underfoot in this level appears to be of better quality than that worked above this. A winze has been sunk on the lode from this level to a depth of about 100ft., carrying good gold in the stone for this distance. There has been no working on the line of this reef at this level within 600ft. of the Globe boundary. From all the information supplied me, the No. 5 level in the Progress is about 65ft. lower than the deepest working in the Globe. This ground is easily worked, and the cost of mining should be very small when the size of the lodes are taken into consideration, and the fact that only about 560 gallons of water have to be lifted per week.

The following statement will show the result of the working in this mine from March, 1894, to July of the present year:—

Date.	Returns.				Expenditure.			Dividends.		
	Tons.	Oz.	dwt.	gr.	£	s.	d.	£	s.	d.
1894.										
10 March ...	425	180	15	6	732	1	9	819	3	0
6 April ...	710	415	15	0	1,685	2	3	1,690	16	3
9 May ...	895	458	11	12	1,859	2	8	1,510	5	9
6 June ...	720	242	5	6	984	3	9	1,332	15	7
30 July ...	1,480	741	9	5	3,011	15	5	994	2	11
23 August ...	495	222	18	8	905	13	7	1,019	18	4
7 September ...	...	...	...	...	...	...	...	851	15	5
10 October ...	...	...	...	...	...	...	...	382	14	4
7 November ...	...	...	...	...	...	...	...	476	19	4
4 December ...	1,375	783	17	23	3,169	10	11	1,388	4	1
1895.										
17 January ...	...	...	...	...	...	...	...	165	11	5
February ...	760	374	11	4	1,516	19	2	1,811	17	6
March ...	715	380	8	0	1,540	12	4	705	0	0
April ...	815	374	18	0	1,518	15	0	844	7	5
May ...	...	319	15	22	1,295	3	6	757	12	1
14 June ...	860	337	16	9	1,365	7	0	855	8	10
July ...	875	308	10	8	1,243	1	4	1,146	9	2
	10,120	5,141	12	7*	20,827	8	8	16,741	1	5
									6,600	0

\* This leaves a net profit on the working of £1,083 7s. 3d., while £6,600 has been paid away in dividends. This shows that there must be a considerable reserve in hand.

There is a great deal of pyrites in the stone, which is very rich in gold. Recently 10 tons 18cwt. of concentrates obtained from the washings of the blankets, after working the concentrates in the berdans, and taking all the gold that could be got by this process by amalgamation, was sent to Melbourne for treatment. The returns for this showed that the concentrates contained gold to the value of £260, or equal to £23 16s. per ton.

As stated in my annual report, the tailings are carried away by the water in Devil's Creek and strewed over its bed, and would now be difficult to recover; but it is certain that there has been in the past, and even at the present time, a very large loss of gold at this company's plant.

The crushing plant and winding gear being fully described in my annual report, there is no need to refer to this again. It may, however, be stated that, notwithstanding anything that may be said to the contrary, this company has a valuable property, and from the large waste of gold that is still being made, until such time as a considerable change is made in the method of treating the ore, it is only by having very rich stone that any profit on the working of the mine can be expected.

#### Larnach.

This is a special claim of 100 acres, including ground held in mining leases known as the Empress, General Gordon, Heather Bell, Lone Hand, Pioneer, Albion Extended, Surprise, and Great Western. This claim adjoins the southern boundaries of the Globe and Progress. Very little can be said respecting this ground, with the exception that some rich specimen-stone was found on the surface, although very little has yet been got from any record of stone crushed. There was 60 tons of stone crushed from the Heather Bell, which yielded 10oz. gold, representing a value of £39. This claim is on the line of the gold-bearing belt of country, and, as there has not been any prospecting done at any great depth below the surface, there is a fair probability of auriferous lodes being found payable for working.

#### MERRIJIG'S.

##### Cumberland.

This is a special claim of 30 acres, bounded on the north by the Success and Exchange holdings, on the west and south by the Golden Head and Durhan Claims. There has been 12,655 tons of stone crushed from this ground, which yielded 11,096oz. of gold, representing a value of £45,420, out of which dividends have been paid to the extent of £13,800.

The workings were carried on below the level of the surface to a depth of 230ft. from three adit-levels. In the lowest of these a shaft was sunk at a point about 580ft. from the mouth of the adit to a depth of 200ft., where the present workings are now carried on. The length of the block of stone

now being worked is from 80ft. to 100ft., having an average width of about 2ft., the direction of the lode being north-east and south-west.

There are three reefs in this ground, one of which dips in a northerly direction towards the Exchange. The average value of the whole of the stone taken from this mine is about £3 11s. 8d. per ton, and the tailings at the crushing plant, which is stacked, contains from 6dwt. to 18dwt. of gold per ton, according to several tests that have been made. This company is at present carrying on prospecting operations, with the view of cutting another block of stone.

#### BIG RIVER.

##### *Big River Company.*

This company holds a special claim of 38 acres. This claim is situated about six miles in a southerly direction from Merrijig's, and about nineteen miles from the Town of Reefton. There is a dray-road constructed for fifteen miles, and the remainder is a horse-track, constructed on dray-road grades. There has been 11,255 tons of stone crushed from this claim, which has yielded 17,150oz. gold, representing a value of £68,599, out of which dividends have been paid to the extent of £35,400, thus showing the average value of the stone crushed from this claim to be about £6 2s. 2d. per ton.

This present company is a reconstruction of a former company having a similar name. Up to the 31st August last the present company have only paid up its capital to the extent of 6d. per share on 24,000 shares, which is equal to £600, while dividends have been paid to the shareholders to the extent of £34,200.

This ground was worked to the surface from No. 1 adit-level, which is 200ft. under the crown of the hill. A shaft was then sunk, which cut this level at about 670ft. in from its mouth. This shaft is now sunk down to a depth of 780ft., and four other levels constructed from it. A good deal of gold was taken out from No. 1 level, but below this, for some distance the lodes were greatly broken.

In No. 2 level a good block of stone was cut and followed down to No. 3 level, which is 540ft. below the surface. It is between this level and No. 5 where the present workings are being carried on. A winze has been sunk from the No. 3 level on a large block of stone to a depth of 110ft., which shows good gold, but at this depth the stone cut out. Wherever stone is got in this mine it is of good quality, but the country already passed through is greatly disturbed.

There is a great quantity of stone now in sight, which it is expected will take about fifteen months to work out, and this will produce a large quantity of gold, as the average return for the past fifteen months is equal to nearly 1½oz. gold to the ton, as the following statement will show:—

Date.	Tons.	Returns of Gold.	Value.	Expenses.	Dividends.
1894.					
April 12	250	Ozs. dwt. gr. 401 18 0	£ s. d. 1,627 13 10	£ s. d. 579 19 2	£ s. d. 900 0 0
May 8	200	219 17 0	887 12 10	558 4 10	600 0 0
June 7	160	153 13 0	617 17 0	925 14 6	...
July 6	...	...	...	549 13 6	...
Aug. 8	110	79 11 12	309 12 5	443 11 5	...
Sept. 7	...	...	...	175 15 5	...
Oct. 6	90	111 0 0	450 7 8	347 3 11	...
Nov. 23	220	282 11 12	1,139 14 4	350 17 1	...
Dec. 24	270	436 1 12	1,681 12 8	511 9 2	900 0 0
1895.					
Feb. 3	240	369 4 12	1,496 17 11	725 3 5	600 0 0
March 4	220	506 4 0	2,050 2 2	682 4 0	1,200 0 0
April 6	563	873 15 0	3,535 3 4	661 5 2	2,400 0 0
May 4	372	692 0 0	2,802 12 0	899 2 9	2,100 0 0
June 3	288	415 11 12	1,684 16 1	559 3 7	1,200 0 0
July 7	575	509 0 0	2,061 9 0	842 12 6	1,200 0 0
	3,458	5,050 7 12	20,345 11 3	8,812 0 5	11,100 0 0

This shows a net profit on the workings of £11,523 10s. 10d.

The elevation of this mine is about 2,200ft. above sea-level, and at certain times during the winter months work has to be suspended, as the water for winding and crushing gets frozen up. Hitherto, the winding has been done with a reversible water-wheel; but the company have purchased a portable steam-engine which is in course of transit to the mine, and will shortly be erected to take the place of the water-wheel. A good supply of water can be obtained from the Big River at a high elevation if required to work a large crushing-plant, and if other mines are opened out in this district the site of the present crushing-battery would be well suited for the erection of a central plant. The present water-supply has only a head of 45ft., which would be useless for a large battery; besides, the present plant is erected at too low a level to crush and treat the quartz economically. There is a good tailings-site, and about 8,000 tons of tailings are stacked on the ground, which will pay well for the working, as the tests made show that these tailings contain about 10dwt. of gold to the ton.

In concluding my remarks on the Big River district, this is likely to be a place where rich blocks of auriferous stone will be found, but the country being broken and greatly twisted about,

there is far more likelihood of more permanent lodes being found at deeper levels, and where such rich stone is found as in the Big River Mine, there is no doubt other mines will be opened in this district which will give equally as large returns. Indeed, very little is yet known of the auriferous character of the ground in the district, as, with the exception of the Big River, all the prospecting that has been carried on is near the surface, and unless a slip is found in the side of the ranges, or a lode found cropping out above the surface—it is by mere chance that one is found, as the country is covered with a good depth of peaty soil as well as a dense scrubby bush.

#### CRUSHING-PLANTS.

Notwithstanding that quartz-crushing has been carried on in the Reefton district for the last twenty-four years, there has scarcely been any improvement made in plants for the reduction and treatment of auriferous ores. The same old style of mill is seen working to-day as was erected when the field was first opened. A large amount of money has been paid in dividends from the quartz mines in this district, which was only due to the very rich stone being found, for the method of extracting the gold from the ore has been the means of at least half of it being run to waste, portions of which is strewed on the river beaches and portions carried out to sea, and whatever is left lying about on the surface is practically beyond recovery.

Quartz-mining in the future must be carried on more systematically than it has been in the past. More attention will have to be given to the process of extracting the gold from the ore. The principle of every small claim having a small crushing-plant erected in connection with it will have to be abandoned wherever it is practicable to get a cheap means of transit to a large central plant, which will reduce the cost of crushing and insure a far better return of gold; besides, one staff of men can carry on the work, which, in some cases, requires four times the number of men by the present method. In some places, in the Reefton district, a large central plant could be erected to accommodate a number of mines. As for instance, the Wealth of Nations and Keep It Dark Companies have crushing-plants alongside each other, with two staffs of men, when one staff of equal number would do all the work required if a proper plant was erected under one building; but even this saving is only small in comparison to what it would be if a proper system was established so as to connect a number of mines to one large central plant.

A large plant could be erected in the vicinity of Crushington, which should crush and treat the ore in a far more intelligent manner than is now done at a much less cost, and extract a far higher percentage of the gold. For instance, the whole of the quartz from the mines at Crushington, including the No. 2 Keep It Dark, Hercules, Keep It Dark, Wealth of Nations, Energy, also from the Globe and Progress Mines at Devil's and Oriental Creeks, could be treated more economically at one large plant than by four separate plants as now used at the present time.

The great advantage of having a large central plant is that a good metallurgist could be employed as superintendent. The plant would be erected with all the most modern appliances for saving manual labour as well as for the extraction of the gold. The ore would be carefully assayed, and mine-owners would be always in possession of the results of the assay value, so that they could tell whether their ore was being properly treated or not. It is a well-established fact that different classes of ore require different methods of treatment in order to produce the best results, and this requires a man having a good metallurgical training to ascertain the best method to adopt.

At the present time there is no option as regards the class of treatment the ore has to go through in the Reefton district. The stone is hand-fed direct into the stamps, coarse gratings or screens are used, and the pulverised ore has to pass over quicksilver or blanket-tables, and, in most cases, over both; and if the gold has not been extracted, the amalgamator, or the man in charge of the battery, gets the blame for allowing the gold to run away, whereas he may have taken every precaution; and whatever blame there was rested with the mill-proprietors in not providing a proper means of treatment.

Taking the whole of the gold obtained from quartz in the Reefton district since the field was first opened, which represents a value of about £1,823,927, it may be safely asserted that gold to an equal value has been wasted—that is, lost in the process of extraction, or has been carried away in the streams.

There are at the present time sixteen crushing-plants in the Reefton district, comprising in the aggregate 255 heads of stamps, with a staff of men to each—men who may have been employed for years at this class of work, but, beyond the method used in the district for the recovery of gold by amalgamation, they may have little or no knowledge of any other process, or, possibly, may not even be able to make accurate assays of the ore under treatment to know what percentage of the gold in the ore was recovered.

Taking the whole of the quartz crushed in the Reefton district, and the yield of gold therefrom, it gives an average of 14dw. 7gr. of gold per ton for the crushing-batteries. Comparing this with the returns given by the Minister of Mines for the Transvaal for the quarter ending 31st of March last, the average value of the quartz crushed at the Johannesburg mills, which are said to be of the most modern type, only gives an average of 8dw. 15gr. of gold per ton, the gold at both these places being of equal value. The average value of the tailings treated at Johannesburg for the same period was 4dw. 13gr. of gold per ton. The gold from the tailings, which is extracted by the cyanide process, is said to be only refined up to £3 per ounce.

In the North Island millmen are becoming more alive to the great importance of gold saving, and are much further advanced in that respect than those in the Reefton district. Mines in that portion of the colony are now paying large dividends that formerly under the old methods adopted barely paid the cost of working. Careful assays are daily made of the ore under treatment at many of the plants, and the percentage of the bullion in the ore accurately ascertained.

None of the crushing-plants in the Reefton district are erected in such a manner that they can be economically worked. They are constructed at too low a level to permit of the ore passing

through different stages of treatment by gravitation, although the character of the country is specially adapted for the erection of crushing-plants. The slopes of the terraces and hills adjoining the valleys are admirably suitable for the erection of plants. Where the stone taken from the mines can be emptied direct on to a grizzly, and what does not pass through goes down to a rock-breaker, where the ore is reduced to about 1in. in diameter and falls into a hopper, which in turn feeds the ore-feeders; and on the lower side of the stamping-battery there should be sufficient elevation to admit of tables, concentrators, vats, and sumps, so that the ore in its different stages of manipulation may pass down from the time it is emptied on to the grizzly until the gold produce is ready for melting.

The principal assays in connection with the mines in the Reefton district are made by Mr. Aitken, instructor of the School of Mines. Many of these assays show that there is a great loss in gold. The following statement shows the results of some of the assays and tests made:—

Name of Company or Party.			Character of Parcel assayed or tested.	Quantity tested.	Gold per Ton.
				Tons.	Oz.dwt.gr.
1.	Progress Company	...	Tailings, fire assay	...	0 12 19
2.	"	...	" " " "	...	0 9 12
3.	"	...	Concentrates from blankets, fire assay	...	2 16 8
4.	"	...	" " " "	...	2 2 18
5.	"	...	" " " "	...	3 6 15
6.	"	...	" " " "	...	2 16 12
7.	"	...	Berdan blanketings, fire assay	...	5 4 3
8.	"	...	" " " "	...	8 2 1
9.	"	...	Tailings, cyanide extraction	...	0 6 12
10.	"	...	" " " "	...	0 6 1
11.	Globe Company	...	" " " fire assay	...	0 6 6
12.	"	...	" " " "	...	0 4 14
13.	"	...	" " " "	...	0 5 21
14.	"	...	Blanketings, fire assay	...	1 13 5
15.	"	...	Concentrates " "	...	2 10 7
16.	"	...	Berdan blanketing, fire assay	...	6 10 16
17.	Fiery Cross	...	" " " "	...	5 5 19
18.	"	...	" " " "	...	5 1 6
20.	Golden Fleece	...	Concentrates, fire assay	...	5 10 10
21.	Royal Fleece	...	Tailings " "	...	0 11 3
22.	Wealth of Nations	...	Blanketings " "	...	2 10 18
23.	"	...	" " " "	...	2 1 12
24.	Cumberland	...	Tailings " "	...	0 5 10
25.	"	...	" " " "	...	0 12 10
26.	"	...	Blanketings " "	...	2 8 0
27.	Golden Fleece	...	Tailings " "	...	0 7 20
28.	United Alpine	...	" " " "	...	0 7 4
29.	Welcome	...	" " " "	...	0 7 20
<i>Treatment in Berdans with Chemicals.</i>					
31.	Fiery Cross	...	Blanketings	4.75	4 10 4
32.	"	...	"	5.35	5 2 1

There is every facility for working the mines and machinery in this district. There is an abundance of mining-timber on all the different claims. There are large areas containing coal of an excellent character for fuel in close proximity to the mines, while an abundant water-supply can be obtained as a motive-power to work machinery, besides the fact that there is scarcely any water to contend with in working the mines.

The fact that no pumping-machinery has ever been required demonstrates fully this statement. The country is well opened up by dray-roads and horse-tracks, and the Township of Reefton being connected by railway with Greymouth the transit of goods and machinery from a seaport is accomplished at a comparatively low cost. With all these advantages quartz-mining in the Reefton district, if carried on in an intelligent manner, should be a large field for the profitable investment of capital in mining enterprises.

I have, &c.,

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

The Hon. the Minister of Mines.

Inspecting Engineer.

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