Gold MINING IN 19TH CENTURY New Zealand

Use the sources in this book plus the photos and other sources to structure your own notes/answers to the question:

Describe developments in New Zealand's gold industry between 1861 and 1900. Evaluate the social, political and economic impact of gold on the lives of nineteenth-century New Zealanders.

The candidate's response to the first part of essay question could include:

- There were rumours of gold in New Zealand as early as the 1820s, but it is usually accepted that the first gold discovery by a European was near Coromandel in 1852. There were later discoveries in Golden Bay (1856), Otago (1861), Marlborough (1864), and the West Coast of the South Island (1864). Significant rushes occurred only on the Coromandel Peninsula, the West Coast, and Otago.
- The discovery by Gabriel Read in Otago sparked the first major rush in New Zealand. Gabriel's Gully instantly became a canvas town. This was followed by the rush to Dunstan, which was sparked by the discovery of Irishman Christopher Reilly and American Horatio Hartley.
- The discovery of gold substantially and very quickly altered the course of New Zealand's colonial history. The main period of extraction was from 1861–1865 in Otago, but there were also sustained periods of extraction in Nelson / Marlborough, Thames / Coromandel / Hauraki, and the West Coast of the South Island.
- 194 000 settlers came to New Zealand in the 1860s, largely to find gold or to make money as part of the huge support industry of publicans, theatre managers, store keepers, dancing girls, bankers, etc that followed the miners.
- Most migrants in this period were male, unmarried, and young. This led to a huge gender imbalance on the goldfields. The migrants were very multicultural. The Irish influx into Presbyterian Otago was described as "the new inequity".
- The search for gold was a worldwide phenomenon. Many of New Zealand's gold miners had mined in California, Victoria, and New South Wales. When they left New Zealand, many of the miners went on to Queensland, Western Australia, or South Africa.
- The gold rush brought Chinese and non-British Europeans to New Zealand in large numbers for the first time.
- The method of gold mining changed depending on the region in which the gold was being mined. In Otago and the West Coast of the South Island, the gold was extracted through the washing of alluvial gravels, silts and sand with simple cradles and sluice boxes (individuals), then with hydraulic sluicing systems using water races, pipes and hoses (groups), and then with massive dredges that worked whole river beds (companies). On the Hauraki fields, the method of extraction was to crush gold bearing quartz. This was no place for the individual miner. Local and overseas investors formed companies to raise the capital needed. Most of the gold that was found after 1870 was extracted by companies who paid the individual miners to work for them.
- Many Otago miners believed that there must be a mother lode – a hard rock source of gold at the start of the river. At Skipper's Canyon, Bendigo and Macetown, rich veins were found and worked. Otago's schist contained quartz reefs that contained gold and rivers and glaciers had ground away at it over thousands of years so there was often higher concentration on gold beneath the rivers and glaciers. There was no mother lode.

The candidate's response to the second part of essay question could include:

- A few lucky prospectors become rich out of gold, but others perished in winter floods and sharp snowstorms. Others developed scurvy because of their poor diets, which were often just tea and flour.
- Gold was a "boom and bust" industry, an unstable economic activity. Historians debate the importance of the gold rush to New Zealand's history. Some argue that the impact of the gold rushes was relatively limited because they were very concentrated in terms of time and location. Most miners who came to New Zealand left again. Others, like Belich, disagree. They point out that right around the Pacific gold-mining rim there was a drop off and that a large group of gold miners and members of the support industry stayed in New Zealand. Their values and aspirations were very important in the shaping of New Zealand society.
- The discovery of gold opened up previously unsettled areas for settlement. It led to the rapid establishment of transport routes. At the peak of the West Coast gold rush, in 1867, there were about 29 000 people on the West Coast, which was around 12% of New Zealand's Pākehā population. Surveyors quickly followed the miners into new areas for settlement.
- Gold led to major demographic changes in New Zealand in terms of gender, ethnicity, and location.
- Many of the migrants who came for gold brought positive attitudes to hard work and versatile skills. They brought a different culture to many of the settlers with an emphasis on alcohol and gambling.
- Gold contributed significantly to the economic and political dominance of the South Island during the second half of the nineteenth century. It led to further rivalry between the provinces. The Canterbury provincial council offered £1 000 to anyone who found gold within the Canterbury province.
- Gold also provided an incentive for foreign investors to put money into the New Zealand economy including the Vogel Plan.
- Most of the gold went overseas, mainly to mints in Melbourne, but much of the money that was paid for it went back into the New Zealand economy. The capital created by gold led to economic expansion in the 1870s.
- Gold created a sense of optimism about New Zealand's future at a time when the North Island was experiencing considerable racial tension and war.
- In 1865, Chinese mainly from the Guangdong province were invited to rework the Otago goldfields. They were very meticulous. They were the first large group of non-European migrants to come to New Zealand. They were the subjects of overt racism that culminated in a poll tax being introduced in 1881 to discourage migration. They lived in their own settlements, such as the Lawrence Chinese Camp. Most hoped to earn enough money to return to China, but many died in New Zealand. A large group were disinterred to be buried back in China, but the boat carrying their bodies sank off the Hokianga in 1902.
- At times, the 1860s goldfields were lawless. There were murders, fights and claim-jumping. Most of the problems were associated with alcohol. At Christmas 1865, Hokitika's 72 pubs were packed with drunken miners. Illegal liquor suppliers were common.

The significance of Gold Mining in New Zealand.

"All that glisters…" an introduction:

Although rumours and traces of gold surfaced in New Zealand as early as the 1820s, the first European discovery of payable gold is attributed to Charles Ring, a Tasmanian who found it at Driving Creek near Coromandel township in 1852. Discoveries near Collingwood in Golden Bay (1856), Gabriels Gully in Otago (1861), Wakamarina in Marlborough (1864) and at Greenstone Creek on the West Coast (1864) followed. Not all discoveries translated into major finds. The ones that did were on Coromandel Peninsula, in Otago and on the West Coast, where there were significant gold rushes followed by decades of mining.

The early mining of the 1860s in Otago and on the West Coast was mainly undertaken by individuals working alluvial deposits (river gravels). In three separate years in the late 1860s and early 1870s the amount of gold won exceeded 20,000 kilograms. These totals have never been bettered. From the 1870s mining became more mechanised. Companies were floated, and dredges and sluicing ventures won more and more gold. Underground mining, which tunnelled out quartz veins that were crushed to release their gold, boomed on the Coromandel Peninsula and West Coast from the 1870s.

Gold mining had declined by the 1920s, and from the 1950s it was a very small industry. The rise of gold prices in the late 1970s brought about a revival, with new technology allowing opencast pits to be dug in Otago and on the Coromandel Peninsula in the 1980s and 1990s.

How much gold?

No one knows exactly how much gold has been found in New Zealand. Official records show that up to 2003 a total of 998.71 tonnes had been mined – about 0.8% of all the gold mined in the world. Because gold-production records have been collected in different ways over the years there are gaps in figures and inconsistencies. Available figures show that up to 2003 a minimum of 312 tonnes had come from the Coromandel Peninsula, 274 tonnes from the West Coast, and 265 tonnes from Otago.

The two major booms in production were in the 1860s (alluvial gold won by diggers) and in the decade after 1900 (underground hard-rock mining). There was a smaller boom starting in the late 1980s (opencast hard-rock mining).

Where you find it…

gold-bearing quartz rock, coromandel

alluvial gold

Shotover River, near Queenstown

Gold, any miner will tell you, is where you find it – as the Cornish miners said, 'Where it be, there it be'. Many geologists would agree, but they would also add that gold is likely to be found only in certain areas. In New Zealand these areas are Otago, Southland, the West Coast, Golden Bay and Marlborough, Coromandel Peninsula, and a few other localised places.

Gold is a rare element. It is inert, very heavy, shiny and malleable. It is gold's aesthetic properties and rarity that command a high price. Only 10% of global production is used for industrial purposes. Its main use is in making jewellery. It rarely occurs in a pure form, and is usually mixed with silver and other metals. In New Zealand, Otago and West Coast gold is purer (93–98% gold, with 2–7% silver or silver plus mercury), while on the Coromandel Peninsula it occurs as the gold–silver alloy electrum (typically 65% gold and 35% silver in the Martha mine at Waihi) along with separate sulfide minerals.

Hard-rock sources…

Gold occurs in fissures and fracture zones, where it has been deposited in quartz veins. It is almost always in very fine flecks in the quartz veins, usually too small to be visible. Gold can be deposited near the earth's surface (epithermal gold) and at greater depths (mesothermal gold).

Epithermal gold can be found with silver in quartz veins on the Coromandel Peninsula. It has been deposited at depths of up to 1,500 metres by hot spring fluids at temperatures of 180–300°C.

Mesothermal gold occurs in the schist rocks of Otago and Marlborough. Here, gold has been deposited at depths of 3–12 kilometres by hot fluids at temperatures of 200–400°C. Greywacke and argillite rocks in the Aorere valley in Golden Bay, Lyell, Reefton and Mt Greenland on the West Coast, and at Preservation Inlet in Fiordland, also contain mesothermal gold in faulted areas known as shear zones.

Alluvial gold…

Alluvial or placer gold comes from eroded hard-rock sources. Rivers and glaciers flowing over gravels have washed and sorted them, concentrating the heavy gold in certain layers. This often makes placer gold deposits much richer than their hard-rock sources.

Alluvial gold can be mined by digging it up with earth-moving equipment, sluicing, dredging, or by hand with a gold pan and shovel. There are localised deposits in Nelson and Marlborough. Little placer gold has been found on the Coromandel Peninsula. It is most widely distributed in Otago and the West Coast, including West Coast beaches such as Gillespies Beach, and at Orepuki in Southland. Offshore gold deposits exist off the West Coast and Otago, although prospecting has been limited by the difficulty of sampling the sea floor.

Mother lode...

The gold in river gravels convinced many miners in Otago that there must be a mother lode – a hard-rock source upriver. In a few places rich veins were found and worked – at Skippers, Bendigo and Macetown. Over thousands of years, glaciers and rivers had ground away Otago's schist, which contained gold-bearing quartz reefs. So the gravels beneath glaciers and rivers often contained higher gold concentrations than the existing hard rock. There was no mother lode; or rather, the mother lode was the alluvial gold itself.

Otago goldfields...

First gold discovery at Dunstan

was returned to its owner, and the case was dismissed.

NEW DIGGINGS

NEAR

MOUNT WATKINS.

EIGHTY-SEVEN POUNDS WEIGHT OF GOLD.

Yesterday afternoon two men went to the Treasury in Dunedin and deposited a bag of gold weighing eighty-seven pounds. They declined to say where they had obtained this rich parcel, but stated that there was room for plenty more men where they had been working. The names of the two men are Hartley and Simmons.

Although the owners refused to state where they had obtained their gold, we believe there is no doubt that it is from the neighborhood of Mount Watkins, near Waikouaiti. It will be remembered that there have from time to time been reports of a party of men with a pack-horse coming into Waikouaiti occasionally at night, and always leaving before morning. We are informed that these two men belong to that party, that they are old Californian miners, and that they first went to Waikouaiti about ten weeks ago. Many people have suspected that they were doing well, but nobody has yet succeeded in tracing them out. It is understood that they were digging somewhere about Mount Watkins, and now that the extreme richness of the ground is so convincingly proved, it is to be presumed they will no longer be able to evade the search that will be made.

Macetown, 1900

Macetown, 1982

Rivers of gold

Historically in Otago the majority of recovered gold was alluvial – less than 10% came from hard rock. Otago's gold is linked to its schist rocks. Over the past 100,000 years glaciers ground away at the rocks, which were threaded with quartz veins containing gold, and rivers washed and sorted the gravels. These processes concentrated the gold by separating the heavier minerals from the lighter ones. The first miners literally picked up nuggets where they lay.

Gabriels Gully

On 23 May 1861 Gabriel Read gained esteem and provincial government bonuses when he found gold. He also saw his name given to the locality of the find, Gabriels Gully, near Lawrence. Another character, Edward Peters, had found gold earlier than Read in the same area, but he had not proven that the deposits were extensive enough to be economically worked. Eventually he was awarded a smaller bonus.

Thousands of diggers hastened to the scene of New Zealand's first major rush. The gully became a canvas town overnight as diggers moved in to work the rich blue-spur rock where Read had uncovered gold 'shining like the stars in Orion'.

Aurum and Ophir

There are many place names in Central Otago that hint at past gold rushes. For example in the upper Shotover River there is Mt Aurum (Latin for gold) – miners in the 1860s believed the mountain was the source of the gold in 'the richest river in the world'. And a site near Alexandra was named Ophir, after the Old Testament place associated with fine gold.

The Dunstan rush

When American Horatio Hartley and Irishman Christopher Reilly deposited a bag of gold weighing just under 40 kilograms on the Treasury desk in Dunedin in August 1862, the rush to Dunstan (the area around Cromwell) was on. Diggers worked the river beaches of the Clutha, Kawarau and Shotover, and higher up in their tributaries. A lucky few made a packet. Many perished in heavy snowfalls and winter floods. In icy gorges the sun never reached the floor and piles of wash froze cement-hard. A diet of flour and tea meant that many developed scurvy. At the peak of the Otago rush in 1863 the goldfields population was estimated at 24,000. Other discoveries in Otago followed, and men moved from field to field.

Supplies

Central Otago was isolated and rugged. One miner, after struggling into the area, remarked, 'It is said that Victoria only wants fencing in. This island wants hammering out flat'.1 Getting supplies to diggers

was a major undertaking. Wagons took weeks, and coaches took days to go from Dunedin to Alexandra over the Pigroot and Dunstan Road. Central Otago as tussock land lacked timber for fuel, so 'buffalo chips' (dried dung) and 'kaladdies' (flax flower heads) were used for boiling travellers' billies. The wagoners were a tough breed, enduring weather cold enough to freeze their beards.

Companies.

Once the easy alluvial gold had been won, mining became mechanised and sluicing claims began. Working deeper alluvial leads required co-operation, the amalgamation of claims, and capital. Companies were formed, and most of the gold won after the 1870s was taken by companies where miners were paid wages, rather than by individual miners.

Hard-rock mines were established. Small towns sprang up in isolated areas, but most reefs were quickly exhausted and today only ghost towns remain. Hidden mine shafts that killed the odd sheep have now mostly been marked or fenced off, although it pays to watch your step among the tussocks and schist tors in gold-mining country.

By 1900 the romantic figure of the digger with his pan and shovel was history – he had been replaced by dredges and underground mines.

blue lake, st. bathans

West Coast

BLACKSANDING AT RAHUI, NEAR CHARLESTON.

beach mining

Mining batteries

Sluicing

Following the discovery of payable gold in Otago in 1861, the Canterbury provincial government offered a reward of £1,000 to anyone who found gold in Canterbury. This gave prospectors an incentive, and colours soon showed up in gold pans in West Canterbury (today's West Coast). Payable gold was discovered in Greenstone Creek, a tributary of the Taramakau River, in 1864, leading to the frantic rushes of 1865–67 as more discoveries followed. Like Otago, the early gold on the West Coast was alluvial. It attracted men from the Otago goldfields, and ships landed diggers directly from South Australia.

Exploration

There were no roads and the diggers had to cut their way through bush. It took time before they could set up stores, and the first miners ate kereru (wood pigeons), potatoes, fern and konini berries. They explored the country between Greymouth and Hokitika, and mined beach sands at Ōkarito, Addisons and Charleston. The diggers described the alluvial deposits as 'tucker ground' – good enough for yielding food, but it was as if the gold had been spread evenly but sparingly by some unseen hand.

The rush

Richer finds followed, and the success of the rush could be seen at Christmas 1865, when all of Hokitika's 72 hotels were packed with boozing miners. These were the days of the wild West Coast. Sly-grog shops illegally selling alcohol sprang up with each new field. Towns like Goldsborough emerged from the bush and disappeared when the gold was worked out. At the peak of the rush, in 1867, there were probably about 29,000 people on the West Coast – around 12% of New Zealand's European population at the time. One in five of the European men in New Zealand were on the 'roaring' coast, but there were few women.
The 1860s goldfields could be lawless. Fights, claim-jumping and murders occurred, although most trouble just stemmed from drunkards. The goldfields had their own terminology. Planting gold to give a false indication of a field's wealth when selling up was known as salting the claim. And rushes that resulted in no gold were duffer's rushes (on the West Coast there are numerous Duffers Creeks).

Quartz reefs of Reefton

The discovery and development of gold-bearing quartz veins near Reefton around 1870 marked a shift from alluvial to hard-rock mining. Unique names are a remnant of the coast's hard-rock mining days. Crushington lies south-east of Reefton, and was where quartz-crushers worked day and night extracting gold from the Globe mine. Quartzopolis was an old name for Reefton (shortened from Reef town), where mines such as the Wealth of Nations and the Keep-it-Dark paid handsome dividends to lucky shareholders. The reefs were rich, but hard-rock mining also required a much bigger investment. Companies were established and machines did more of the work. Quartz was crushed by pounding stamper batteries – between 1870 and 1951, 84 Reefton mines produced 67 tonnes of gold.

Once gold dredging proved itself in Otago it was also used on the West Coast to work river gravels or old river channels. Sluicing was practised extensively in places such as Kumara. Gold was taken from beach gravels using riffle tables on wheels (known as Long Toms). The gold occurred in thin layers of black sand, and because the particles were so fine, much was washed away. To prevent this, some miners used boxes fitted with copper plates coated with a mercury amalgam which caught the gold.

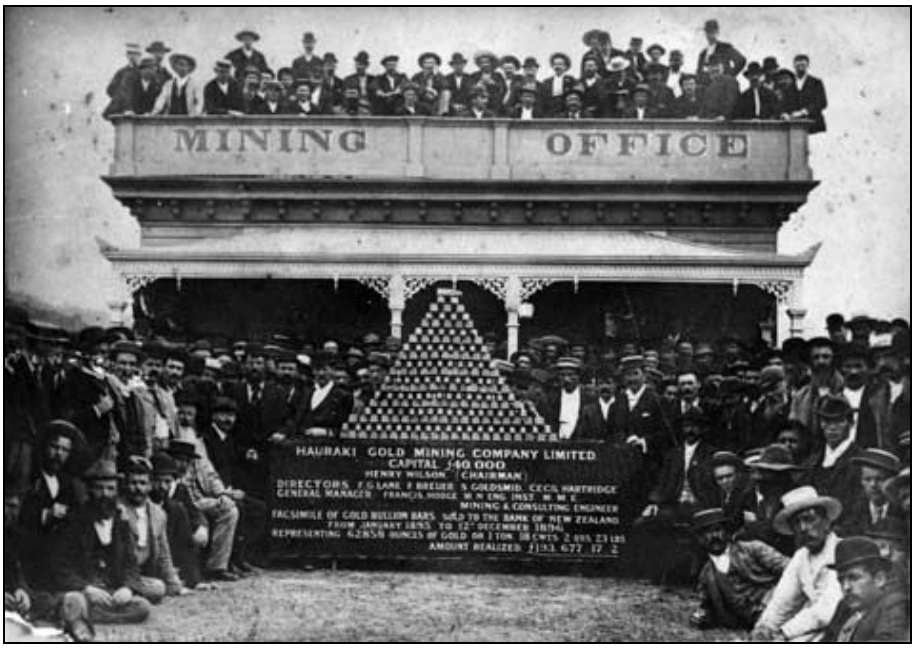
Hazards

Safety was poor and funeral processions were common in mining settlements. Falling boulders and collapsing terraces claimed lives in alluvial workings. Underground miners fell down shafts. Conditions such as silicosis (caused by inhaling quartz dust and also known as phthisis) created breathing problems and proved fatal for some. In 1915 the Miners' Phthisis Act was passed which provided pensions to miners with silicosis and financial compensation for widows and children.

Coromandel Peninsula

Payable gold

The first rumours of gold in New Zealand came from the Coromandel Peninsula in the 1820s. Nothing came of the reports for decades. Then in 1852 some Aucklanders offered a reward of £100 for the discovery of a payable goldfield near Auckland. When the reward was increased to £500, a sawmiller named Charles Ring claimed it after he found golden flakes in his pan at Driving Creek, near Coromandel town. His find led to only a small patch of alluvial gold – by April 1853 less than £1,200 worth had been won. But even a small strike attracts prospectors, and if the original strike fails they search again. Prospectors found little until quartz reefs were uncovered in the hills of Coromandel Peninsula in the early 1860s. But extracting gold from quartz was difficult.



Golden pyramid

Hard rock at Thames

The first big strike was near Thames in August 1867, when a speck of gold was seen in the rock face of a waterfall in Kuranui Stream. Other reefs were uncovered, and within months the Thames foothills swarmed with men. Mining quartz reefs needed capital investment to tunnel, mine the ore, crush it and separate the gold. This type of mining favoured larger companies and gradually they took control of production.

Some reefs were spectacularly wealthy. In 1870 the Caledonian mine in just over a year produced 140,000 ounces (3,969 kilograms) of bullion (silver and gold). At the peak of the rush in 1868, 18,000 people were living in Thames. Other very rich reefs were soon discovered and quickly worked out so that by the 1890s the big gold rushes were over. Miners now knew where the gold was, but they needed to find an economic way to mine it.

Recovering the gold

Machines called stamper batteries, which crushed quartz into powder, were set up in the Coromandel ranges. Most mines were steadily producing ore, but the recovery methods were highly inefficient (only 45% of the gold and barely any silver was recovered).

In 1889 the cyanide process was trialled by the New Zealand Crown Mines Company at Karangahake – the first time in the world cyanide had been used on a large scale for commercial mining. Cyanide was added to crushed quartz ore. Gold and silver dissolve in cyanide, allowing more of these metals to be recovered (about 90% of gold and 50% of silver). They are extracted from the cyanide solution using chemical processes.

The new process was a leap forward as it made lower-grade deposits profitable. Previously, much fine gold had been lost, and in places it paid to rework tailings (waste rock) with cyanide to recover the lost gold. Cyanide recovery stimulated investment. Mining continued successfully until the 1920s, by which time many ore reserves were depleted. The depression saw a brief flurry of new mines but nothing came of them.

A handful of very rich mines dominated production. One was the Martha mine at Waihi, which when it closed in 1952 had produced a total of 992,233 kilograms of bullion. Waihi was the site of a large miners' strike in 1912 – a bitter wrangle that lasted six months and resulted in New Zealand's first death in an industrial dispute.

cyanide vats

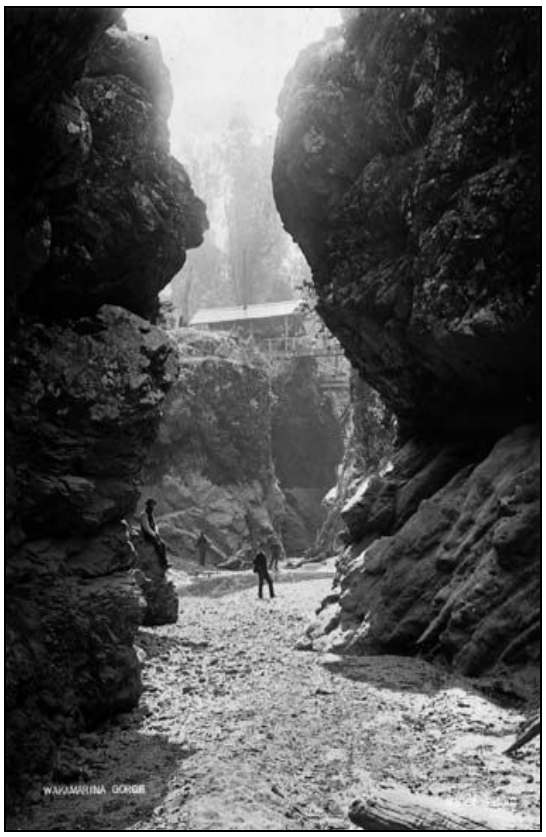
waterwheel and stamper, Serpentine

Other goldfields

As time would tell, the big deposits were in Otago, the West Coast and on Coromandel Peninsula, but gold was also found elsewhere in New Zealand.

Golden Bay and Nelson

Golden Bay is not named for its sunshine, but for its gold. As early as 1853, traces were found in the Aorere valley, and larger deposits were opened up in 1857. Some 2,500 men spread out from Collingwood working alluvial gravels. Good gold was found elsewhere in Nelson in places such as the Matakitaki valley, Mt Arthur, Wangapeka, and in the Buller Gorge at Lyall.



wakamarina gorge 1902

Wakamarina River, Marlborough

In 1864, gold was discovered in the Wakamarina River, a tributary of the Pelorus River. Up to 6,000 Otago miners rushed to the workings, as initially these were very rich. A tent town sprang up, with 3,000 men giving the name Canvastown to the area. But the river gravels were worked out quickly and the rush soon passed. Later, reef gold was also discovered, but it was low grade and the reefs were mainly worked for the tungsten mineral scheelite.

Preservation Islet

Payable alluvial gold was dug from Coal Island in Preservation Inlet, Fiordland, in the 1880s. In the 1890s two small towns, Cromarty and Te Oneroa, were cut out of the bush as quartz reefs were found and hard-rock mines were used to excavate them. But the gold did not last, and by 1904 few miners remained.

Orepuki and Round Hill, Southland

In the 1860s patches of black sand on the beach at Orepuki, near Riverton on the Southland coast, were found to yield very fine gold and platinum. Sluicing soon won gold from coastal terraces. Other finds at nearby Round Hill proved even richer, and extensive sluicing operations continued until the 1950s. A distinct feature of Round Hill was the Chinese settlement.

Gold in Southland was also found in the Waiau catchment at Blackmount and the Mataura catchment around Waimumu, Waikaia and Nokomai.

Terawhiti, Wellington

Traces of gold were known from Cape Terawhiti, near today's Wellington suburb of Karori, as early as 1852. In the 1870s and 1880s a number of quartz reefs were worked, but they yielded very little gold.

Methods of mining

Sluice and cradle, Kapanga Stream

Water race, Otago

When a miner found an area of payable ground he pegged out a square claim. The size of claims varied among goldfields, but were usually 24 feet square (53.5 square metres). Miners often teamed up with mates to share claims and workings.

Shovel, pan and cradle

Gold mining was rough, physical work. Where alluvial gold was very rich, it could be obtained with a shovel and pan. However, pans were used mainly for prospecting. Simple machines known as cradles (often made from wooden liquor boxes) were rocked back and forth – the heavier gold collecting on matting on the cradle base.

Sluice boxes

Riffle or sluice boxes were the main methods of recovering gold. Nicknamed Long Toms, these were long, terraced wooden boxes, over which gold-bearing gravel was washed. Each step of the box had a lip that trapped the heavier gold and allowed the lighter materials to wash away. Eventually the heavy gravel and gold caught in the terraces was washed up in a pan.

These methods all relied on water, without which recovering gold was impossible. At each of New Zealand's goldfield's there were small dams and water races – channels that cut across contours, bringing water from creeks to areas where gold was worked.

Sluicing

Sluicing was a method where water was piped into successively narrower pipes leading to hoses (with nozzles called monitors), which sprayed jets of water strong enough to kill a person. The jets were aimed at gravel faces and helped to wash gold-bearing gravels down through sluice boxes. In places like Bannockburn and St Bathans in Central Otago distinctive gravel pillars are a legacy of these giant water guns.

Hydraulic engineering

Hydraulic elevators were used to reach leads of alluvial gold that were covered by gravel. Most elevators worked like giant vacuum cleaners, sucking a slurry of gravel and water up from beneath large gravel terraces.

hydraulic elevator at st. bathans

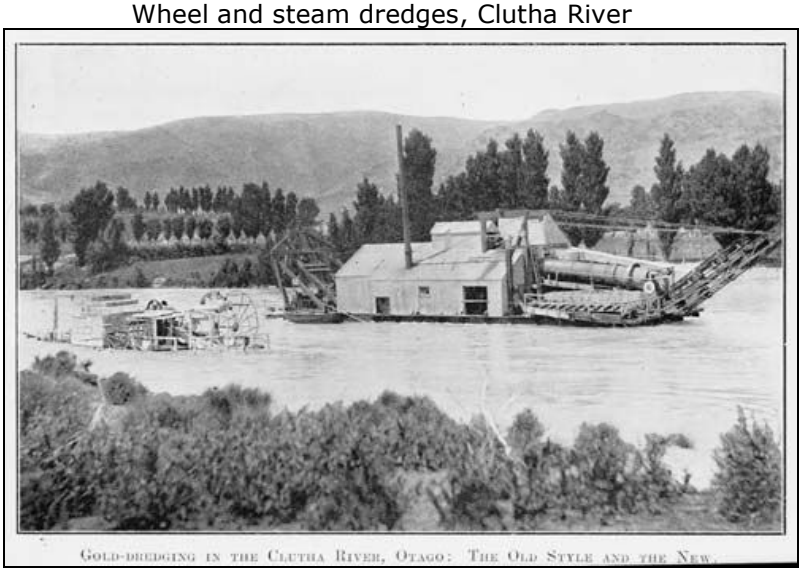
Engineering was also used to expose river beds. The Oxenbridge tunnel on the Shotover River and the dam gates across the source of the Kawarau River draining Lake Wakatipu at Frankton are the two most famous examples. Both were spectacular failures – little gold was found in the exposed bed of the Shotover once water was diverted through the tunnel. And when the Kawarau dam gates were closed they had little effect on water levels downstream.

Hard-rock mining

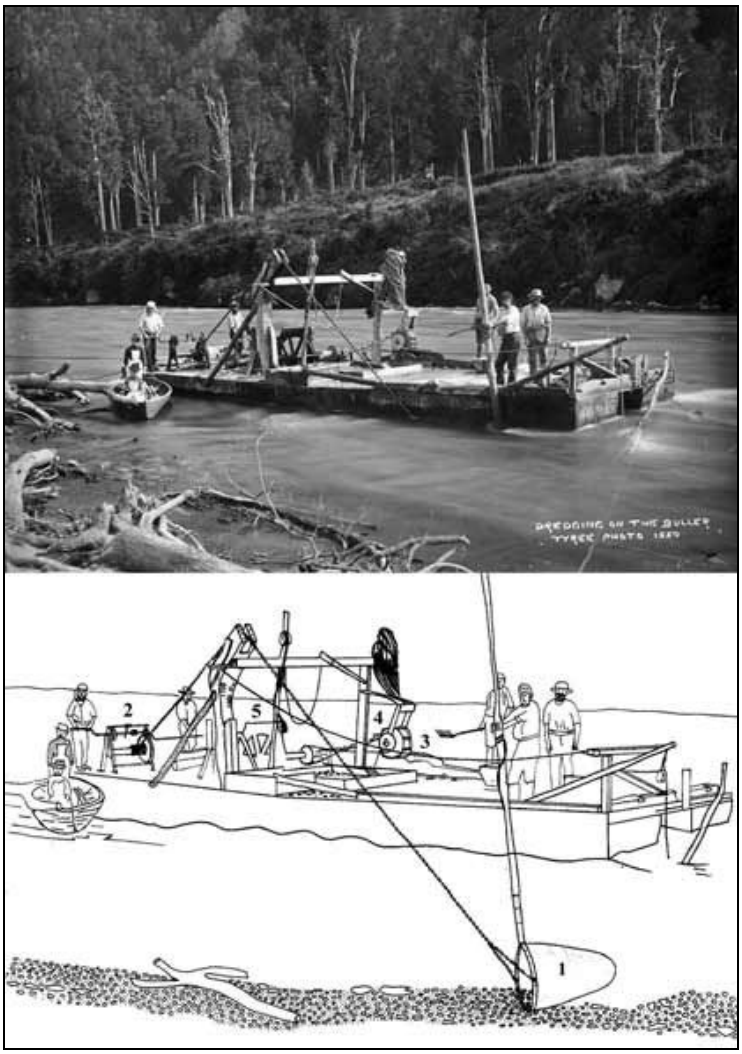
Hard-rock mines followed quartz veins, which contained gold. Underground mining was very expensive as tunnels had to be blasted and the roofs supported. Mines such as those at Waihi on Coromandel Peninsula and Waiuta on the West Coast followed reefs until they became too deep or low grade to be mined economically. The recovered quartz was crushed by stamper batteries, and cyanide was used to reclaim the gold.

Dredging

Wheel and steam dredges, Clutha River



Spoon dredge, Buller River, 1895



It was not necessary to expose the river bed to mine it. There had been plans to use a submarine, the Platypus, to recover gold from the bed of the Clutha River, but the idea was not practical. More useful were floating barges known as dredges, which scooped gravel off river bottoms, separated the gold on board, and dumped the waste rock. In 1863, spoon dredges began working the Clutha. These were crude and only involved dragging a spoon dredge (a leather bag tied around an iron loop attached to a pole) across the river bed. Some gold was won, but spoon dredges could not dig deep or process much gravel.

Bucket dredges

In 1868 the bucket dredge was developed. A series of buckets on a long chain continuously dug up gravel. Originally these were powered by wheels turned by the river's current. In 1881 the first steam-powered dredges were used on the Clutha River, and electric-powered dredges arrived in 1890. These could also be used in ponds away from the main river channel, allowing old river channels to be worked.

In 1888, the Chinese businessman Charles Sew Hoy of Dunedin ordered a steam-powered bucket dredge to be built in a Dunedin foundry. It had a string of buckets on a ladder that could be lowered to the river bed and onto river flats on the shore. It was immediately successful on the lower Shotover River. This is considered to be the prototype for the New Zealand style of dredge. Gradually this design and variations of it proved to be adept at removing gold from river beds or artificial ponds on river flats. By the 1890s Dunedin was at the forefront of gold-dredge design and it was not long before New Zealand-style dredges were being successfully used overseas.

Boom years

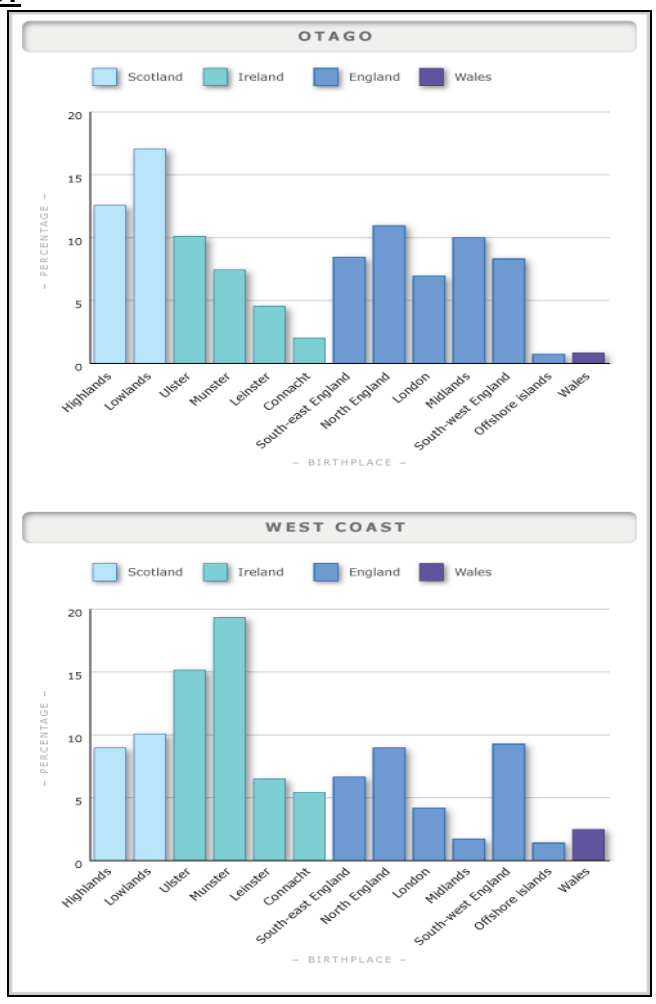
Over the next 20 years hundreds of dredges recovered tens of thousands of ounces of gold from the beds of Otago's rivers and old river channels. A dredging boom that reached its zenith about 1900 was characterised by the use of many small dredges. In 1900 there were 228 dredges working in Otago and Southland. By contrast, a second boom in the 1930s and 1940s saw a few large, powerful dredges.

Dredging created unique local landscapes such as the Earnscleugh tailings near Alexandra. Essentially they are piles of stones – in Otago's dry climate, vegetation has not covered them.

West Coast dredging

Dredges worked the West Coast in lesser numbers – an estimated 150 dredges mined there. The Kaniere dredge recovered 378,000 ounces between 1938 and 1978. A dredge works now.

Miner's origins:



British Isles

The miners were a mixed bunch, but they were dominated by a few groups. Myth may attribute the origins of many of those who mined in New Zealand to the Californian forty-niners, so named because of the 1849 rush to the Californian goldfields. But in truth few had ever set foot in California. The

influx was from the Victorian goldfields, which had attracted British miners in the 1850s. They brought Victorian names with them – in Central Otago there is a Bendigo ghost town and a Ballarat Creek. Scottish, Irish and English miners made up roughly equal proportions on the Otago goldfields.

On Otago's Arrow diggings in the 1860s there was no jail, so prisoners were often chained. One wild, drunken Irishman awoke to find himself attached to a log:

'When he recovered he was attacked by a violent thirst, and seeing that he could not release himself from the log he hoisted it to his shoulder and walked with it to the nearest pub where the police found him drinking heartily with the log still athwart his shoulder.'

Many miners who had not struck it lucky in Australia paid their fare and sailed across the Tasman Sea to New Zealand's West Coast. A third to one-half of West Coast miners were Irish. English miners made up a third and most came from counties with a mining history such as Cornwall. Scattered among the British and Irish were Germans, Scandinavians, French, Italians, Chinese and other nationalities.

A sample of 1,587 miners treated at West Coast hospitals in the 1860s and 1870s revealed that some 80% were from the British Isles, 11% from continental Europe, and most of the rest from Australia or North America.

Women

Goldfields were populated mainly by young single men looking to make their fortune, but there were also married men who had left wives and children at home. It was only on lucrative goldfields and hard-rock mines, which lasted beyond a few years, that women and children were more commonly seen. Early in the Otago rushes barmaids did not last long before they were married off. Publicans struggled to retain staff – they even advertised for the ugliest barmaids they could find, but those too received marriage proposals. But most men earned only enough to live on, if they were lucky.

Gold mining was a major source of employment in early New Zealand. After mining, many moved into farming or other professions. Those who were struck by gold fever stayed, living out their lives in shacks until they were too old or infirm to work a shovel and gold pan. These old prospectors were known as hatters. Their passing marked the end of a pioneering era, when men could be footloose drifters who entrusted their fate to gold in the gravel.

Maori and Chinese miners

Maori knew the South Island mountain passes and rivers from their trips to collect pounamu (greenstone). Early prospectors had Maori guides. When Maori realised the worth that Europeans placed on gold, some joined the rushes. In 1858 there were 600 Maori men working the Collingwood fields alongside 1,300 Europeans. It was Maori prospectors who revealed the promise of the West Coast when they showed a Collingwood shopkeeper their gold. He recognised the coarse gold as different, and after questioning they led him to the Arahura River.

Maori were less common on the Otago fields. Even so, Maori Point on the Shotover River takes its name from Daniel Erihana and Hakaraia Haeroa's 1863 find. When their dog was swept away and Daniel swam after it, he chanced upon gold on a shingle bar and, so the story goes, gold dust in the dog's coat. Before nightfall the two men had recovered 300 ounces (8.5 kilograms) of coarse gold from the rock crevices.

Maori traditionally placed no worth on gold – pounamu (greenstone) was their valuable mineral. In the early 1800s an Otago whaler named Palmer was told by a Maori chief that the yellow metal of the watch-seals of white men could also be found on the beaches of the Clutha River. And about 1852, upon seeing a sample of Tasmanian gold, another Maori said he had once picked up a potato-sized nugget from the banks of the Clutha, and had thrown it into the river.

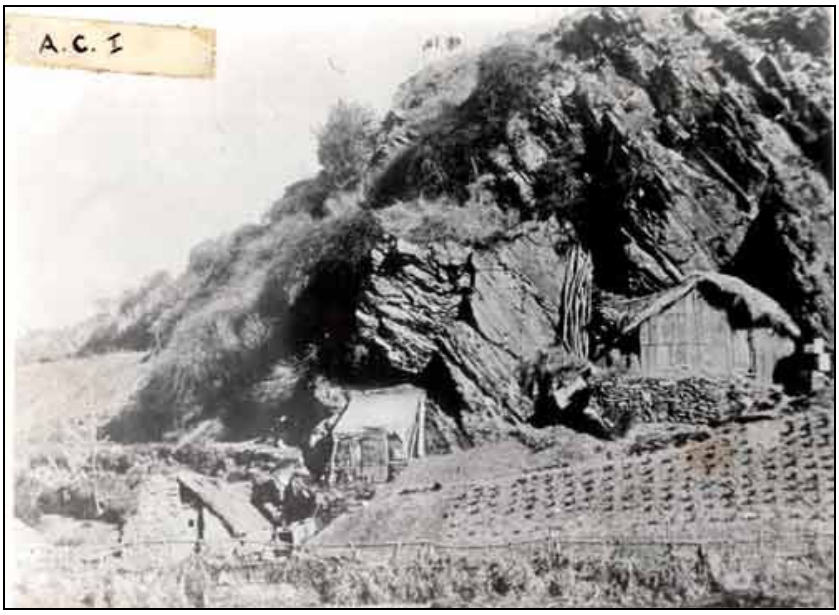
On Coromandel Peninsula, Maori resisted attempts to open up their lands to gold mining in the 1860s, but little could stand between Europeans and gold. In 1935 Hori Watene of the Ngati Tamatera tribe, testifying at a commission of inquiry into the Ōhinemuri goldfield, described gold as a curse because it had heightened European interest in their lands.

Chinese miners

The Otago provincial government encouraged miners, mainly from the Guangdong province in southern China, to come to New Zealand to replace the Europeans who had deserted the Otago fields by 1866 for new rushes on the West Coast. The Chinese intended to earn wealth for their families and eventually return to China.

Their mining methods were unique – they meticulously worked over an area and left very little gold behind, whereas most European miners were more haphazard. The Chinese preferred previously

mined areas as there was known gold there, and they knew that much gold was lost in the washing up.



Chinese

Arrowtown

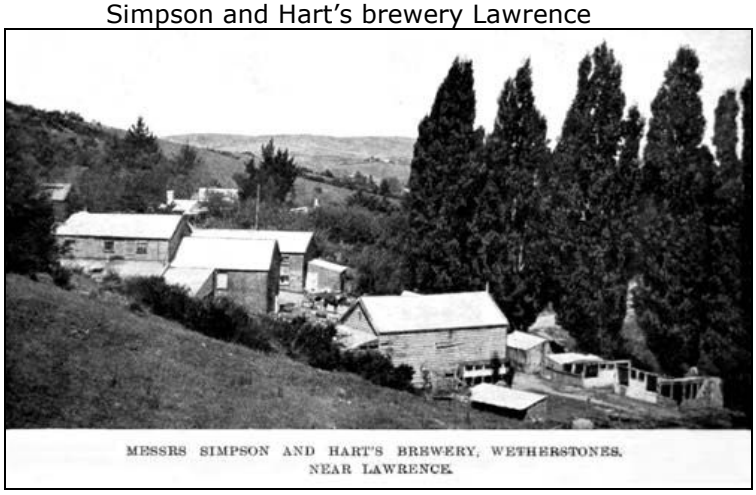
After finding gold in Otago and Southland, many Chinese miners were attracted to the West Coast. At Īnangahua's alluvial gold workings they made up an estimated 40% (715) of the population in 1882, but numbers dwindled in the depression of the 1880s. Their celebration of Chinese New Year with fireworks added interest to the goldfields. Superstition kept some Chinese men out of tunnels. At locales such as Greenstone Creek on the West Coast, when constructing water races they cut deep clefts in the cliffs to avoid tunnelling.

Their appearance, dress, language and use of opium set the Chinese miners apart as different. They lived in their own settlements, and some owned shops supplying their countrymen. The population reached about 5,000 in the 1881. Prejudice saw a poll tax introduced in 1881 to discourage immigration. Most hoped to earn enough gold to return home, but many died in New Zealand. Some were disinterred to be buried at home, but the remains of 499 Chinese miners (including Charles Sew Hoy) instead had a sea-burial when their ship the Vennor sank off the Hokianga in 1902.

'Mr Punch's welcome', Otago 1865

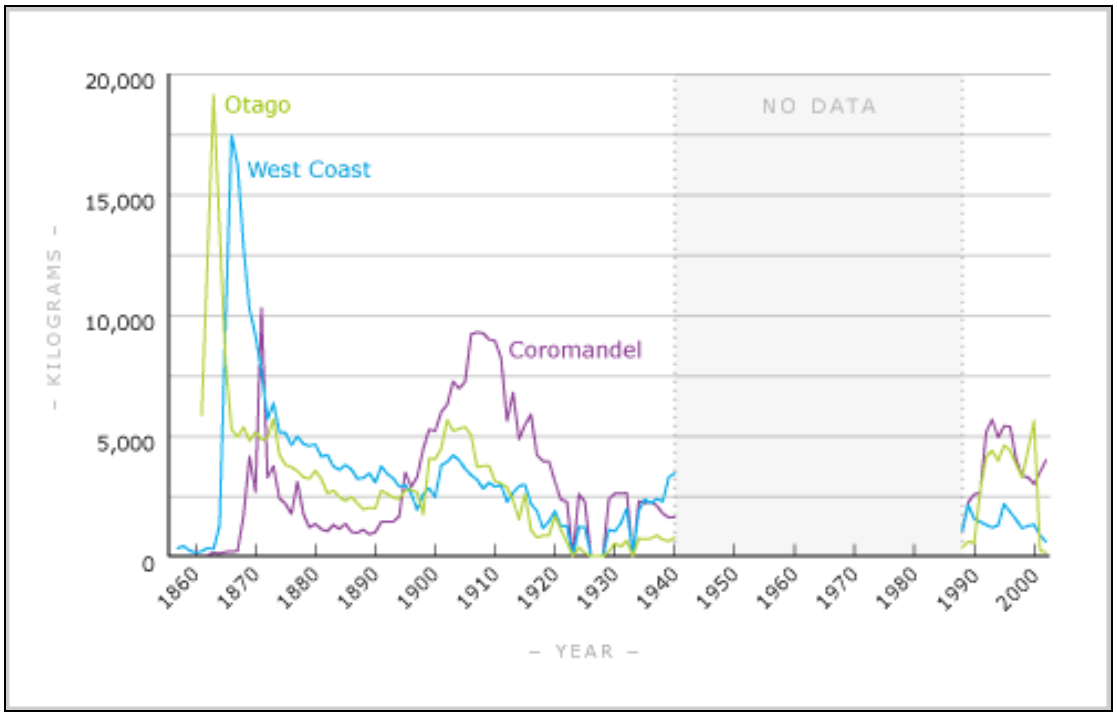
Gold and the economy

Simpson and Hart's brewery Lawrence



MESSRS SIMPSON AND HART'S BREWERY, WETHERSTONES, NEAR LAWRENCE.

Collingwood, Nelson, 1870s



New Zealand gold production by region

Without gold New Zealand's early economy would not have developed as quickly as it did. Gold attracted people, investment and shipping. Miners had to be fed and clothed and their thirst satiated. Breweries sprang up, roads and bridges were built, and infrastructure developed.

Once mining became mechanised and capital-intensive, foundries supplied metal piping for sluicing and gold dredges were built. Many engineering firms, including Thames' A & G Price, had its start in manufacturing mining equipment. The Paeroa–Waihi railway was pushed through to get at the gold in places such as the Karangahake Gorge. The New Zealand stock exchange was seeded by money earned on the goldfields. And Dunedin's dominance among New Zealand cities in the late 1800s was due largely to the yellow metal. The first supply of commercial power and electric light in the southern hemisphere occurred in 1888 at Reefton, a mining town.

Many companies never found gold, went bankrupt, and overseas investors lost out.

The heaviest nugget officially recorded is the 2.81-kilogram 'Honourable Roddy', found at Ross in 1909 and named after the Minister of Mines, Roderick McKenzie. It was gifted to King George V at his coronation in 1911. In the late 1950s enquiries to Buckingham Place as to what had become of it received an embarrassing answer – it had been melted down to make a royal tea service.

How much gold and silver?

Up to 2003, about 538,640 kilograms of alluvial and 368,544 kilograms of hard-rock gold had been produced in New Zealand - (907 tonnes). The total value (in 2003 terms) was US$116.32 billion. A few large operations were responsible for most of the hard-rock gold. The Waiuta mine near Reefton produced 62,369 kilograms of gold between 1870 and 1951. The Martha mine near Waihi produced 311,845 kilograms of silver and 141,747 kilograms of gold between 1880 and 1951. New Zealand's total gold output in 2003 was worth over $200 million and is expected to increase.

Key Industry : Gold

Part One: Features of the development of the Gold Industry

- The Gold industry began in NZ when Gabriel Read found gold in May 1861
- Soon men swarmed to the region attracted by the lure of instant fortunes.
- By 1862 around 8000 people had arrived from Victoria (there had only been about 300 Europeans in Central Otago before.) -Dunedin was transformed from 2000 to 12 000 by the end of 1863
- News of rich discoveries on the West Coast of the South Island saw thousands leave Otago, and the population of the Coast reached 40 000 in 1866. Towns sprang into existence virtually overnight. At first men improvised buildings, usually using a lot of canvas, but wood and stone were quickly available. Hokitika, Greymouth and Westport were soon flourishing ports and commercial centres. Pubs, stores, banks and markets proliferated. Coach services were begun, roads were constructed, and punts and bridges - primitive and dangerous -were built to cross the rivers and streams. But the rush was over quickly and By October 1867, only 18 000 people were left, mainly concentrated in Buller, Nelson, and the Grey. As the decade ended gold was discovered in the Thames area, south from Auckland across the Hauraki Gulf and the Firth of Thames.
- With the declaration of a goldfield prospectors swarmed into the area looking for the alluvial gold which had attracted thousands to Otago and the West Coast. Alluvial gold could be won with a shovel and a cradle, but none was found near Thames.
- Gold was there, however, embedded in quartz. Although the rush to Thames was the smallest, by the end of 1868 some 6000 licences had been issued and Thames boasted a population of 12000.

Part Two: Consequences of Gold

Gold had a dramatic impact especially in the South Island. In the 1860s the two islands developed in quite different ways and underwent quite different experiences. The population of the South Island grew sixfold in a decade.It trebled New Zealand's European population and made the South Island the most populous and wealthy.

1. SOCIAL CONSEQUENCES

- On the goldfields the age and sex structures became extremely unbalanced, contributing to the energy and confidence of the society and the male dominance of the culture.
- The South Island was opened up to closer settlement.
- Eldred-Grigg concluded in 'The Southern Gentry' that gold and pastoralism fostered such a powerful sense of provincial loyalty in Otago, Canterbury, and the West Coast, that the development of New Zealand nationalism was crippled before it began to emerge.
- The demographic consequence of the gold rushes confirmed the worst fears of those who wanted to achieve Wakefield's dream.
- Most of those who arrived were male, unmarried, and young.
- Only 25 women on the West Coast for every 100 men and that 80 per cent of the men were between 21 and 39 years old.
- In Otago the sex ratio was 1 woman to 10 men in 1861, 18 in 1864, and 47 in 1871.
- The majority were British-bon (96 per cent in Otago and 82 per cent on the Coast), but Irish-Catholics were much more numerous than before.

- 23% of migrants to Otago were Irish-Catholic versus 26% to the West Coast.
- 14 % of the miners on the Coast were from continental Europe and almost four per cent were American.
- Miners saw themselves as cosmopolitan and often elected 'foreigners' to public office.
- Even Maori miners worked on the diggings, and there were American Blacks, Indians, and others.
- The arrival of Chinese miners from Australia in 1864 (by 1871 there were 2577) angered any European miners but the Chinese proved tenacious and industrious.
- During the height of the rushes the restless young miners quickly established their own democratic social patterns. They drank, gambled, and lusted after the few women with great energy and (for the most part) good spirits.
- In the Wakefield settlements of the South Island the new egalitarianism jarred, but protests only roused the miners.
- The miners refused to acknowledge rank or status (although they had their own systems), and took part in the great and democratic lottery which rendered all men equal.
- Their attitudes decisively shaped the culture of the new society and gave new vigour to the attack on the runholders. They stole their sheep, killed pigs and rabbits on their runs, and demanded hospitality.
- The miners were, for the most part, recruited from the 'artisans' and mechanics. They brought the traditions of radicalism and non-conformity with them, undermining some of Wakefield's hopes and strengthening others. They accepted the runholders, but were not happy with any form of monopoly.
- They distrusted intellectual expertise. They also believed that the land was public, and that where gold was found all rights to use the land for other purposes should be extinguished. They also believed in equal opportunity in access. The miners obtained almost everything they wanted without having to fight for it, and so their values were woven, quite unobtrusively, into the fabric of New Zealand life.

2. POLITICAL CONSEQUENCES

- Men dreamed of railways and dizzy growth. One leading politician in Otago , James Macandrew , looked forward to Otago having a population of some six million!
- Relatively law-abiding character of the goldfields in New Zealand
- Authorities in the 'gold provinces' borrowed from the Australian experience in order to avoid it.
- And that experience, it should be pointed out, had seen much of the land seized and held by the wealthy, the outbreak of rebellion on the Victorian diggings, and explosions of anti-Chinese violence.
- In 1856, before the first major rush, the New Zealand Government passed the Goldfields' Act which provided for the declaration of goldfields and subordinated everything, including private land rights, to gold mining.
- In Otago, instead of taxing the miners, an export duty was imposed on gold ; a system of wardens' courts was set up and provision made for democratically-elected mining boards; and the miners' right, which entitled the miner to a claim and all gold found on it, also entitled him to vote.

- Otago also recruited most of the administrators , including the goldfields' police, from Victoria. The chief administrator, Vincent Pyke, was the outstanding political leader of the miners in Victoria, the first to speak clearly for the 'have nots'. And in Otago he helped ensure that the miners got justice. Between 1866-77, for instance, the Otago Government seized almost 670 000 acres from runholders and opened it to miners.

Chinese goldminers

- As the alluvial gold was taken, yields and population fell. In Otago the merchants and businessmen encouraged Chinese miners to come. By 1871, the Chinese population of Otago exceeded 2500. Most had come from near Canton, via the Australian diggings, and hoped to go home to China.
- They had learnt bitter lessons in California and Australia and kept apart from the European settlements, building snug dwellings from the abundant rock. Chinese shopkeepers came with them.
- Most of them were neither Christian nor English-speaking, and maintained their traditional clan systems. Men such as Ah Tong, an English-speaking Catholic, acted as mediators between them and the hostile majority. Others, such as Charles Sew Hoy, established profitable businesses to supply their wants.

- Miners were angry, however, at the presence of these industrious and frugal 'heathens'. In 1871 Parliament set up an inquiry into allegations that the Chinese were dirty, diseased, corrupt, and immoral. The committee found the allegations to be untrue, but the European miners remained unhappy.
- The Chinese were harassed and subjected to various practical jokes -some quite vicious -but there were no outbreaks of violence such as occurred in California and Australia. Many different types of Anti-Chinese legislation was passed form the 1870s onwards to attempt to deal with the perceived 'problems' of Chinese migrants.

ECONOMIC CONSEQUENCES

- Dunedin benefited greatly. Business boomed, Australian banks established branches, and retail and engineering firms flourished.

- Enterprising newcomers began manufacturing a wide range of consumer goods, including beer; entertainers flourished, and the runholders finally had a market for meat.

- In Dunedin, gold helped to pay for handsome new public buildings, new churches, a high school for boys, in 1869 a university, and in 1871 a new girl's high school. Christchurch followed suit.

- The dreams of the original architects of settlement: Cargill and Godley were suddenly possible.

- The economic consequences of gold were enormous in the 1860s, although as yields fell gold became less significant to the economy than it was in Australia= Boom and then Bust nature of industry.

- Moreover, Europeans now occupied most of the South Island.

- Towns, roads, bridges, farms and businesses sprang into existence.

- Cobb and Company instituted coach services, coastal shipping flourished, and agriculture boomed.

- By 1870 farmers in Otago and Canterbury produced 90 per cent of the wheat, 85 per cent of the oats, 80 per cent of the barley, 46 per cent of the hay, and 40 per cent of the potatoes.

Gold exports were:

- Otago from 1861 to 1870 exported gold to the value of £10,588,000
- West Coast from 1864 to 1870 £9,293,000'