NEW ZEALAND.

By Frank B. Passmore, C. E.

New Zealand comprises three islands, called respectively the North and South islands and Stewart's island, and is situated in the South Pacific ocean, between the parallels of 34° and 48° south latitude, and the meridians of 166° to 179° east longitude.

It is distant about 12,000 miles from England (nearly at the antipodes) and some 1,200 miles to the south-east of Australia.

New Zealand was, as far as can be ascertained, first taken possession of by the Maoris about the beginning of the fifteenth century. The country was, however, unknown to Europeans until discovered by Tasman in 1642, after he had discovered Van Dieman's Land or Tasmania. On reaching the coast Tasman had an encounter with the natives at a place which he named "Murderer's Bay," but which is now known as "Massacre Bay," and is situated to the north-west of the South island.

It would appear that after this Tasman did not land, but continued his voyage, keeping along the coast. During this cruise he named some of the capes and bays.

In 1769 Captain Cook visited New Zealand and landed at Poverty bay. The reception he received does not appear to have been very friendly, but probably that was owing as much to fear on the part of the natives as any other cause.

The area of New Zealand is about 100,000 square miles, the North island being about 45,000 and the South island 55,000 square miles. The length of the North island is about 500 and its greatest breadth 250. The length of the South island 500 and its breadth 200 miles at the widest point.

The North and South islands are separated by Cook's strait (thirteen miles across at the narrowest point), while Foveaux strait separates the South island from Stewart's island.

The colony is divided into various provinces. The North island comprises the provinces of Auckland, Hawke's bay, Taranaki and Wellington; Auckland forms the north and Wellington the south of the

island, while Hawke's bay and Taranaki occupy a small portion of the east and west coast respectively.

The South island comprises the provinces of Nelson, Marlborough, Canterbury, Otago and Westland; Nelson lies to the north-west, Marlborough to the north-east, Otago occupies the south, and Canterbury the middle, except a narrow strip to the west, which forms the county of Westland.

Each of the above provinces has a separate government and distinct land, fencing and other laws. During the last session of parliament an act was introduced for the purpose of abolishing the system of provincial government, and this act will become law after the expiration of the next parliament.

The principal harbors are: In the North island, Bay of Islands, Auckland and the Thames in the Hanraki gulf, Tanranga in the Bay of Plenty and Napier in Hawke's bay, on the east coast; Kaipara, Maunkan and Port Nicholson (Wellington) on the west. In the South island, Nelson in Blind bay, Pictou in Queene Charlotte sound, Lyttelton harbor or Port Cooper (Port Chalmers, and the Bluff) in Otago, are the chief shipping places.

In Wellington there is a patent slip capable of receiving the largest sailing vessel that visits the port, and at Port Chalmers (the port for Dunedin) there is a fine stone paving dock, measuring 328 feet long, fifty feet wide, and with twenty-two feet of water on the sill. This is the only stone dock in the colony, but timbers have been felled for the erection of one in Auckland.

New Zealand is of volcanic origin, and the greater portion is very mountainous. The general direction of these mountains is from north to south. The highest peaks in the North island are Tongariro-Ruapelm (9,195 feet) and Mount Egmont (8,270 feet).

The South island is traversed by the southern Alps as a backbone. The highest peaks are Mount Cook, in Canterbury (13,200 feet), and Mount Franklin, in Nelson (10,000 feet).

Most of the peaks, especially in the North island, have been active volcanoes. Near Auckland there is a very fine crater, from the top of which more than twenty extinct volcanoes are visible.

The soil in the neighborhood of these craters is extremely rich.

Tongariro is even now occasionally in eruption. White island, in the Bay of Plenty, is at times active. Large deposits of sulphur, of varied colors, cover its sides, presenting a most beautiful appearance. There is a lake here, the waters of which are so strongly impregnated

with sulphuric acid as almost immediately to destroy any metal with which it comes in contact.

The chief rivers are: The Wairoa, in the north of Auckland, which flows south into the Kaipara harbor, and large vessels can go many miles up the stream; the Waikato, which rises near Lake Taupo and runs through it, then in a northerly direction and joins the sea south of Maunk harbor; the Thames, which rises in the Waikato district and flows north into the Hauraki gulf; the Wauganui and Manawatu, which discharge themselves into Cook's strait; the Hult, which flows into Port Nicholson; the Avon, on which Christ Church is situated, and which, although small, is the most English-like of any in the colony, and is not subject to freshets as are most of the others; the Waimakariri, the Waitaki, the Molyneux (which flows in a southerly direction into the sea at Molyneux bay) and the Mataura, which flows south into Toitoes bay in Foveaux strait.

Scarcely any fish is found in the New Zealand rivers; but the acclimatization societies have introduced large quantities of salmon and trout ova. The latter seem to have succeeded well, but I have not heard of any well authenticated case of salmon having been caught.

The largest lakes are Lake Taupo, in the North island, which is about twenty miles in distance, and in the South island, lakes Wanaku and Wakatipu in Otago. There are smaller lakes, such as Lake Coleridge and Tekapo, in Canterbury.

In the Auckland province there are many wonderful geysers, hot lakes, sulphur springs, and pools of boiling mud. The waters are highly medicinal, and numbers of visitors frequent them in search of relief from long-standing rheumatic affections, and there are well authenticated instances of most marvelous cures.

The scenery in the neighborhood of Lake Roto Mahana is magnificent. On one side of the lake there is a geyser which has formed a series of white terraces, on which there are pools, of water of turquoise blue; on the other side there are similar terraces of a pale pink color. As a rule the geysers are working, and the water flows over these terraces like fairy waterfalls. At times they are inactive. Birds, in their flight across this cauldron, are sometimes affected by the vapor and fall into it, when their bodies rapidly become incrusted, presenting an appearance of petrifaction.

New Zealand is very rich in mineral resources. The value of gold exported during 1874, amounted to £1,505,331. The chief gold fields are at the Thames, and in Otago and Westland.

Coal is worked in the north and south; but many good mines are not opened up for want of means of transit. Railways are, however, being pushed on, and there is no doubt that, in time, New Zealand will not only be in a position to supply her own wants but will be able to export coal largely.

There are large deposits of rich iron ore, but these have not been worked, owing, in a great measure, to the scarcity and high price of labor.

Along several portions of the coast, but particularly at Taranaki, the shore is covered with an iron sand, and an attempt to convert this is being made. It was tried previously and failed; but now furnaces and machinery have been erected at a large cost, and work will commence soon.

When in England, in 1874, I obtained an analysis of this Taranaki iron sand, which shows it to contain nearly sixty-eight per cent of iron. Very excellent results are obtained in England from titanic iron ore, which is, I think, exactly similar to the above, except that it is in lumps. I believe a very similar article is found in Canada. The analysis of the sand (of which I send a small sample) is —

		Per centage of metallic iron.	
Protoxide of iron	27.53	= 21.41	67.69 per cent.
Peroxide of iron	66.12	= 46.28	
Titanic acid	6.17		
	99.82		

The favorable climate and soil of New Zealand enable every fruit and flower that is produced at home to be grown here; but owing to the want of frost in the greater portion of the colony during winter, many of the fruits have not such a fine flavor as in England.

Fern trees and ferns grow in great profusion and variety. Wild flax (Phormium tenax) abounds. A few years ago it was manufactured and exported to a considerable extent; but a fall in the price very materially checked this industry. A factory has, however, been started for the purpose of making matting and paper from the plant. The matting is similar to the ordinary cocoanut matting, but is rougher in appearance. I am at present trying an experiment to determine the relative wearing qualities of the two materials. I have not heard of any paper of a superior quality having been made. A very good rope is manufactured from this flax, and I attach a report

of a series of experiments made by Captain Simpson, R. N., on board H. M. S. "Blanche." (Appendix A.)

New Zealand possesses a number of good timber trees. The largest of these is the kauri, which reaches the height of more than 150 feet, and is often eight to ten feet in diameter. It is a most valuable timber for ship building, and, in fact, for nearly every purpose. It only grows in the north of the North island.

It would be impossible in a short space like this to enlarge on the merits of the various woods; but I send a book containing reports on "the durability of New Zealand timbers," which gives the best information obtainable on this subject.

The native dog and cat are the only indigenous animals in New Zealand; in fact, the latter may almost be omitted, for I have never heard of one being caught of late years. The wild dogs are still very numerous, and make great havoc with the lambs on sheep runs. The large quantity of bush (in most parts of the North island particularly), affords ample shelter and security for these dogs.

There are no snakes in New Zealand, neither are there any insects with poisonous bite, except a small spider called the "katipo." There appear to be two kinds — one a glossy black, and the other black with a narrow red stripe or spot. They are found in sandy places and near rotten wood. In size they are about a quarter of an inch in diameter, and sometimes more. Their bite has the effect of causing immense swelling and great lassitude, and it is thought that death would follow in some cases unless attended to.

In former years the moa, a gigantic bird of the ostrich tribe (ten or eleven feet high), must have been common in New Zealand, but it has long since disappeared. Several very perfect skeletons have, however, been found. Pheasants have been introduced and thrive well; in fact, they are now plentiful over the whole colony. California quails and partridges have also been imported, but the result has not been satisfactory. The skylark appears to thrive better in the colony than at home, and I have frequently seen a flock of twenty or thirty in the air singing at the same time; whereas in England I do not remember seeing more than one or two together. Most of the English birds have been introduced with more or less success. Wild ducks are found in great abundance during the winter.

The climate of New Zealand varies considerably between the north and south. During 1874, the maximum temperature in the shade ranged from 75° to 95° Fah., and the minimum from 23° to 37° Fah. The rainfall during the same period varied from twenty-three to

seventy-one and a half inches. (This does not include observations taken at Bealey and Hokitika, where the rainfall was ninety-eight and 104 inches respectively.)

The climate of New Zealand is healthy, and as a rule agreeable. Owing to its position it is subject to frequent high winds. The prevailing breezes are from the north-west and south-west, but the winds from the south-east are the coldest and most trying. The population of New Zealand is composed of two classes, the Maori and European. It is believed that the Maoris first visited and settled in New Zealand about the fifteenth century. They were a brave and warlike people, and built their villages or "pahs" on elevated ground, in the fortification of which they showed considerable skill. Like all other savages they were cannibals, but this practice has disappeared with the advance of civilization. The Maoris are, as a rule, well built, strong men; the average height is about five feet seven inches. The skin is olive brown, and the hair coarse and black. The old men were very handsomely tattooed, and the women have the lips and chin marked, but the practice is dying out.

The Maoris are good agriculturists, and in many parts use all the improved implements of their more civilized neighbors. As a race they are remarkably intelligent. They generally assume the European garb, and many of them speak very good English. I was astonished when visiting some Maori schools to see how well the children wrote and spelt our language. The Maori race is dying out, which is in a great measure to be accounted for by the fact that since they have mixed so much with the Europeans, they have learned low European habits, and smoke and drink to excess. They have abandoned their dwellings in the hills, and have often settled themselves in low swampy ground, and of course the result has been disease and death.

The Maoris were divided into several tribes. The "Ngapuhi" appear to have been the first to embrace civilization, and in February, 1840, the chiefs met near the "Waitauyi" (weeping waters) and were the first to sign the famous treaty by which the natives acknowledged themselves to be subjects of the queen. I attach a fac-simile of this treaty.

The approximate number of Maoris in New Zealand is 48,470, of these some 3,000 are in the South island and the remainder in the North. The Maoris are represented in parliament by their own members, and their anxiety for the construction of roads and works

would seem to indicate that the old feelings of rebellion have died out, and that they wish to join in the general advancement and prosperity of the country. I inclose a few photographs. Space would not permit of my giving any detailed account of the last unfortunate Maori war, but I attach a map showing approximately the loyal and disaffected districts in 1869.

The European population of New Zealand, in 1874, was about 341,800. The government gives free passages to all suitable immigrants, and during 1874 some 29,000 arrived. These new arrivals are absorbed as soon as they are landed. A week or two after the arrival of an immigrant ship it would often be impossible to notice that any addition had been made to the population. The great demand for labor consequent on the large amount being spent on public works, has had the effect of raising wages most materially, as will be seen by the accompanying statement (Appendix B), which shows the gradual rise from time to time. This return only shows the rise at Auckland, where labor is cheaper than in many other places, but a corresponding increase has taken place over the whole colony. With the rise in wages the price of provisions has followed, and many articles of consumption are at the present time seventy-five and 100 per cent dearer than they were two years ago.

Almost every religious body is represented in New Zealand. No State aid is given to any denomination, but education is suitably provided for. The government gives assistance to some 547 schools, which show 38,714 pupils on the books. In addition to these there are numbers of private schools, but it appears difficult to obtain as good instruction for children, especially girls, as can be obtained in older colonies. At Wellington, Christ Church and Dunedin colleges have been established with very gratifying results.

The chief agricultural industry of New Zealand is the growth of wool. The following will show the extent of cultivation in the islands in February, 1875:

	Acres.
Land broken up, not under crops	154,888
Land under grain crops	279,451
Land under green and other crops	74,332
Land in sown grasses	1,434,982
Total	1,943,653

The average yield per acre was: Wheat, twenty-eight bushels; oats, thirty-five bushels; barley, twenty-nine and one-half bushels; hay, one and one-fourth tons; potatoes, five tons.

The telegraph system in New Zealand is very complete. At the end of 1874, there were 2,632 miles of line open, representing 5,284 miles of wire. With the exception of a break of thirty miles between Opunaki and Stony river, in the province of Taranaki, south of New Plymouth (where the line would have to pass through native land, to which the owners object), every town of importance is connected by telegraph. During 1874, there were 724,582 private messages sent, representing £50,628 8 1, and the government sent 119,719 messages, which, at the rates charged to the public, would amount to £12,694 2 9. The tariff for messages is the same to any part of the colony. Ten words are allowed free for the address and signature. The first ten words cost one shilling and every additional word one penny. Press telegrams are sent at half these rates between 8 A. M. and 5 P. M.. Between 5 P. M. and 8 P. M., the evening rate for press telegrams is, for the first twenty-five words, six pence, and for every additional twenty-five words or fraction thereof, three pence. On arrival of an Australian or San Francisco mail, press telegrams of 200 words can be sent at evening rates. All rates are double on Sunday. A submarine cable connects the North and South island. This is worked on the duplex system. Arrangements have been made with a company in England to connect New Zealand with Australia by submarine cable. The work will be executed during the present year.

There are no imperial troops in New Zealand, but there are various volunteer corps in each province making on the whole,

			Men.
Artillery	9	corps with a strength of	459
Cavalry	16	corps with a strength of	587
Engineers	2	corps with a strength of	107
Rifles	70	corps with a strength of	2,907
Naval	4	corps with a strength of	296
Cadets	33	corps with a strength of	1,108
Total	134	corps with a strength of	5,464

On the 31st December, 1874, there were twenty-two fire brigades in the various towns, numbering 639 officers and men.

I have before mentioned that Tasman and Cook were the first to visit New Zealand. The latter urged on the English government the

advisability of colonizing the island, as also did Benjamin Franklin, the American statesman, but the government took no steps to accomplish this object. In 1837, a company called "The New Zealand Company" was formed for the purpose of colonizing the country, and the first party left England in May, 1839, under the command of Colonel William Wakefield. They selected Port Nicholson as the site of the first settlement, and the first batch of immigrants landed in 1840. This settlement is "Wellington," the present capital. Auckland was established in 1840 by Captain Hobson, R. N., who arrived, in January of that year, to occupy the position of lieutenant-governor under Sir George Gipps, governor of New South Wales, of which colony New Zealand was a dependency.

In May, 1841, New Zealand was declared a separate colony, and Captain Hobson was made governor. Auckland remained the seat of government until 1865.

New Plymouth (Taranaki) was settled in 1841 by the "New Zealand Company," and Nelson was founded in the same year. Otago was settled in 1848 under the auspices of the Church of Scotland.

Canterbury was founded in 1850 with the assistance of the Church of England party. Hawke's bay (formerly a portion of the Wellington province) became a separate province in 1858, and Marlborough separated from the province of Nelson in 1860. Westland was bought from the natives in 1861.

The above will show how very recent the public-works scheme of this colony must be. The public-works statement presented to parliament by the Minister for Public Works last session will show the position of affairs up to June, 1875. I attach a copy.

The first railways were constructed in Canterbury. Both that province and Otago have made railways out of provincial funds, but with these exceptions the whole of the railways have been constructed by the general government, who have also made the greater part of the railways in the above-named provinces. The general government railways are made under the immigration and public-works act of 1870.

On the 30th June, 1875, there were opened for traffic:

Made by the general government	in the North island,	78½	miles.
	" South "	199½	"
Made by the provisional government		73	"
Total		351	miles.

Since that period several new drives have been opened, as well as extensions to those previously worked.

With the exception of the lines in Canterbury and Otago which are leased to the provincial government, all the railways are worked by the general government, under the superintendence of the writer.

All the general-government railways are made three feet six inches gauge, except some twenty miles in Canterbury. The provincial lines in Otago and Canterbury differ in gauge, but the former and a portion of the latter are being altered to three feet six inches.

Owing to the hilly nature of the country (except in Canterbury, where the east coast is a vast plain), the railways are made with steep gradients and sharp curves. Gradients of one in forty are very common. The steepest grades are one in thirty-three; but I must except a length of some two miles, not yet open, which, in order to get over the Rinutake range, will rise with a gradient of one in fifteen. This, however, will be worked on the Tell system. Curves of five chains radius are the sharpest used except in a few cases, where curves with four and a-half chains radius have been introduced for special reasons. I attach a map of the two islands, which will show the railways already opened and those in course of construction.

The general government are providing water for the use of the gold fields. When the work is completed there will be nearly 100 miles of water races.

Roads are being made and improved in all directions. The progress of the public works has not been as rapid as might have been, but this is owing to the great scarcity of labor, and it was not thought advisable to draw the labor from other industries, which would have been the inevitable result had the work been pushed on faster.

It is estimated that the average cost of our railways will be between £6,000 and £7,000 per mile, and, considering the nature of the country and the price paid for labor, if the result is obtained it will reflect infinite credit on the engineer-in-chief who has so ably managed this large system of work. In order to find funds to carry out these public works, money has been borrowed at various times. The sums already raised and authorized to be raised amount to £19,380,906. This is apparently a heavy debt for so young a colony; but such a large portion of the money has been judiciously expended in reproductive works, that the result cannot be other than satisfactory. I attach the financial statement presented to the last parliament by the colonial treasurer.

The shipping of 1874 showed a marked increase over that of previous years. During the year there entered 856 vessels, representing 399,296 tons, and the crews of these vessels numbered 15,924. During the same period there cleared 822 ships, representing 385,553 tons, with crews numbering 14,225 hands. This does not include coasting traffic, which represents about 1,353,085 tons, conveyed by 14,350 vessels, employing 118,143 hands.

The total value of imports during 1874 amounted to £8,121,812, for which £1,188,951 16 7 was received in duty. The total exports during 1874 amounted to £5,251,269, of which wool and gold formed the greater portion. There were 46,856,012 pounds of wool shipped, valued at £2,832,008, and 376,388 ounces of gold, valued at £1,505,331. The imports per head of population (excluding Maoris), was £23 15 2. The exports per head was £15 7 3.

The postal service of the colony is very complete. The rates of postage (not exceeding one-half ounce) on town letters, is one penny, and on letters for any part of the colony, two pence. Newspapers one-half pence for town delivery, and one penny for any other part of the colony. During 1874, 3,753,635 letters were received from places within the colony, and 585,530 letters from places outside the colony, making a total of 4,339,165, or about thirteen letters per head of population, excluding Maoris. During the same period 4,129,585 were dispatched to places within the colonies, and 589,706 letters to places outside the colonies, making a total of 4,719,291, or about fourteen letters per head of population; 3,872,668 newspapers were received, and 2,434,024 were posted during the year. The postal revenue for the year was £104,371 2 11, or equal to 6s. 1¼d. per head of population. At the end of 1874 there were 103 post-office savings banks open, 52,627 deposits, value £699,249 14 3, had been received, and 29,778 withdrawals, value £620,155 8 9, were made during the year. The cost of management was £2,250, equal to six and five-ninths pence for every withdrawal and deposit.

Not much has been done in New Zealand in the way of manufacture. On the Wairoa river a factory has been created for the manufacture of matting and paper from flax. In Auckland there are glass works, rope walks and soap works.

In most of the principal towns sash-and-door factories are established as well as engineering shops capable of turning out a considerable quantity of work; but all the raw material and machinery have to be imported.

In Nelson and Otago cloth factories have been established with marked success.

I have sent samples of colonial tweed to England, where it has been pronounced by an expert as superior in quality to any manufactured at home. It is, however, somewhat wanting in "finish" but this only requires time to perfect.

Saw mills are scattered all over the country where there is timber.

Breweries are to be found in nearly every town of any pretensions, and the beer and porter brewed is considered of excellent quality.

There are ship and boat-building yards in all the chief ports; but I think Auckland excels in this industry.

There are several tanneries; but no bark has yet been found equal to that used at home and the result is that the colonial leather (unless made with imported bark) is inferior to the imported article.

Fish curing affords employment to a small number of the community, as also does meat preserving.

Potteries and tile works have been started in several places; but I think nothing beyond common ware has been produced.

There are several coach factories; but the work executed generally seems wanting in finish. There is a great want of skilled labor in the colony and what labor there is fetches a high price. Labor saving machinery has been but little introduced; yet I know of no country where it is more urgently required, or could be introduced to greater advantage.

The resources of New Zealand are great, and I make no doubt that there is a great future in store for this "Britain of the South," but this result can only be obtained by steady perseverance, and by making use of every opportunity to develop the mineral wealth and make the colony a manufacturing country.

APPENDIX A.

New Zealand Flax Rope Tested.

Report of result of trial of New Zealand Phormium with English Rope.

H. M. S. Blanche, Wellington, 20*th October*, 1874.

Sir. — In compliance with your order of 30th September, 1873, relative to the trial of New Zealand phormium, I have to report that as the ship was such a short time at sea, during the first three months that the rope was rove for trial, I deemed it desirable to give it a further trial of three months before reporting upon it. A detailed report of all rope rove is given in the attached form, the general result of the trial in my opinion being that the fiber of the New Zealand rope, when subjected to a direct and steady strain, is stronger than that from which navy rope is made, but that it is more brittle and more easily broken if "kinked," and that its great inferiority to the navy rope through its stretching and swelling is, beyond this, due almost entirely to its manufacture.

I am, etc.

(Signed.) C. B. SIMPSON, *Captain.*

Commodore James G. Goodenough, *Senior Officer.*

Report on New Zealand Rope manufactured at Auckland, and tried on board H. M. S. "Blanche," against Naval Rope of corresponding size. Date of trial, between April and October, 1874.

ROPE ROVE.	Dimensions.	Size on May eighteenth, after about 30 hours' rain.	Size on June seventeenth, after several days' rain.	Tenth July.		Thirty-first Aug.		Number of yarns in navy rope.	Number of yarns in New Zealand rope.
				Maxim. measurement.	Minim. measurement.	Maxim. measurement.	Minim. measurement.		
Cutters' falls	3½ in.	4 in.	4 in.	4½ in.	3 in.	4½ in.	3 in.	abt.100	80
Preventer main-brace	3½	4½	4½	4½	3	....	....	....	.....
Fore lift	3½	4	4	....	....	....	....	....	.....
Fore brace	3½	4	4	4	2⅞	4½	3	....	.....
Foretopsail sheet-whip	3½	4½	4½	4½	3	....	3	....	.....
Mizentopsail sheet-whip	3½	4	4	4½	2⅞	....	....	....	.....
Luff fall	3	3½	3¾	....	....	....	....	93	63
Galleys' fall	3	3½	3½	3½	2⅞	4¼	2⅞	....	.....
Foretop-gallant sheet	3	3¾	3¾	....	....	....	....	....	.....
Maintop-gallant sheet	3	3½	3½	....	....	....	....	....	.....
Foretopmast-staysail sheet	3	3½	3½	....	....	....	....	....	.....
Foretopsail reef-tackle	2½	2¾	2¾	....	...	....	....	60	39
Crossjack brace	2½	2¾	2¾	...	....	....	....	....	.....
Dingy fall	2½	2¾	2¾	....	....	2¼	2¾	....	.....
Main-truss fall	2½	2¾	2¾	....	....	....	....	....	.....
Lower boom topgallant-lift fall	2½	2¾	2¾	....	....	....	....	....	.....
Forecastle jigger	2½	2¾	2¾	....	....	....	....	....	.....
Quarter-deck jigger	2½	2¾	2¾	....	....	....	....	....	.....

N. B.— Naval 3½ inch numbers as much as 128 yarns. Ninety-nine was the number in piece tried against New Zealand rope.

REMARKS.

July 8. — When about to proceed to sea, cutter falls were considered hardly safe, but left rove.

July 10. — All the much used ropes appear to be hurt by the sheaves more than the naval ropes. They became much chafed and very rough; also many of the yarns show themselves to be slacker than the rest of the rope, and some became kinked.

July 11. — Tried which would carry away first, naval two and a-half inch or New Zealand two and a-half inch. Latter did before the other was even well stretched. Then tried naval two and a-half inch against New Zealand three and a-half. Former carried away.

July 13. — Main-topsail sheet-whip had to be turned end for end in consequence of being so frayed out and chafed where it led through the main-bits by the hauling, and was so swollen that it would hardly reeve through the blocks and bits.

Tried, thirteenth July, three and a-half inch of New Zealand rope against three inch of naval. Latter carried away. Then three and a-half inch against three and a-half inch. New Zealand carried away. In trying the rope the New Zealand stretched so much, because so very small, and was so extremely oily that it was with difficulty the ends could be secured, the only way being knotting behind the seizings. If hitched, it always carried away in the hitch, even though a round turn had been taken around the toggle, and nearly in all cases it carried away when one part was over another.

In the case of the preventer main-brace, main-topsail sheet, and fore-brace, it was found impossible to stopper them from their smoothness and oiliness.

August 31. — The galley's and cutter's falls were considered unsafe, and were therefore unrove. The rope was very much frayed out, and many yarns kinked and broken, and the strands stretched nearly straight. All naval rope rove at same time in good working order.

Dated on board H. M. S. "Blanche," WELLINGTON, *October* 30, 1874.

WALTER B. BRIDGES, *Senior Lieutenant.*
(Signed) H. W. CAMPION, *Navigating Lieutenant.*
P. HOLLAND, *Boatswain, First Class.*

Approved:
(Signed) C. B. SIMPSON, *Captain.*

APPENDIX B.

NEW ZEALAND RAILWAYS.

Table showing Wages and cost of Material, at Auckland Agency, each six months, from June 18, 1872 to June 30, 1875.

	Carpenters' foreman.	Carpenters.	Carpenters' mates.	Masons' foreman.	Masons.	Blacksmiths.	Strikers.	Engine drivers.	Firemen.	Brakesmen and Pointsmen.	Engine cleaners.	Engine fitters.	Carriage fitters.	Benchmen.	Inspectors.	Gaugers, walking.
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
From June 18 to December 31, 1872.....	10 00	9 2	7 00	11 00	10 00	9 6	7 00	9 6	6 00	7 00	6 00	9 00	9 00	7 00	11 00	9 6
January 1 to June 30, 1873.....	10 00	9 2	8 00	11 8	11 00	9 6	7 00	9 6	6 00	7 00	6 00	9 00	9 00	7 00	11 00	10 00
July 1 to December 31, 1873.....	11 6	9 6	8 00	13 4	12 00	10 00	7 00	11 00	7 00	7 00	6 00	9 00	9 00	7 00	13 4	10 00
January 1 to June 30, 1874.....	12 00	10 00	9 00	13 4	12 00	10 00	7 6	12 00	8 00	7 00	6 00	9 00	9 6	7 00	13 4	12 00
July 1 to December 31, 1874.....	12 00	10 00	9 00	13 4	12 00	11 00	7 6	12 00	8 00	7 00	6 00	9 00	10 00	7 00	13 4	12 00
January 1 to June 30, 1875.....	12 00	10 00	9 6	13 4	12 00	11 00	7 9	12 00	8 6	8 00	6 00	9 00	10 00	7 00	13 4	12 00
Average rate.....	11.03	9.65	8.45	12.76	11.06	10.15	7.28	11.05	7.25	7.01	6.00	9.00	9.04	7.00	12.63	10.95
Average increase per cent.....	13.00	5.35	20.71	16.00	16.00	6.84	4.00	16.31	20.83	1.42	....	....	4.44	....	14.81	15.26
Increase per cent present over original.	20.00	9.17	35.71	21.18	20.00	15.78	10.71	26.31	41.66	14.38	...	...	11.11	....	21.18	26.31

APPENDIX B—NEW ZEALAND RAILWAYS—(*Continued*).

	Gaugers.	Repairers.	Horse drivers.	Laborers.	Storekeeper.	Storeman.	Clerks.	Timekeeper.	Watchman.	Nippers.	Messenger.	Slatelayers.	Quarrymen.	Bricklayers.	Tide-work laborers.	Sawyers.
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
From June 18 to December 31, 1872....	7 6	6 6	7 00	5 6	9 00	9 00	6 00	6 00	6 00	1 6	5 10	8 4	8 00	10 00	7 6	7 00
January 1 to June 30, 1873.....	7 6	6 6	7 00	6 00	9 00	9 00	6 6	7 00	6 00	1 9	5 10	8 4	8 00	10 00	7 6	7 00
July 1 to December 31, 1873.....	10 00	6 6	7 00	6 6	10 00	9 00	8 00	8 00	6 00	2 00	6 6	11 00	8 00	10 00	7 6	7 00
January 1 to June 30, 1874.....	10 00	7 6	7 00	6 6	10 00	9 00	8 00	8 00	6 6	2 00	7 00	11 00	8 00	10 00	8 6	7 00
July 1 to December 31, 1874.....	10 00	7 6	7 00	6 8	10 00	9 00	8 00	8 4	6 6	3 00	7 00	11 00	8 00	10 00	8 6	7 00
January 1 to June 30, 1875.....	10 00	7 6	7 00	7 00	10 00	9 00	8 00	8 4	7 00	3 00	7 00	11 00	8 00	10 00	8 6	7 00
Average rate.....	9.15	7.00	7.00	6.38	9.07	9.00	7.05	7.07	6.03	2.02	6.55	10.02	8.00	10.00	8.00	7.00
Average increase per cent.....	22.00	7.69	.....	16.00	7.77	....	25.00	28.33	5.00	46.66	12.35	22.45	....	.....	6.66	.....
Increase per cent present over original.	40.00	15.38	.....	27.27	11.11	....	33.33	38.83	16.66	100.00	20.06	32.05	....	.....	13.33	.....

MIDDLE ISLAND
OF
NEW ZEALAND
MAP
Showing Completed & Proposed
ROADS & RAILROADS
in 1875.

Scale of Miles.

10 0 10 20 30 40 50 60 70 80 90 100

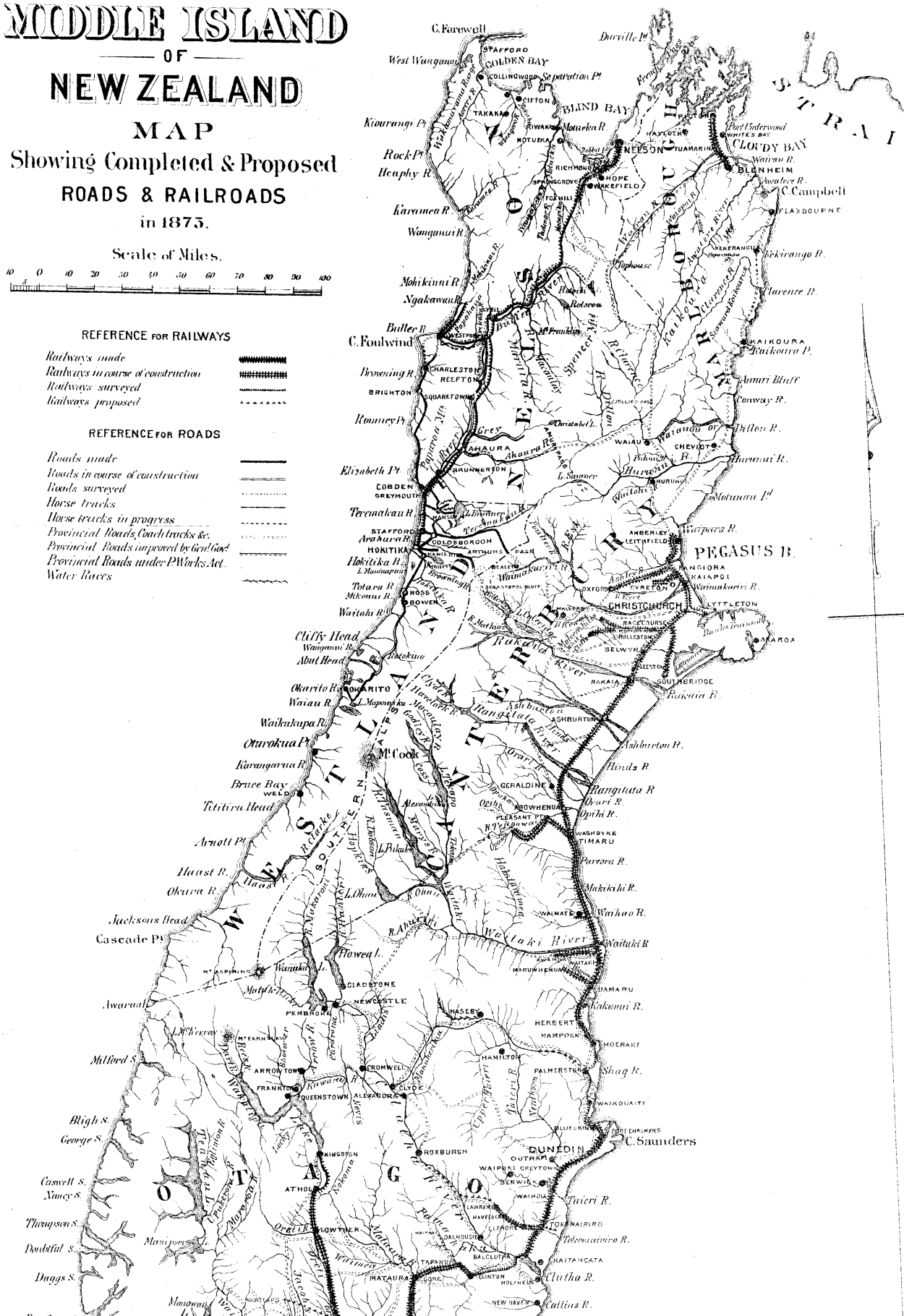
5

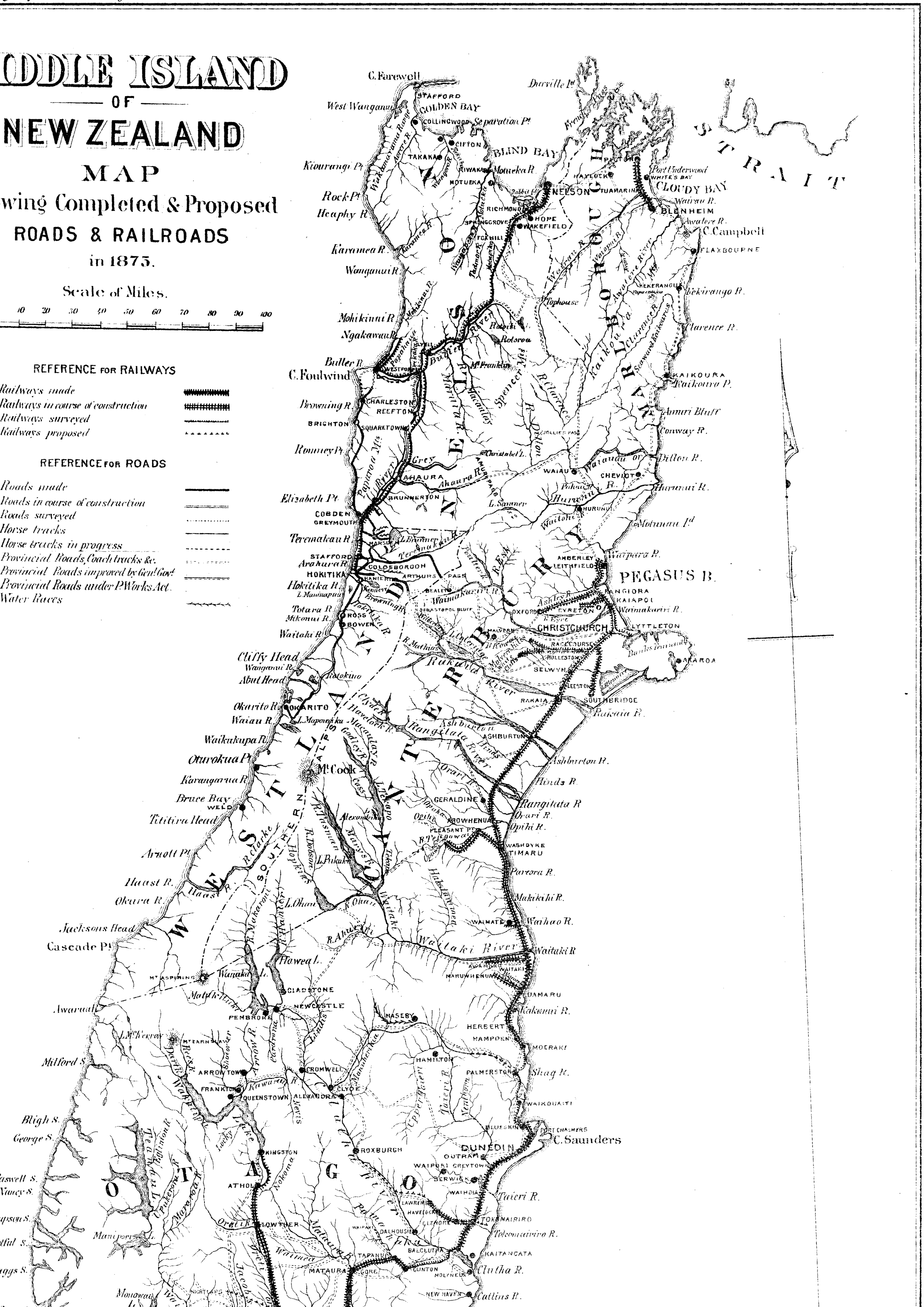
REFERENCE FOR RAILWAYS

- Railways made
- Railways in course of construction
- Railways surveyed
- Railways proposed

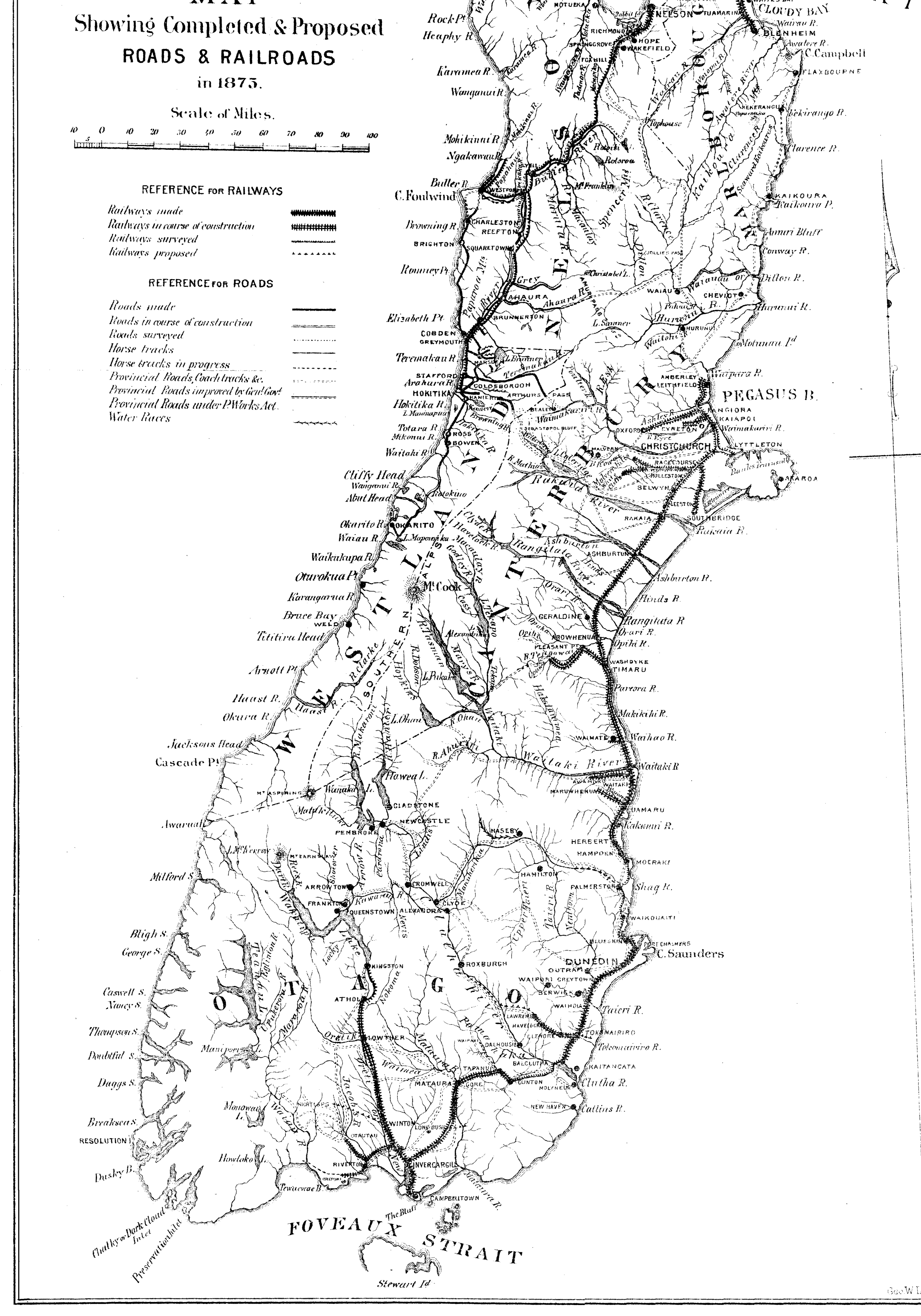
REFERENCE FOR ROADS

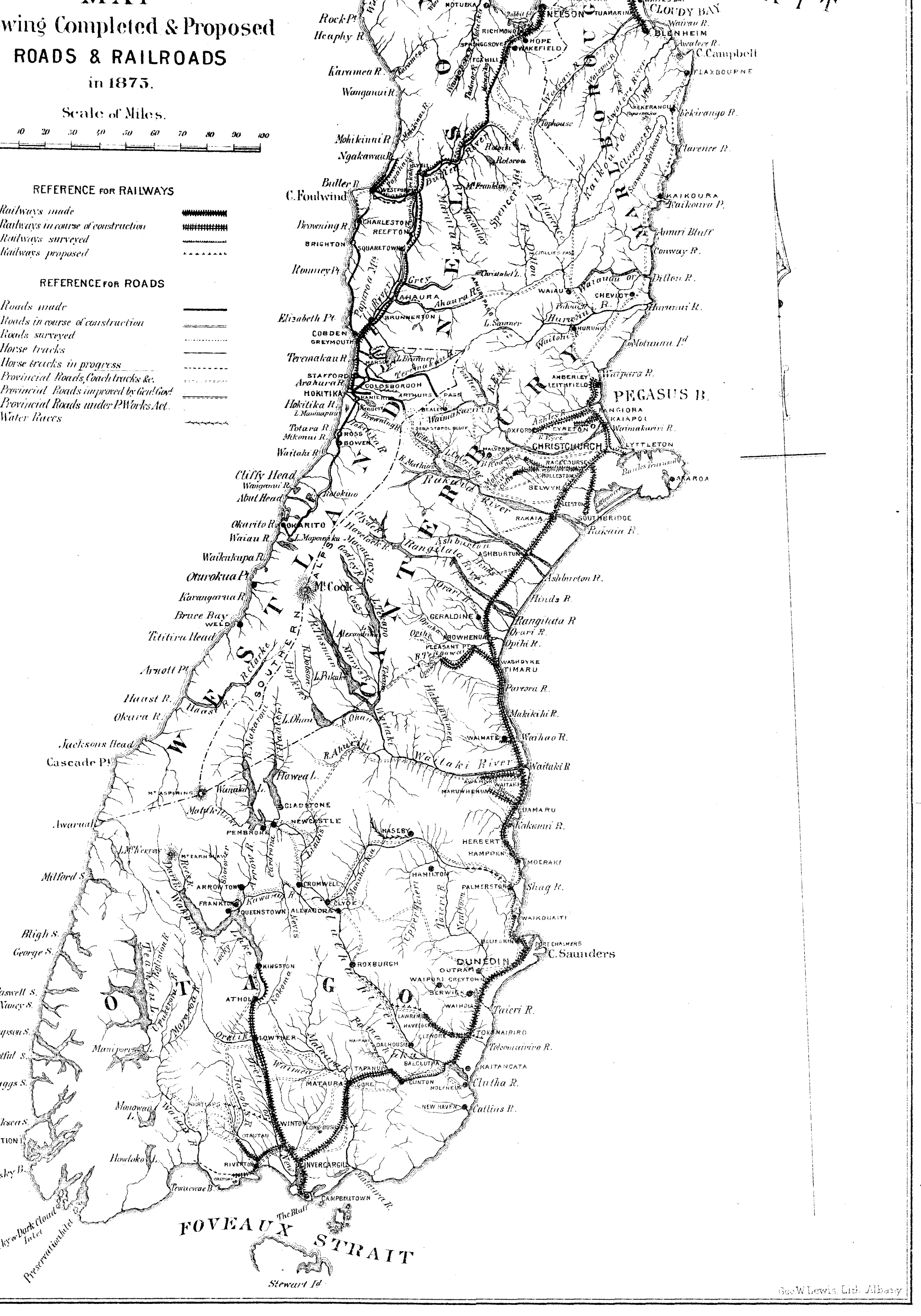
- Roads made
- Roads in course of construction
- Roads surveyed
- Horse tracks
- Horse tracks in progress
- Provincial Roads, Coach tracks &c.
- Provincial Roads improved by Govt Govt
- Provincial Roads under P. Works Act.
- Water Races





DDLE ISLAND
OF
NEW ZEALAND
MAP
wing Completed & Proposed
ROADS & RAILROADS
in 1875.
Scale of Miles.
10 20 30 40 50 60 70 80 90 100
REFERENCE FOR RAILWAYS
Railways made
Railways in course of construction
Railways surveyed
Railways proposed
REFERENCE FOR ROADS
Roads made
Roads in course of construction
Roads surveyed
Horse tracks
Horse tracks in progress
Provincial Roads, Coach tracks &c.
Provincial Roads improved by Genl. Govt.
Provincial Roads under P. Works Act.
Water Races
C. Farewell
GOLDEN BAY
BLIND BAY
NELSON
BLENHEIM
CLOUDY BAY
STRAIT
C. Campbell
WESTPORT
C. Foulwind
REEFTON
GREYMOUTH
HOKITIKA
PEGASUS B.
CHRISTCHURCH
LYTTLETON
AKAROA
Mt. Cook
GERALDINE
TIMARU
Waitaki River
OAMARU
DUNEDIN
C. Saunders
QUEENSTOWN
CLYDE
CROMWELL
BALCLUTHA
Clutha R.
Milford S.


MAP
Showing Completed & Proposed
ROADS & RAILROADS
in 1873.
Scale of Miles.
10 0 10 20 30 40 50 60 70 80 90 100
REFERENCE FOR RAILWAYS
Railways made
Railways in course of construction
Railways surveyed
Railways proposed
REFERENCE FOR ROADS
Roads made
Roads in course of construction
Roads surveyed
Horse tracks
Horse tracks in progress
Provincial Roads, Coach tracks &c.
Provincial Roads improved by Genl Govt
Provincial Roads under P. Works Act.
Water Races
NELSON
CLOUDY BAY
BLENHEIM
C. Campbell
FLAXBOURNE
KAIKOURA
PEGASUS B.
CHRISTCHURCH
LYTTLETON
AKAROA
ASHBURTON
TIMARU
GERALDINE
Mt Cook
OAMARU
DUNEDIN
C. Saunders
INVERCARGILL
CAMPBELLTOWN
RIVERTON
QUEENSTOWN
HOKITIKA
GREYMOUTH
WESTPORT
C. Foulwind
Cascade Pt
Milford S.
FOVEAUX STRAIT
Stewart Id


wing Completed & Proposed
ROADS & RAILROADS
in 1875.
Scale of Miles.
10 20 30 40 50 60 70 80 90 100
REFERENCE FOR RAILWAYS
Railways made
Railways in course of construction
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Railways proposed
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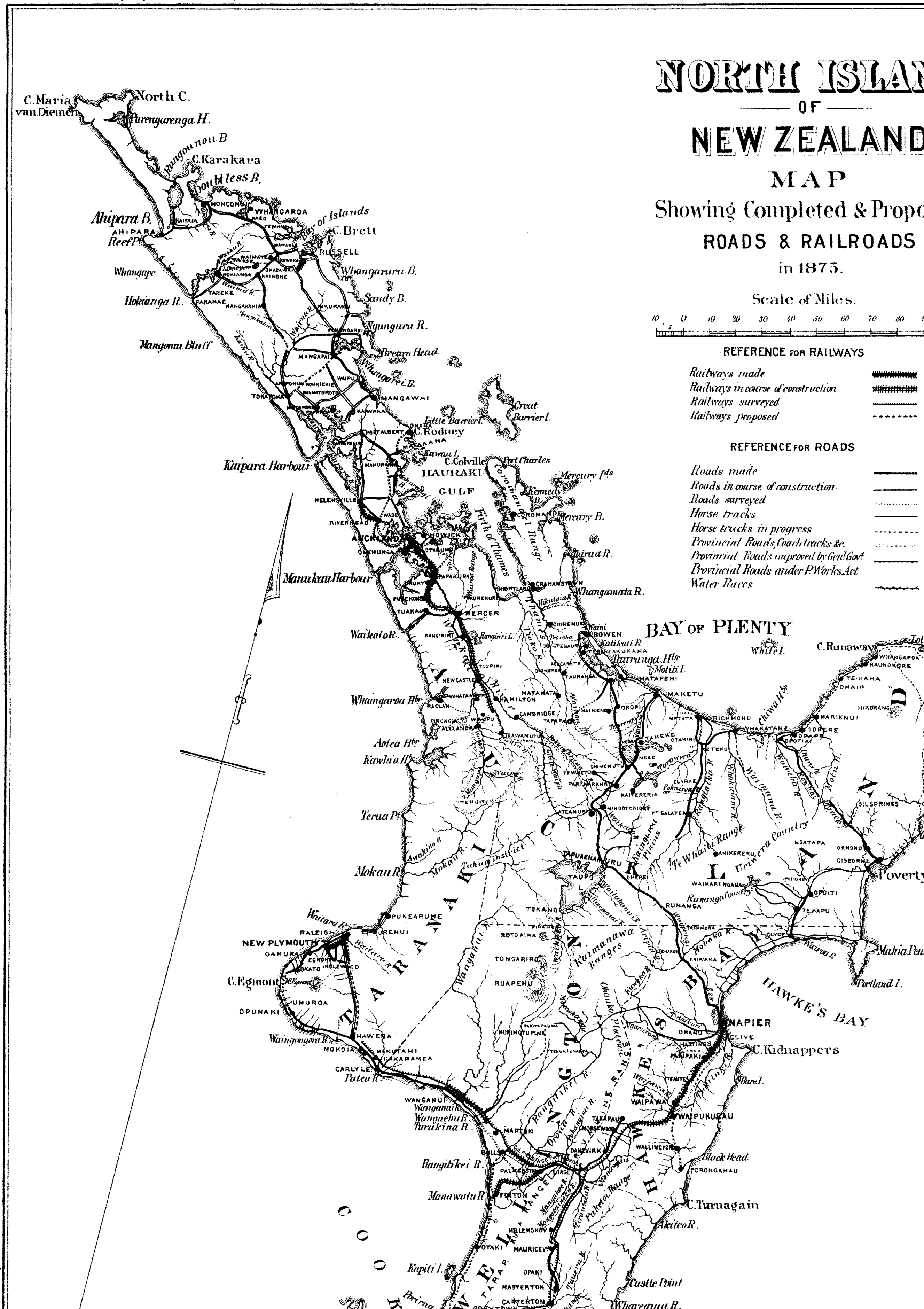
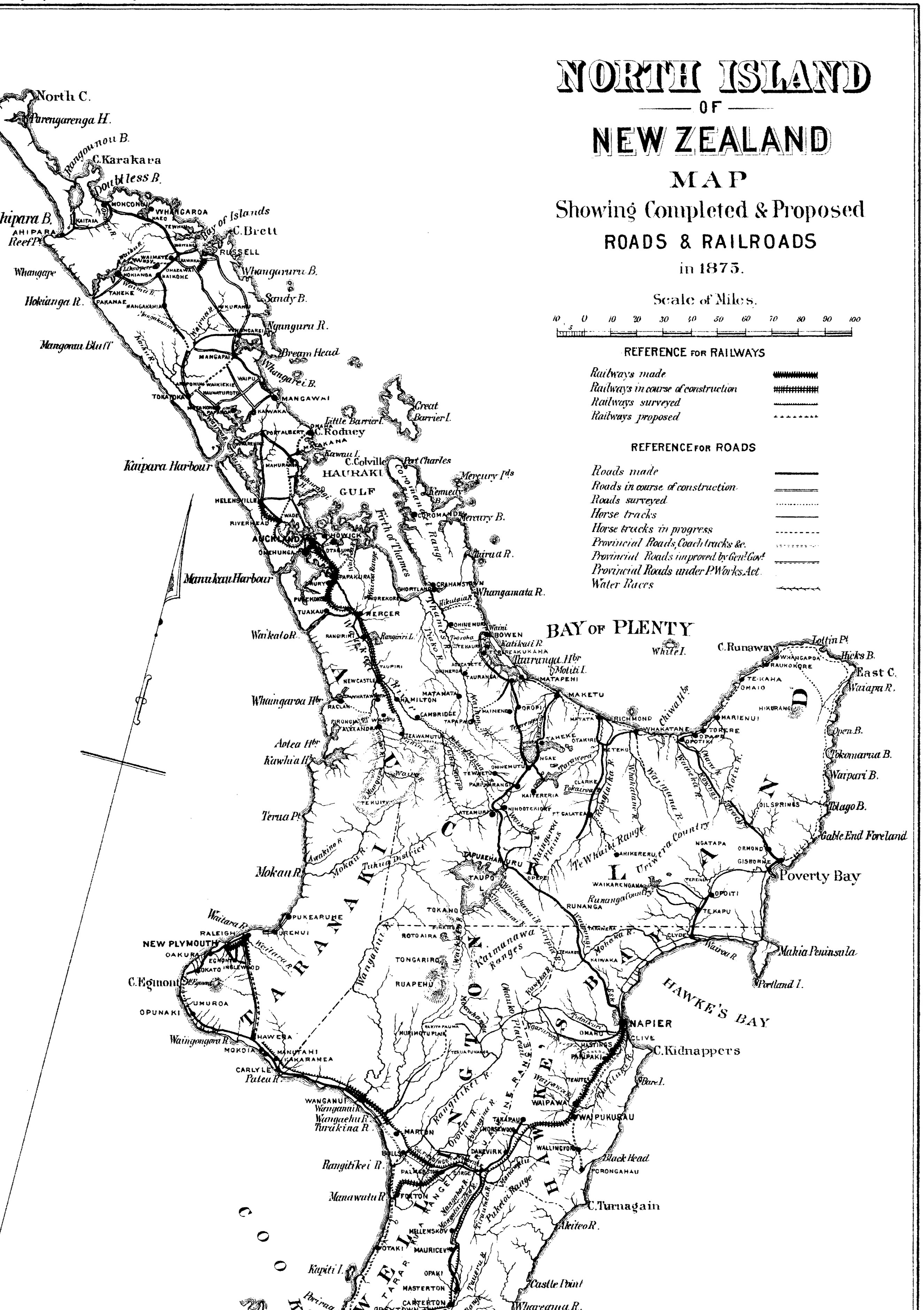
Roads in course of construction
Roads surveyed
Horse tracks
Horse tracks in progress
Provincial Roads, Coach tracks &c.
Provincial Roads improved by Genl. Govt.
Provincial Roads under P. Works Act.
Water Races
NELSON
CLOUDY BAY
BLENHEIM
C. Campbell
FLAXBOURNE
KAIKOURA
C. Foulwind
WESTPORT
CHARLESTON
REEFTON
BRIGHTON
GREYMOUTH
COBDEN
HOKITIKA
STAFFORD
PEGASUS B.
KAIAPOI
CHRISTCHURCH
LYTTLETON
AKAROA
SOUTHBRIDGE
RAKAIA
ASHBURTON
GERALDINE
TIMARU
WAIMATE
OAMARU
MOERAKI
PALMERSTON
WAIKOUAITI
DUNEDIN
C. Saunders
BALCLUTHA
KAITANGATA
MATAURA
INVERCARGILL
RIVERTON
CAMPBELLTOWN
The Bluff
FOVEAUX STRAIT
Stewart Id.
Mt. Cook
MT. ASPIRING
QUEENSTOWN
ARROWTOWN
FRANKTON
CROMWELL
CLYDE
ALEXANDRA
ROXBURGH
KINGSTON
WINTON
NASEBY
HAMILTON
Milford S.
Bligh S.
George S.
Jacksons Head
Cascade Pt.
Haast R.
Bruce Bay
Okarito R.
Cliffy Head
W E S T L A N D
C A N T E R B U R Y
O T A G O
Geo. W. Lewis Ltd. Albany



NORTH ISLAN
OF
NEW ZEALAND
MAP
Showing Completed & Propo
ROADS & RAILROADS
in 1875.
Scale of Miles.
REFERENCE FOR RAILWAYS
Railways made
Railways in course of construction
Railways surveyed
Railways proposed
REFERENCE FOR ROADS
Roads made
Roads in course of construction
Roads surveyed
Horse tracks
Horse tracks in progress
Provincial Roads, Coach tracks &c.
Provincial Roads improved by Genl. Govt.
Provincial Roads under P. Works Act.
Water Races
C. Maria van Diemen
North C.
Parengarenga H.
Rangounou B.
C. Karakara
Doubtless B.
Ahipara B.
AHIPARA
Reef Pt.
Bay of Islands
C. Brett
RUSSELL
Whangaruru B.
Whangape
Hokianga R.
Sandy B.
Ngunguru R.
Mangonui Bluff
Bream Head
Whangarei B.
MANGAWAI
Great Barrier I.
Little Barrier I.
C. Rodney
Kawau I.
C. Colville
Port Charles
HAURAKI
GULF
Mercury Ids
Kaipara Harbour
HELENSVILLE
RIVERHEAD
AUCKLAND
HOWICK
ONEHUNGA
Firth of Thames
Coromandel Range
COROMANDEL
Mercury B.
Tairua R.
Manukau Harbour
SHORTLAND
GRAHAMSTOWN
Whangamata R.
MERCER
TUAKAU
Waikato R.
BAY OF PLENTY
White I.
C. Runaway
Tauranga Hbr
Motiti I.
MATAPEHI
MAKETU
HAMILTON
CAMBRIDGE
NEWCASTLE
Whaingaroa Hbr
ALEXANDRA
Aotea Hbr
Kawhia Hbr
RICHMOND
WHAKATANE
Terua Pt.
OHINEMUTU
Mokau R.
Tukua District
TAUPO
TAUPO L.
Te Whaiti Range
Urewera Country
GISBORNE
Poverty
Waitara R.
PUKEARUHE
URENUI
RALEIGH
NEW PLYMOUTH
OAKURA
INGLEWOOD
C. Egmont
OPUNAKI
UMUROA
TARANAKI
TONGARIRO
RUAPEHU
Kaimanawa Ranges
Mahia Pen.
Portland I.
HAWKE'S BAY
NAPIER
CLIVE
C. Kidnappers
HASTINGS
HAWERA
Waingongoro R.
CARLYLE
Patea R.
WANGANUI
Wanganui R.
Wangaehu R.
Turakina R.
MARTON
BULLS
Rangitikei R.
WAIPAWA
WAIPUKURAU
Black Head
PORONGAHAU
Manawatu R.
FOXTON
Puketoi Range
C. Turnagain
Akiteo R.
Kapiti I.
OTAKI
MASTERTON
CARTERTON
Castle Point
WELLINGTON
HAWKES BAY
AUCKLAND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Bream Head
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MANGAWAI
Great Barrier I.
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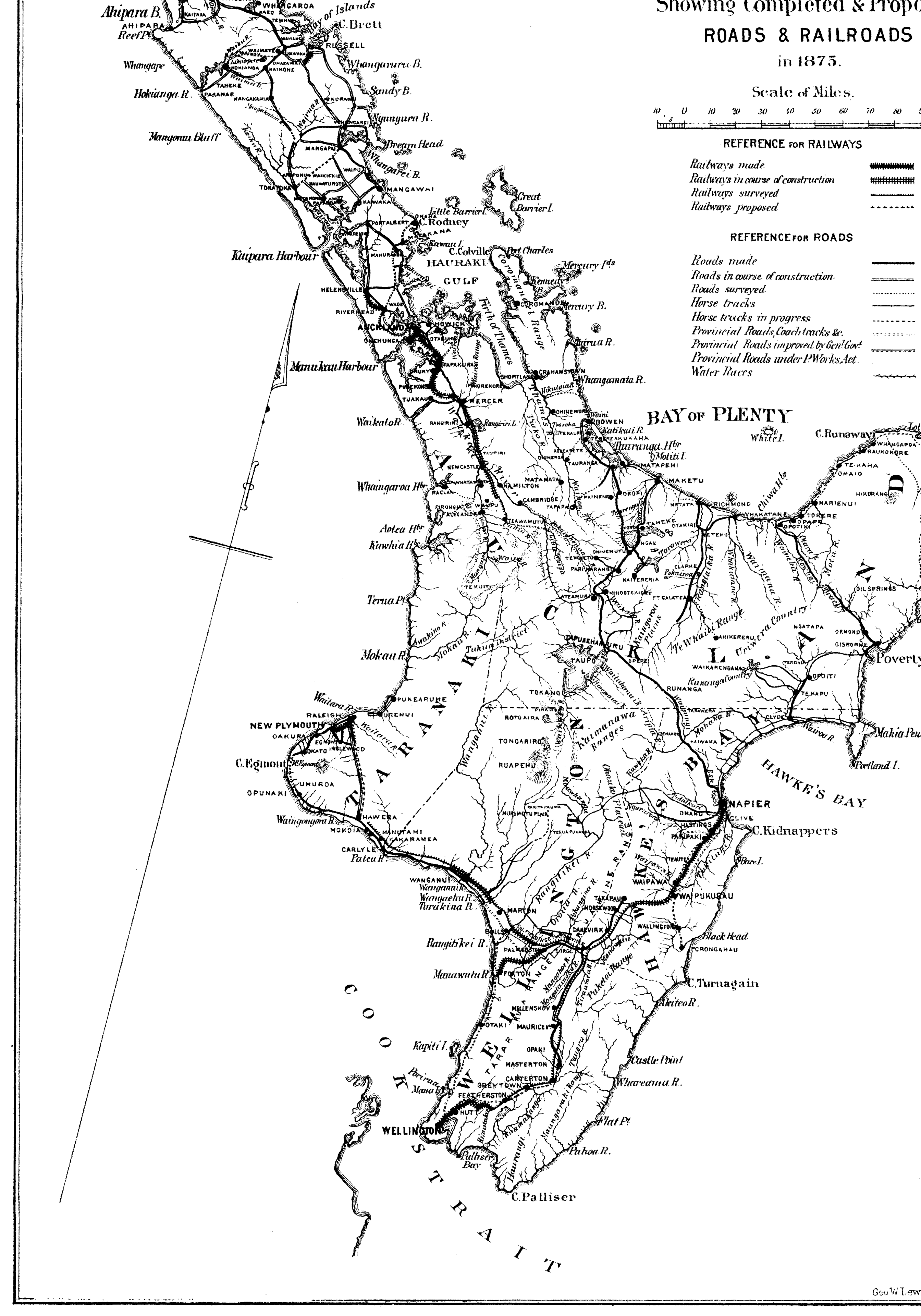
AUCKLAND
ONEHUNGA
Manukau Harbour
MERCER
GRAHAMSTOWN
Whangamata R.
Waikato R.
BAY OF PLENTY
White I.
C.Runaway
East C.
Whaingaroa H^br
HAMILTON
CAMBRIDGE
Tauranga H^br
TAURANGA
MAKETU
RICHMOND
WHAKATANE
Aotea H^br
Kawhia H^br
Urewera Country
Mokau R.
Tukua District
TAUPO
Poverty Bay
GISBORNE
Gable End Foreland
Waitara R.
NEW PLYMOUTH
C.Egmont
TARANAKI
Kaimanawa Ranges
TONGARIRO
RUAPEHU
Mahia Peninsula
Portland I.
HAWKE'S BAY
NAPIER
C.Kidnappers
WANGANUI
Rangitikei R.
MARTON
WAIPUKURAU
Black Head
Manawatu R.
C.Turnagain
Kapiti I.
Castle Point
COOK
WELLINGTON
HAWKE'S BAY



Showing Completed & Propo
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Scale of Miles.
10 0 10 20 30 40 50 60 70 80
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Whangamata R.
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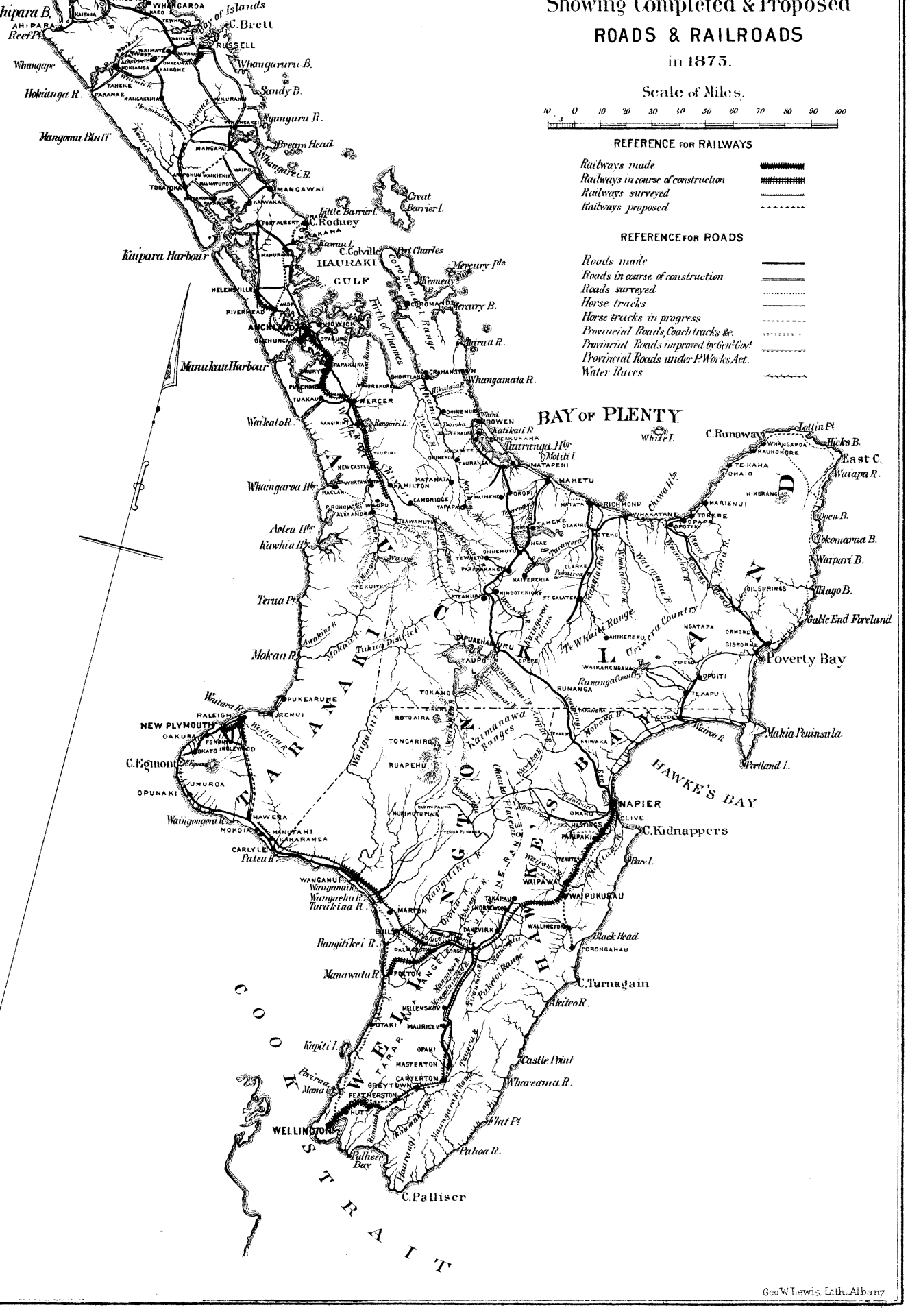
BOWEN
White I.
C. Runaway
TAURANGA
MATAPEHI
MAKETU
Whaingaroa Hbr
HAMILTON
CAMBRIDGE
RAGLAN
ALEXANDRA
RICHMOND
WHAKATANE
OPOTIKI
Aotea Hbr
Kawhia Hbr
TEAWAMUTU
Terua Pt
OIL SPRINGS
Mokau R.
Tukua District
TAUPO
Te Whaiti Range
Urewera Country
Poverty
Waitara R.
RALEIGH
NEW PLYMOUTH
OAKURA
C. Egmont
OPUNAKI
TOKANO
ROTOAIRA
TONGARIRO
RUAPEHU
Kaimanawa Ranges
Mahia Pen
Portland I.
TARANAKI
HAWKE'S BAY
NAPIER
CLIVE
C. Kidnappers
HAWERA
MOKOIA
CARLYLE
Patea R.
Waingongoro R.
WANGANUI
Wanganui R.
Turakina R.
MARTON
Rangitikei R.
WAIPAWA
WAIPUKURAU
WALLINGFORD
Black Head
Manawatu R.
FOXTON
C. Turnagain
Akiteo R.
OTAKI
Kapiti I.
MASTERTON
CARTERTON
GREYTOWN
FEATHERSTON
Castle Point
Whareama R.
Flat Pt
WELLINGTON
Pahoa R.
Palliser Bay
C. Palliser
COOK STRAIT
Geo W Lew



Geo W Lewis Lith. Albany