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The 1855 Wairarapa, New Zealand, earthquake - historical data

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Introduction

This compilation contains transcriptions of written historical material relating to the effects of the 1855 M8.1-8.2 Wairarapa earthquake, New Zealand's largest historical earthquake, and its aftershocks. It is the first time that such a compilation has been produced for a New Zealand earthquake. The source material for the compilation has been retrieved from many sources by many people over many years, but predominantly in the last 10-20 years by Rodney Grapes and the late George Eiby, and more recently by Rodney Grapes and Gaye Downes in the preparation of *The 1855 Wairarapa, New Zealand, earthquake - analysis of historical data* (Grapes & Downes 1997).

This compilation is so designed that it can readily be made into a searchable computer database, so that extracts relating to any particular aspect of the earthquake and/or from any particular location can be separated out simply and quickly. Many of the extracts are annotated to provide some insight about the author, the reliability of the account, or about important details contained within the extract. For example, several extracts attribute the effects of the 1848 Marlborough earthquake, which was centred in the Awatere Valley in the South Island (Grapes *et al* 1998), to the 1855 earthquakes. Where easily recognisable, a note is added at the end of the extract. However, the added information does not replace the full discussion, analysis, and description of the earthquake provided by Grapes & Downes (1997). Full references, and where appropriate, cross-references are given. All the extracts are keyworded with location, effects and reliability keywords. These are listed on the following page. We have not included in this compilation accounts of the 1855 earthquake that have appeared in the popular press unless the source material on which the accounts were based obviously differs from that which is included here. It is preferable to obtain information from the original sources.

Although care has been taken to ensure that the transcriptions are accurate, we do not guarantee that the transcriptions are correct in every detail (see *Disclaimer* at the end of the Introduction). They are therefore unsuitable for any purpose other than for the purpose of this compilation, that is, for the understanding the effects of the 1855 earthquake and its aftershocks. With this use only in mind, some punctuation has been added for ease of reading and spelling of commonly used words has been corrected, again for ease of reading. Place names have been retained as written with our interpretation of the correct name enclosed in square brackets, where appropriate. Those wishing to publish material that is contained in this database should always obtain the original from the organisation holding it and also seek permission to publish. For only one extract (Atkinson) transcribed here, the source has not been identified, - the material was collected many years ago without full referencing. The owners of other original material have been contacted where possible. Extracts from the notebooks of Sir Charles Lyell have been supplied by Leonard G. Wilson.We have endeavoured to contact Lord Lyell of Kinnordy for permission to publish them, but had not received a reply at time of publication.

As new research increases our understanding of New Zealand earthquakes, or new evidence, written, seismological, geotechnical, geomorphological or geological, is uncovered, this database will provide the means for further detailed studies or reinterpretation, if necessary. It will be added to when new information comes to hand. Since the publication of Grapes and Downes (1997) several new extracts have been added, the most important being those of Acland and Drummond.

This compilation is dedicated to the late George Eiby, as was Grapes and Downes (1997). George's enthusiasm for history and seismology led to studies of New Zealand's historical earthquakes over more than 20 years. His research resulted in a collection of a large number of historical accounts of which we have made extensive use. While it is easy to recognise George's

contribution to this compilation it is difficult to name others who no doubt contributed to his collection of material. We apologise for any omission and hope that these people accept our appreciation of their efforts. In extending the data over the last 2 years, however, recognition should go to the curators of every repository of archival material in New Zealand who answered our plea for relevant information, and gave permission for publication of the many extracts, artworks and photographs contained in this manuscript. Diane Bright of the Institute of Geological & Nuclear Sciences Library and the staff of the Alexander Turnbull Library and the National Library of New Zealand have been untiring in their help. The resources of the National Archives have also been of great value as has the help of Kathleen Coleridge (Special Materials Librarian, Victoria University of Wellington). Individuals, such as Margaret Hurst, and many others have shared the results of their research and provided accounts of significance. Special thanks also go to Geoffroy Lamarche for translating one of Sir Charles Lyell's papers from French. Diane Maunder and Nick Perrin (GNS) have carefully reviewed the text. We are very grateful for their patience and attention to detail.

This project, that is, this compilation and Grapes & Downes (1997), has been funded through research grants from the Earthquake Commission and the Foundation for Research, Science and Technology.

References:

Grapes, R. Downes, G. 1997. The 1855 Wairarapa, New Zealand, earthquake - analysis of historical data. *Bulletin of the New Zealand National Society for Earthquake Engineering 30:* 271-368.

Grapes, R., Little, T., Downes, G., 1998. Rupturing of the Awatere Fault during the 1848 October 16 Marlborough earthquake, New Zealand: historical and present day evidence. *New Zealand journal of geology and geophysics 41:* 387-399.

Location keywords

at sea	Makara	Porirua
Auckland	Manawatu	Poverty Bay
Awatere Valley	Marlborough	Rangitikei
Bay of Islands	Masterton	Rotorua
Bay of Plenty	Motueka	Takaka
Canterbury	Motunau	Taranaki
Christchurch	Mount Tongariro	Taupo
Flaxbourne	Napier	Tauranga
Foxton	Nelson	Thames
Gisborne	New Plymouth	Waiau
Golden Bay	North Canterbury	Waikato
Hawke's Bay	Northland	Wairarapa
Hutt Valley	Northwest Nelson	Wairau Valley
Kaiapoi	Onekaka	Wairoa
Kaikoura	Otago	Waitotara
Kapiti Coast	Otaki	Wanganui
Kekerengu	Palliser Bay	Wellington
Lyttelton	Pauatahanui	

Reliability, event and effects keywords

reliability	Event	effects
Primary	Mainshock	artesian well effects
primary/reminiscence	Aftershocks	artworks
secondary	Background	atmospheric effects
		background
		biological effects
		building damage
		casualty
		faulting
		ground damage
		response/recovery
		tsunami/seiche
		uplift/subsidence
		volcanic effects

Notes:

primary - contemporary eyewitness account
primary/reminiscence - eyewitness reminiscences
secondary - second or third hand account
artworks - sketches and paintings portraying earthquake effects
background - relevant background information, mainly relating to uplift/subsidence
Other keywords are self-explanatory.

DATABASE

Note: NLNZ = National Library of New Zealand, Wellington, New Zealand.

ACLAND, John Barton Arundel

Source: Acland, J. B. A. 1855. Diary extracts 1854-1862. *In:* Acland Family papers, J. B. A. Acland papers 42 B2/xvii. Macmillan Brown Library, University of Canterbury, Christchurch, New Zealand.

Location: Christchurch, North Canterbury, Canterbury, Motunau, Wellington, Otago

Keywords: primary, secondary, mainshock, aftershocks, response/recovery

> [1855] January 23 [At Christchurch] an earthquake occurred this evening at 9.30, another shock at 11.30....
> [January] 24 Woke at 7.30 with the house shaking from another shock. There was one also about 8.00. Left Christchurch ... We reached a station at Doublecorner [near Amberley and Waipara] at the northeast corner of the Canterbury Block 35 miles from Christchurch ... In the night we had 2 or 3 earthquakes but not violent.
> [January] 25 [Near Motunau] Tonight we had 2 or 3 earthquakes again, one was rather violent but we are now becoming quite accustomed to them as in this province we hear of no damage done.

Nothing further about earthquakes until

> March 12 [at Lyttelton] ...rode up to Ilam ... to take a message to Capt Lincoln, then returned and went into port, called at Whee's on the way where we saw Mr Paul, the author of the little red book on Canterbury. He was settling in Wellington but has left it on account of the earthquakes – it appears that they have had 300-400 shocks going on in fact almost every hour for three weeks and on comparing notes our shock as compared with theirs seems to have been about a 3rd rate one. The Wellington people are trying to poohpooh it and keep it quiet for fear of hurting the settlement but the fact cannot be concealed that Wellington is very near the focus of these unpleasant shakes. We are probably about on the edge as at Otago the great shake was only noticed by 2 or 3 people who thought they felt something.

Source: Acland, J. B. A. ca 1857. Lunar observations 1857 and summary of geography. *In:* Acland Family papers, J. B. A. Acland papers 44 B4/ix. Macmillan Brown Library, University of Canterbury, Christchurch, New Zealand.

Location: Canterbury

Keywords: primary, mainshock, building damage

> Earthquakes
> ... the last of any note was in Jan 1855 when houses and chimneys were thrown down in Wellington but no house was injured in Canterbury.

ADKIN, G. L.

Source: Adkin, G.L. 1921. Porirua Harbour: a study of its shoreline and other physiographic features. *Transactions of the New Zealand Institute 53:* 144-156.

Location: Porirua, Wellington

Keywords: secondary, uplift/subsidence, biological effects

p149

> I have also received details of a statement made by Mr. James Jones, an old Pahautanui [Pauatahanui] settler, to the effect that after the earthquake the tidal flats at Pahautanui were permanently raised above high tide, and were for a time noisome on account of putrefying shell-fish and other marine matter.*
>
> * [Adkin's footnote to above text] Mr. Jones stated that an area of at least 100 acres was raised above sea-level, and his estimate of the amount of uplift was 3 ft. This agrees with my own estimate [i.e. Adkin's] based on observations of the raised shore-platform. Mr. Jones also referred to the shallowing of the Pahautanui Stream, thus confirming in all details the historical evidence cited by Dr. Bell [for refererence see below].

Bell, J. M. 1910. The physiography of Wellington Harbour. *Transactions of the New Zealand Institute 42:* 534-540.

Source: Adkin, G. L. 1948. *Horowhenua its Maori place-names and their topographic and historical background.* Published for the Dept. of Internal Affairs, Wellington. Reprinted in 1986 by Capper Press Ltd., Christchurch, New Zealand.

Location: Manawatu

Keywords: secondary, background, ground damage, building damage, uplift/subsidence, tsunami/seiche

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> Te Awahou *kainga*
> A former native village on the right bank of the Manawatu River situated at the site of the present town of Foxton. Being on the main route and crossing place of northward-bound traffic in early pakeha times, the place was soon occupied by Europeans. The 1855 earthquake was another factor in the inauguration of European settlement at this place, most of the inhabitants of the ill-fated Te Paiaka 'central township', as originally planned by the New Zealand Company, moving thence to Te Awahou.

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> Haumia-roa *kainga*
> A former native village on the right bank of the Manawatu River near Te Paiaka.... In the earliest days of permanent European settlement on the Manawatu River, Haumia-roa was selected by Messrs Kebbell Bros. (Thomas and John) as the site for the establishment of their sawmill—the first installed in the district—and later a flour-mill, both driven by a steam plant. Their holding comprised 404 acres of land running back from the northern bank of the river and included the high alluvial river-bank and the swamp behind. The enterprise was brought to an untimely end by the 1855 earthquake

which wrecked the mill and the machinery and did other damage of a widespread character in this locality.

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Manga-pirau *kainga*

The first settlement of the Ngati-Wehiwehi *hapu* of Ngati-Raukawa when these people entered into possession of the strip of territory allotted to them in Horo-whenua. The place (which may have been a fortified *pa* rather than an open village) was situated close to the coast just south of and near the lower course of the Wai-kawa River. At that time the Wai-kawa trended northward from a little below its Te Kotahi reach to make a common mouth with the Ohau River. An extensive flat then occupied all this vicinity and on it was a fine lagoon. The lagoon was called Manga-pirau and the Ngati-Wehiwehi settlement took its name from it. Thos. Bevan sen. states that when his father came to the Wai-kawa in 1844 and settled alongside Te Kotahi reach, Manga-pirau was still in occupation and was located about half a mile from the Bevan establishment. The extensive flat and the picturesque lagoon were then in their primeval state, but the latter was destroyed by the fissuring of the ground during the 1855 earthquake.

p220

Manga-pirau lagoon

A former lagoon, situated close to the coast and a little south of the earlier mouth of the Waikawa river. Thos. Bevan sen. describes this lagoon, as it was in the early 50's, as one of the most picturesque he had ever seen. "It abounded in fish, and was full of ducks and other game."

A description of how the lagoon was destroyed during the 1855 earthquake is graphically given by Bevan: "It was on the night of 23rd January ... 1855, that the dreadful earthquake occurred. In our district [Wai-kawa] it was preceded by a violent storm of rain, which fell in torrents, and the air was very hot and sulphurous. Then came a roaring noise and a terrible shock, followed by many others... In the morning we could see that the sea-waves had come up to the front of the house, leaving hundreds of fish stranded on the sand. The ... hills were cracked in all directions and our fine lake had disappeared for ever. All that remained of it were hundreds of eels, high and dry, where the beautiful expanse of water had been only a few hours before." [see also Bevan]

p280

Te Paiaka *kainga*

A former native village on the left bank of the Manawatu River about half-way between the Kopu-toroa and Aratangata tributaries. It is shown on S.C. Brees' survey of the river executed in 1842 for the New Zealand Company. It was the intention of the New Zealand Company to establish the principal central township to serve the Manawatu area at Te Paiaka. A start was actually made and a number of traders and other took up residence there and erected the buildings necessary to their requirements. In 1855, however, the severe earthquake brought the enterprise to an abrupt end. At Te Paiaka and at the neighbouring Haumia-roa where a combined saw-mill and flour-mill was in operation, the earth-tremors seemed to reach their greatest pitch of intensity, and the almost complete destruction of the beginnings of the pakeha regime resulted. Consequently, the place was abandoned and a town-site nearer the mouth of the river,

where the seismic disturbance had been much less severe, was adopted instead. The place selected was then known as Te Awahou (now Foxton).

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Rangi-uru creek

The name given to the lower tidal portion of the Manga-pouri watercourse, a tributary of the Otaki River. This tidal portion extended up to (or a little past) the junction of Maringi-a-wai with the Manga-pouri; the length of the portion known as Rangi-uru Creek was thus three quarters of a mile or less according to the position of the mouth of the Otaki River. Up to the time of the 1855 earthquake Rangi-uru Creek had a broad and deep tidal channel much used by canoes, but at that date the coast was uplifted, in this vicinity from 18 inches to two feet, so that now only spring tides come up it and its size is much diminished.

No sources are given for information in most of the above extracts. Bevan material is found elsewhere in this database.

ALDRED, John

Source: Aldred, J. 1855. Journal (1828 and 1832-64). MS-0007-0008, Alexander Turnbull Library, NLNZ.

Location: Christchurch

Keywords: primary, mainshock, aftershocks

Jan. 25 [1855]. The night before last several severe shocks of earthquakes. They continued at intervals thro yesterday and several have been felt this day. We feel them to be alarming.

February 5th. The earthquakes still continue to occur.

ALLEN, George Frederic

Source: Allen, G. F. ca.1904. The severest New Zealand earthquake. *In:* Transcribed from Burnet, J. H. Scrapbook, in Extracts Book B. Whanganui Regional Museum Collection, Wanganui, New Zealand

Location: Wellington, Wanganui, Manawatu

Keywords: primary, secondary, mainshock, aftershocks, building damage, ground damage, uplift/subsidence, response/recovery

P129-132 In the first article on this subject, I mentioned (in the third paragraph) two severe earthquakes said to have taken place in 1834 and 1841. These, taken with those of 1848 and 1855 seemed fairly to suggest to the Wellington early settlers that severe shocks took place at septennial intervals. There must have been some authority for the belief that a severe shock took place in 1834 (or thereabouts), and still more for that respecting the shock of 1841, for I distinctly remember Archdeacon Stock's allusions to them. But I cannot, with the few books available up here, trace anything referring to either. Indeed, Dr. Thomson's "Story of New Zealand" absolutely ignores them.

At p 10 Volume 1, he says; "Ever since the arrival of the aborignee" (meaning of course the Hawaiki immigrants) slight earthquakes have been occurring in the country between

White Island (Whaka-ari) and Banks Peninsula; in other words between latitude 37 deg. and 43 deg. European evidence of these phenomena is abundant. In 1769, Captain Cook felt an earthquake in Queen Charlotte Sound. In 1843, an earthquake was felt in Whanganui, but the Wairau massacre then engrossed all men's minds and no notice was taken of it. Mr. Stephens registered fifty-five slight shocks at Nelson during 1843-54. Judge Chapman recorded twenty-four at Wellington in 1846, and sixteen in 1847; and in 1848 and 1855 the city was shaken to its very foundation.... Cook Strait is the centre of the earthquake region.... Thorndon and Te Aro Flats upon which Wellington now stands, are elevations of what was once the sea bottom; and the Wairarapa and the Thames (Wai-hou) Valleys are arms of the sea emptied by the rising of the country. (The same may be said of the valleys of the Whanganui, Whangaehu, Turakina, etc.) Proofs may be traced ... in the appearance of rocks in Cook Strait, since the advent of the Anglo-Saxon colonists, and in the undoubted rising of Port Nicholson (now commonly called Wellington Harbour) to the extent of five feet since 1848.

And now I will come to the graphic account of 1855, kindly sent to me by Mr. Bates of Napier, as he experienced it at Whanganui. He writes me:

The enclosed was written at the time the shakes were continuing.... With regard to the (comparative) severity of seismic shocks in New Zealand, I submit my own opinion as I have experienced them: - 1. 1855, January 23 - in Whanganui. 2. 1868 [1863?], (January probably) in Napier. 3. 1904, August 9, in Napier. Of course I have felt many more, from 'slight' to 'undesirable' ones.

"On the 23rd. January, 1855, Helena, my native girl, was with her friends on the river (Whanganui), and not liking to sit alone in my cottage, I donned my waterproof for a stroll. The day had been fine, with a smart breeze, but the evening looked threatening. I had not been long out when the rain commenced and fell heavily. The soldiers of the 65th Regiment, who were playing at skittles and other games at the Commercial Hotel, remained until the last call in hopes of a cessation; but to no purpose, and they had to reach barracks through a heavily falling rain, in summer attire. The clock at the hotel was a quarter of an hour late, and having heard this mentioned by the soldiers during the evening caused me to compare its time by mine. I shall have to notice this subsequently. The soldiers had all retired, and I was sitting over a glass of "Old Tom" (English Gin), watching the progress of a game at "All fours" between two persons in the parlour. I must here mention that all the houses in this settlement are built of wood, most of them one-storey high, some two; - of the latter kind is the hotel, with two chimneys - of course from the kind of house - rather tall ones. Near to one of these I was sitting employed as I have stated. Suddenly, an extraordinary motion was felt, which I had scarcely noticed before an exclamation of "What's that?" was uttered, and immediately the ominous answer of "An Earthquake" was given. I now heard the jingling of the bottles in the bar, and instinctively I made my escape from the house, and this so expeditiously that I did not even lay down the glass I had in my hand on any of the tables in my passage. Now outside of the building, I cautiously eyed the position of the chimneys, and making the necessary circuit to avoid them, stood in the drenching rain to notice more collectedly the fearful convulsion. The chimneys fell just after I cleared them, and the rocking of the house was violent and continuous. The ground

was in extraordinary commotion, and the best term I can apply to the movement is a dancing one. Indeed, I cannot accurately describe to you its peculiarity. In a few moments I was wet to the skin; but the shake continuing I did not like to venture in to the house. The violence of the shock abated for a little, succeeded shortly by a greater convulsion, differing in nature to the commencing one, the first great one being rotary, the other undulatory. The two first shakes are termed, par excellence, the great shakes, and although several severe shocks were subsequently felt they were only small in comparison. The earth was in agitation the greatest part of the night, I might almost say for a month afterwards, and even now we feel vibrations several times a week. I have several times felt one sharp and sudden lift, as if the ground had been quickly elevated. This is not very unlikely, as on the following morning after the great shakes, the features of some parts of the river's bank were completely altered. The beach immediately opposite my own door I could hardly recognise, crack after crack appearing. And in one place particularly the effects were visible, one portion of the bank having been elevated, or the whole bed of the river having sunk five or six feet. A portion of Shakespeare Cliff came down, carrying with it a goat if not more. Most of the bottles at the Commercial which were on the shelves, were smashed. The sawyers up the river were exceedingly terrified, and they continued on the spree for many days after. I heard that most of their pits were destroyed; but they are a class much given to exaggeration. Most of other clocks stopped, and among others the one at the hotel, which would not again keep time until repaired. This had the hands pointing to 8.51 when it stopped, and as I before stated, being fifteen minutes late or thereabouts, would give the approximately time 9.6 p.m. I state this because the shock was felt in Wellington at 9.11, and I sometimes think that the shock (felt over a great extent of the islands) must have simultaneously [affected] every part, the difference of latitude perhaps accounting for the discrepancies of time ... Of course the journals of the district do not contain any account worth sending you, the editors, for obvious reasons, taking as little notice of the occurrence as possible. The country in this part consists of high hills and broken land; all along the river exceedingly so. Indeed, hereabouts, the land seems as if it had had one intense and mighty boiling, and then suddenly to have cooled and consolidated.... I am about to leave this place (Wanganui) for Auckland, and I strongly advise you to leave England if you are not doing well. There's no fear of earthquakes in Auckland, besides a man had better run the risk of being swallowed up here than have nothing to swallow at home. Plenty to eat here, and always a bottle in the house, and no man to call 'Master'."

With regard to the seat of origin of the earthquake of 1855. Archdeacon Stock considered that it emanated from a large submarine crater off Palliser Bay, and he thought that its centre was at the letter R of 'Palliser' as the word was printed on the Admiralty chart of that day.

It will be noticed that Mr. Bates' description of the various kinds of shocks agrees closely with that of Mr. Stock.

ANON 1.

Source: Anon 1. 1928. Great 'quake - over seventy years ago - a contemporary account. *In*: *The Northlander,* April 18 1928.

Location: Wellington, Hutt Valley, Wanganui

Keywords: primary, mainshock, aftershocks, building damage, casualty, tsunami/seiche, uplift/subsidence, biological effects

The following account of the great earthquake of 1854 [sic], is taken from the pocket note-book of a passenger just then arrived from England, not from a diary written in his leisure hours, but a few hurried words in pencil written during the "shakes." Since this occurred, 71 years ago, it is not likely that there will many persons alive today whose memory of that event will be very clear and keen, for at most, such persons would scarcely have been more than very young children; hence this account may be of general interest to-day, when earthquakes in New Zealand have become so very few and very far between, also, so very mild as not to be taken any notice of by old settlers.

The gentleman who experienced this serious earthquake arrived in Wellington on January 10, 1854 [sic], and the first mention he makes of the earthquake is as follows:-

"January 23: A sudden and very sharp shock of earthquake at 9 p.m., greatly alarming everybody in the house, chimneys thrown down and children thrown out of their beds, the house rocking and shaking, everything on mantle-pieces and shelves thrown down.

Mr B. and self rushed out, having to hold on to one another, and then, when on verandah, to the posts, to keep from falling. This severe shock lasted a full minute, with the result that every chimney in the town was thrown down, and all brick buildings greatly damaged. One death and several persons injured.

Tremblings continued all night. At 5.15 a.m., another severe shock, the sea overflowing its usual high tide mark, then receding in a singular manner (never again coming within three feet of previous highwater mark, proving the land had risen three feet with that one shock). Damage to houses and property not less than £70,000. Vibrations and shocks all day at short intervals; 24th, same again; 25th. at 11 a.m. and 1 p.m. sharp shocks felt, the earth continually trembling, and now and then lifting, shocks and rolls, for a few seconds at a time.

Mr.B., a civil engineer, has come to the conclusion that men of his profession will never be wanted in such a country, and so has decided to return to England first opportunity. The last two nights I have not had my clothes off, so as to be ready to act as occasion may require. 4.45 p.m. a smart shock. A captain of a vessel just arrived in harbour reports the sea to be spread with hundreds of dead fish of all kinds. Within half an hour of last shock, two others of equal power; 7.30 p.m., another sharp shock; another at 9.5 p.m., and trembling pulsations nearly constant.

January 26: Slept in my clothes for the third night; 5.50 a.m., a slight shock; 9 p.m., a slight shock; 10 p.m. a smart shock; 10.55 p.m., a smart shock. 27th. Several slight shocks during the night; kept on my clothes for the fourth night; am told there have

been as many as 30 shocks, big and little, during the last ten hours. During the day the wind blew a hurricane. Shocks by day have continued, but with less force and frequency. 28th. 8.30 a.m., a smart shock: at 9 a.m. a slight shock; 3.45 p.m., a smart shock; a shock while in church, at which a young woman screamed a loud "Oh!" 29th, to bed last night with clothes off; 10 a.m., a smart shock; 8.50 p.m., another, tremblings throughout the day, shocks at night; 30th, 4.30 a.m., a severe shock, and several lighter ones in the next four hours; smart shocks at 12.10, 4.15 and 11 p.m.; 31st, smart shocks at 8 a.m.; several lighter ones during the day.

February 1: Slight shocks during last night; a sharp shock at 6 p.m. 2nd, 3.30 p.m., a severe shock; 3rd, 10 p.m., a smart shock; 4th, slight shocks continue during the day; 5th, 3 a.m. also at 4, several shocks; also in the evening; 6th, 5.30 a.m., a slight shock; 5 p.m., a smart shock: 5.5 p.m., another; 11 p.m., a severe shock; 8th, slight rolling shocks continue; at 10 p.m. one of the most severe shocks yet felt; 9th, many slight shocks and tremblings during the night; 10.30 a.m., a very severe shock; 10, at 9 a.m., a slight shock; 13th, at 11 p.m., a severe shock. February 23, at Wanganui: Slight shocks are being felt here; 27th, at 3 p.m., a long continued roll and shakes; March 1 to 3, slight shocks continue. [No further mention of shocks, the gentleman having arrived on his country property near Wanganui]."

The Mr B. referred to here is undoubtedly Mr Bennett. It can also be assumed the writer is the Mr Sherriff, who was with Bennett at the time of the earthquake and referred to by Bennett (q.v.) in his diary.

ANON 2.

Source: Anon 2. 1884. Article. *In: Wairarapa Standard,* December 19, 1884.
Location: Hutt Valley
Keywords: secondary, mainshock

On January 22, 1855 (the anniversary of the province) they paid a visit to Karori. It was upon that day that the first violent shock of earthquake was experienced and in returning to their homes [Hollard and Hill] they found everything breakable smashed, clocks, crockery, etc. were in fragments and tables, chairs and other articles of furniture were upside down and otherwise damaged....

ANON 3.

Source: Anon 3. 1878. "Verifier" 1878. *Scepticism in geology and the reasons for it.* John Murray, London, England.
Location: Wellington, Wairarapa, Hutt Valley
Keywords: mainshock, secondary, background, uplift/subsidence, faulting

Of the earthquake in New Zealand of 1855, a description appears for the first time in the tenth edition of the *Principles.* The author lays the greatest stress on it, because "the geologist has rarely enjoyed so good an opportunity as that afforded him by this convulsion." - Lyell, ii. 88. The accounts of it, also, were furnished to him by "three well qualified scientific observers, who were eye-witnesses," and their statement of the

elevation of a high cliff of *hard slaty* rock over a distance of ninety miles inland from the sea, is a unique instance of the kind, and requires to be carefully examined and tested on the spot at the present time by competent observers. This earthquake occurred on January 23rd, 1855, in Cook's Straits, in the vicinity of Wellington, and was *supposed* by Mr. Roberts, an engineer, "to have permanently elevated, in the vicinity of Wellington, a tract of land comprising 4600 square miles, not much inferior to Yorkshire."

But it is added, "the points of minimum and maximum elevation were 23 miles apart, which therefore expresses the breadth of the upraised area" - P. 85. The length of the fault running inland from Muka Muka, which marks the termination and the highest point of the upheaval, viz., 9 feet, amounted, according to Mr. Borlase, "to the extraordinary distance of about 90 miles." - P. 86. Now if we multiply 90, the length, by 23, the breadth, we find the result to be an area not of 4600 but only 2070 square miles. Farther on* it is stated by the author - "At the same time this vertical movement took place, Jan 23, the harbour of Port Nicholson, about 12 miles west of Muka Muka Cliff (where the rise of 9 feet occurred), together with the valley of the Hutt, was raised from 4 to 5 feet." The reader would naturally suppose that this was a separate catastrophe in a different district; but on consulting Sir Charles Lyell's map we find that Muka Muka Cliff and the valley of the Hutt are included in the strip of 23 miles wide by 90 long, which he has already told us was elevated from 1 to 9 feet (P. 85), while Muka Muka Cliff is only an escarpment of the Remutaka Mountains which bound the Hutt valley on the east, and are also included in the same strip or tongue of land, washed on either side by the sea.

How can we account for such confusion and contradictions in the statement of "an engineer who observed minutely the changes in the level of the land," and who " was able to measure accurately the amount of permanent upheaval in the older formations"?

Until we can obtain further information on the results of this earthquake, we are compelled to refuse belief in the "fissures 6 to 9 feet broad" in the *older formations,* especially as there exists, as far as we know, no well-authenticated instance on record of the raising of an entire mountain chain in any part of the globe **, nor of permanent fissures in hard or crystalline rocks by any earthquake. We are informed by one well acquainted with New Zealand and the locality of this earthquake, that the assertion of permanent upheavals over so large an area is allowed to be a mistake, and is not now to be made out on the spot.

Moreover, after the repeated and persistent assertion of *permanent* upheaval (Lyell, p. 82), the narrative of the New Zealand earthquake winds up with the usual confession that "a question arose whether the land about Port Nicholson," where the shocks were most violent, upheaved several feet in January, had not "sunk again to some slight extent before September 1855" - Lyell, vol. ii. p. 88.

It is but just to add that Mr. Roberts "felt persuaded that he could not have failed to notice even a slight change of level, had any occurred;" and the author adds, "It is

surprising how soon the signs of a recent change of level on a coast are effaced to all eyes but those of the scientific observer."

To sum up the results of the New Zealand earthquake, it may be safely asserted that the idea of a change of level over a space nearly as large as Yorkshire originated in a total mistake; while the 90 miles fault, if it really extends that distance, will probably turn out on examination to be not a fracture of solid rock, but a mere shift or landslip at the junction of two discordant unconformable formations.

* *Principles,* vol. i., p.86
** Observe, however, we are told of a fissure 15 inches wide, "traced by Mr. Mills [actually Mr Weld], and partly by observers on whom he could rely, for 60 miles." - Lyell, vol. ii. p. 89. Also "deep rents caused in solid rocks in Syria, 1837," no place or authority named. -Lyell, vol. ii. p. 89. "Near Valparaiso, in 1822, parallel fissures in the granite; some were traced 1½ m. inland" (no spot named). - Lyell's *Principles,* vol. ii. p. 95. But Mallet rejects the idea of the formation of fissures of any magnitude by the direct influence of earthquake. - *Report,* p. 52.

ANON 4.

Source: Anon 4. 1855. Letter *In*: *Times* (London), July 18 1855.

Location: Wairarapa, Wellington

Keywords: primary, mainshock, building damage, ground damage, uplift/subsidence, casualty, aftershocks

To the Editor of the Times
Sir, I send you an extract from a letter, dated the fifth of March 1855, received by me from a friend in New Zealand, giving an account of a severe shock of earthquake ... I am, etc. A.G.H

New Zealand, March 5th, 1855.
In case my wife's letter, giving you an account of the earthquakes should not reach you, I intend to let you know something about them. I cannot learn that more violent ones have been experienced in any part of the world during this century, and, had this part of the island been densely populated, and the houses built as those in Europe are, the loss of life would have been fearful. On Tuesday, the 23rd of January last, I had engaged to visit a neighbour 14 miles off but the electric appearance of the air and very lowering clouds made me anticipate bad weather, which might have detained me from home, and so I refused to go, providentially as it would appear, for the large brick chimney of my friends only sitting room fell into it, and no one in the room could have escaped. We were sitting round our table with a friend, when, at half-past nine o'clock at night, without the rumbling notice which earthquakes generally give us, the shock commenced; the house waved to and for, rocked, and jumped, as you might fancy a ship would when she strikes on a rock; the lights were dashed off the table, books, glass, china &c., on the shelves round the room, came down, together with the chimney, part of which fell inside and mixed with the ruins of the furniture, &c. Our friend jumped out of the window, and clung to a post outside, but was thrown down then and

obliged to lie on the ground. I rushed to open the door, for fear we should all be jammed in, with no means of taking the family out of the house, but it was some time before I could open it, and then only by watching the waving of the house; and when the door was opened, and I let go my hold of it, I was thrown down, and could not rise on my legs till the shock was over, which lasted about three minutes, although trying my utmost to get up for the purpose of bringing out the family. No house, but one built with posts let into the ground, and wooden houses put together like a box, as the houses in this country are built, could have outlived such a rattling. Ours, though somewhat out of the perpendicular, is not down; the roof, however is entirely dislodged, and must be put on again before winter. With wages at 8s. a-day, I hardly know how we shall accomplish this and get bedding and other stores for, in addition to the earthquake, a day or two after we had a fire, which burnt down the tent in which we were obliged to live, and everything in it. Every one in this valley (of the Hutt) lived in tents for some weeks, as the shocks have continued up to the present time; but none have been as severe as the first. This part, for many square miles, is rent in every direction; cracks in the ground of many feet in length, and from a few inches to several deep feet, exist over very large spaces, at short intervals from each another; our horse track to the river, which is about half a mile off, has more than twenty such across it, 12 of which opened and shut with violence during the shock, and threw water to a considerable height over the surrounding bushes. I saw the water, cracks, sand, and mud, which were thrown up, the morning after, and glad I was that no fissure had opened nearer to our house than 200 yards, or it must have come down on us. Fissures opened in two native 'warries' to my knowledge, and nearly smothered the inmates with water, besides bringing their light buildings down on them. Five natives, however, were killed in one house in this valley [Wairarapa?], and only one man in Wellington, 54 miles off. There - since the last severe shocks, six years ago - they have built what they imagined to be earthquake-proof wooden houses, and, though some of them are much damaged and much property destroyed, only one or two are down. All the brick and mortar ones, however, and all the chimneys are down, although they do not appear to have felt the shocks as much as we did. Wellington has, however, been raised by the first shock two feet in perpendicular height, and some inches since by the subsequent ones. We suppose that we are also raised up, judging by the sea coast; where the former low-water mark was it is now high-water mark.

This letter was sent to the *Times* (London) by a friend of the writer, who is not identified. Several factors lead to the belief that the writer lived in the Wairarapa Valley i.e. the death of the 5 Maori and the distance to Wellington, rather than in the Hutt Valley, as is stated in the letter, and that he might have been Charles Borlase. Borlase lived at Waihakeke about 68 km (43 miles) from the Wairarapa coast and 86 km (54 miles) from Wellington, not far from the Waiohine River, where he kept a canoe for ferrying travellers. The writer's friend in London may have inserted the phrase "Of the Hutt" in the letter (because it is bracketed).

The letter makes no specific reference to the appearance or the observed length of the fault trace. However, it is fairly certain that when Lyell (1856, 1868) (q.v.) refers to a "Mr Borlasse" as supplying observations on the appearance and length of the fault he is referring to Borlase. Personal observation by any one person of 150 km of fault trace extending through large areas of densely wooded country seems improbable, but Borlase was in a good position to receive

descriptions from travellers who passed by and was apparently a welcoming host ("Borlase .... then as always was kindness itself.... and after spending a pleasant night with him...." (Bagnall 1976)).

Bagnall, A. G. 1976. *Wairarapa - an historical excursion.* Hedley's Bookshop Ltd., Masterton, New Zealand.

ANON 5.

Source: Anon 5. 1934. Article: Some big earthquakes. *In: Wanganui Herald* , March 6 1934.
Location: Wanganui
Keywords: secondary, mainshock, ground damage

> There was another big shake in 1855 or 1857, when the settlers went through much the same trying experience for several weeks. The main awe-inspiring incident occurred about 10 ''clock at night, and was followed by a terrific gale and warm rain, which added greatly to the destruction of the buildings and discomfort of the settlers. Somewhere in the vicinity of Sandy Hook there was an extraordinary convulsion of the earth, huge trees were uprooted, and cracks three or four feet wide were visible all along the beach on both sides of the river, as also in other parts of the town and district. There was also a big washout in the Avenue, between the Post Office and Hallenstein's corners. In those days the centre of the Avenue was hollowed out into almost a channel or cutting by the small cart traffic and stock-driving, for the upper stratum being all pumice was crushed into dust under slight pressure or friction. The dust being light was either blown into the river or carried there during the wet weather by the water which flowed down the channel. One of the settlers, resident near the junction of No.2 Line with the River bank, whose husband was in Wellington on the occasion mentioned, and who had no nearby European neighbours to appeal to for help, was heard coo-ee-ing across the river just after the quake. Several men responded to the call, going across the river in a canoe, and while groping about in the thick darkness after effecting a landing they fell into one of the big cracks opened up in the ground by the shake. Naturally there was great consternation in Wanganui that night and for several weeks during which the ground continued to tremble and uncanny shakes occurred at intervals.

ANON 6.

Source: Anon 6. 1929. Letter to Editor. *In: Dominion,* September 26 1929
Location: Wellington, Hutt Valley
Keywords: secondary, mainshock, uplift/subsidence

> Sir, —A friend in Masterton has forwarded a "Dominion" containing details of the big earthquake, realising that as an old Mastertonian I should be interested in getting particulars of so serious a catastrophe. Bad as it was, there is room for much thankfulness that none of the chief centres of populations were situated in the devastated area.
>
> It brings to mind incidents told me by old settlers who went through the experience of 1855. Mr A W Renall, for many years a resident of Masterton, had a grit mill, I think at Karori, in which he was standing at the time of the great shake. When it stopped, he

found that he was standing with his two feet through a wheelbarrow wheel. This had been stored overhead in the mill, but how it came down, or how he got his legs through it, he told me he never could understand.

Previous to this date the only road to the Hutt was along the beach; this was impassable when the tide was in. So the authorities let a contract for a road, the chief clause being that it should be above high-water mark. This contract was secured by a Mr Herbert. He had just started the job when the great shake came, raising the beach five feet, saving the contractor more than half his expected work. It is truly an ill wind, or ill shake, that does not do someone a good turn. I believe this Mr Herbert was the founder of Herbertville, and possibly this township owes its start to the shakes '55. —I am, etc.,

ANON 7.

Source: Anon 7. 1862. Earthquakes, and their phenomena. *In: Chapman's New Zealand Monthly Magazine.* October 1862 (published in Auckland).
Location: Palliser Bay, Wellington, Wanganui, Wairarapa, Hawke's Bay, Marlborough
Keywords: primary/reminiscence, secondary, mainshock, tsunami/seiche, ground damage, aftershocks, uplift/subsidence, biological effects

p114

This was strikingly the case in the earthquake of the 29th [sic] January, 1855, which occurred under the observation of the writer, and the effects of which were felt as distinctly, if less violently, at Whanganui as at Wellington, while N.E. and S.W. from this directing line the violence of the shocks diminished in exact proportion to the distance of the stations of observation from the Strait....

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Speaking from the best of his recollection, and unaided by any notes made at the time, the writer would say that the three shocks which rapidly followed each other in the Cook's Strait earthquake of 1855 lasted in all about seventy seconds.

As a general rule, all great concussions are followed by a constant recurrence of minor ones for a more or less considerable period. The earthquake of 1855, so often above referred to, occurred at fifteen minutes past 9 p.m. on the night of the 29th [sic] of January, and for some six and thirty hours after the earth was never still for twenty minutes together. From about that time the shocks began to be less frequent, but averaged two or three per day for the whole month of February.

A feature almost invariably noticed in connection with the vibration of the earth is the violent agitation communicated to the ocean; displayed first in the form of a wave of enormous height, which appears to gather far out at sea and to roll in upon the land, and, secondly, in the complete disturbance of the ordinary course of the tides. The former, in its degree, is noticed in almost every lake and river within the area of concussion. At Lisbon this wave or roller rose to the perpendicular height of fifty feet; and at Port Royal it attained a still greater altitude. In Cook's Strait in 1855 the highest elevation of the roller appears to have been about thirty feet, a shed at Te Kopi, in Palliser Bay, situated about twenty seven feet above the sea, having been swept away on that occasion. At Wellington itself the wave was not so great. The low neck of Watt's Peninsular was submerged about three feet, to the infinite alarm of many who were camped there that night on the occasion of the races. A small but

deep lake near Whanganui, on the banks of which the writer was then living, surged backwards and forwards many times in a remarkable manner, and was covered the next morning with masses of raupo, torn up from a depth of several feet in the swampy heads of the bights into which the lake runs up. Another sheet of water, in the same vicinity, broader and shallower than the above, spread so suddenly over the low flat land at its lower end, that a man, well known to the writer, who was riding out from the town of Whanganui, and was about half-way across the level just named, found his horse suddenly knee deep in water, and checked her hurriedly, thinking she must have mistaken her road and be walking straight into the lake. Just then the bell of the native chapel at Putiki rang violently, and then came a heavy crash of falling brickwork, while the old mare the man was riding set out all her four legs wide apart and trembled violently. The water retreated as suddenly as it had rushed up....

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Large quantities of mud were ejected in parts of the City of Wellington in 1855, more especially opposite the Union Bank in Willis Street, and though the writer is not aware from his own experience of the evolution of gaseous vapour, he has heard reports that such were observed in places in the Ahuriri district. The gases were stated in this case to be of a sulphurous nature....

p118

In our own country the motion of the northern coast of the Straits is upward, while that of the southern coast, less distinctly marked, appears to have a downward tendency. But many instances might be cited where this motion has been alternate, and in no case more noticeably than on the coast of Italy at Pæstum [see note at end of extract]: now standing many feet above the Mediterranean, the shafts of the columns, though coated with stucco of the hardest kind, are pierced in every direction, from about eight feet from their bases, by the *pholas* and other marine animals: as clearly proving that they must have been submerged for ages, as the deep belts of dead shell fish upon the rocks in Wellington Harbour demonstrated that the whole of the surrounding shore had been upheaved in those seventy seconds through a space of above nine feet.

This is probably the Temple of Serapis, near Naples, rather than the Greek temple at Pæstum (see Lyell 1856c).

ATKINSON, Jane Maria

Source: Atkinson, J.M. 1855. Letter to Margaret Taylor from Jane Maria Atkinson. Source unknown. #

Location: New Plymouth, Taranaki

Keywords: primary, mainshock, building damage

The week has been made much more bustling and exciting than usual by the longest and strongest earthquake shock that has been experienced in this settlement.... Lely, Kate, Arthur and I were sitting quietly working and writing, when suddenly the room began to creak and roll, precisely as a steamer does when moving away from the side of a wharf. The feeling was so wonderful and astonishing, we could only look awe-struck in each other's faces. I should think the rolling trembling motion lasted upward of two minutes ... of course it seemed a great deal longer. We did not spend half that time in

the house, for knowing the top of our stone chimney had been cracked two years ago by a shock, we felt it prudent to keep at a distance from it. We stepped through the french window on to the grass. The trees were swaying to and for as though drunk, and several dead branches on our neighbour's land came crashing down. As the motion was subsiding we heard five or six explosions, exactly like the discharge of heavy artillery in the distance to the south....

Not a stone nor a piece of mortar in the Beach Cottage was moved, but our chimney was so cracked, that next day when the bush party returned it was thought advisable to turn out all hands and take down the upper part. We felt several slight shocks on Wednesday, but not much - the earth seems at peace again. On Tuesday night, for some time after the shock, a movement was perceptible, just as though we were lying on the back of some huge creature, breathing regularly and gently. Some chimneys are injured, some crockery smashed, and a good deal of milk and cream spilt, otherwise no harm has been done to the Settlement. We fear news from Wellington.

See also Porter, F.

BAGNALL, A.G.

Source: Bagnall, A.G. 1972. *Okiwi; European occupation of the eastern bays Port Nicholson; an outline history.* Mahina Press, Wellington, New Zealand

Location: Wellington

Keywords: primary, secondary, uplift/subsidence

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Paddy, when speaking of the tide at the rocky point [Point Howard] said that he had heard 'There was a road through the bush above the rock." Sergeant McDonogh confirmed that the point would not be a safe passage at high tide, 'even for a sober person', an interesting comment on the extent to which the beach was raised by the 1855 earthquake.

p51

These alliances, however, were still in the future for the two families in their hillside home. For them as for many Wellingtonians the major event of the decade was the earthquake of 1855. Family tradition recounts their terrifying experiences during that January night. The kerosene lamp overturned and as the house was built in part of an excavated site they moved into a punga shed, fearing slips. Next morning they were amazed to see that the sea had receded —the shore-line had risen about four feet—'a wildly excited lot of Maoris, the women with their long black hair streaming out behind them, were busy gathering the harvest of shell fish ... left bare.' There would no longer be any necessity to wait for the tide to pass Point Howard but as Mrs Jackson recalled, '... the privacy of our bathing was gone for ever, for we could never be sure that someone might not come round...'

Source: Bagnall, A. G. 1976. *Wairarapa: an historical excursion.* Hedley's Bookshop Ltd., Masterton, New Zealand.
Location: Wairarapa, Wellington, Palliser Bay
Keywords: secondary, ground damage, uplift/subsidence

p63-64 Beyond Russell's Folly the next spot at which there was trouble was at the Mukamukaiti where travellers had to rush round the rocks as the sea receded and then wait in a small inlet until the 'force of the drawback' left the way clear. The grassy terrace between the Mukamukaiti and the Mukamukanui would have been a pleasant interlude but beyond the larger stream was the third and most critical obstacle. The rocks on the main point could normally be passed only at ½ ebb to about ¼ floodtide. At the foot of one of the rocks was a deep hole into which, according to Matthews, unobservant travellers sometimes stumbled. One such victim was the Rev. R. Cole, who shared with Colenso some responsibility for the souls of Ngatikahungunu. "Parson Cole", once allowed his horse to subside into this trap which an appropriate christening gesture confirmed it for many years as Cole's Hole. On the Wairarapa side of the final cliff was a small area 'Captain McDonald's Flat'. McDonald may have been A.C. McDonald, the manager of the Union Bank who accompanied Judge Chapman to the Wairarapa in 1847 but his identify is only less certain than the reason for the name. On some notable occasion the entire terrace broke away from the hill and slipped some distance before it lodged behind the lower rocks where part of it was washed away. Almost immediately below this precarious flat the seas swept up to within a few yards of the track which after the earthquake was raised to some 20 to 25 feet [6-8 m] above it. The severe effects of the earthquake of February 1855 were felt throughout the valley but the raising of the Palliser coastline by no less than four feet at this spot removed in one convulsion the route's major nightmare.

In addition to the pushing up of the terrace some millions of tons of slips poured down into the sea. Sections of the range above the coast, in the words of an eye-witness, were 'absolutely torn to pieces'. The visual evidence of the destruction remained for nearly a century but for some 20 years no vegetation grew and 'great rents several feet wide were visible'. A cave at the Kiriwai back-water where settlers used to store wool and stores was completely buried. The backwater itself, hitherto a deep channel up which laden schooners could sail readily, was turned into a lagoon. On the eastern side of the lake at Whatarangi there was no upheaval but the accompanying tidal wave washed away the Te Kopi whares as well as many bales of wool. Providentially, the return wave cast the bales ashore. *

This description of the coastal route along the western side of Palliser Bay, Mukamuka rocks and the uplift of the area in 1855 is Bagnall's interpretation of historical material obtained during his researches into Wairarapa's history. Not all the sources are known. Reference for the last section (*) is given to the recollections of A. Matthews (q.v.) in the *Wairarapa Times*, November 22 1901.

BANNISTER, C.

Source: Bannister, C. 1940. *Early History of the Wairarapa*: Masterton Printing Co., Masterton, New Zealand

Location: Wairarapa

Keywords: secondary, ground damage

> How Bruce's hill was split asunder.
> One of my old time Maori friends, Hamua Paora ... Sitting by the fire after a succulent tea of pigeons roasted on a forked stick, he told me of the greatest flood in the Ruamahanga River. By my calculations it must have been about 1838. I asked him if it was before Collins came with sheep. He said that it was and that he was a little chap at the time, holding up his hand about three feet and six inches from the ground so I concluded that he would be about ten years old. I asked him how old would he be when Collins came. He said he was old enough to get married. That would be about sixteen or thereabouts. He died in 1918, aged 88. He said he was with his father and the other Maoris at their Pa on the south side of the Ruamahanga River, opposite Bruce's farm, when a taniwha dived through the ground from Wairoa in the north down to the South Island. It split Bruce's Hill asunder, one half going into the river, blocking it up and causing a large lake. Paul told me that the ground was shaking for a week or more. They all lay on the ground calling to their pet Atua (god) to save them, also repeating karakias (incantations). This blocking of the river caused it to go dry. That meant plenty of kanui te tuna (plenty of eels) for them. One party from Te Ore Ore proceeded as far as Opaki, now called Willow Park, when they heard a terrific noise. On looking to see what it was they saw a bank of water approaching them. They dropped their eels and climbed into the tree-tops, where they stopped till the flood waters subsided. I asked Paul how deep was the water. He indicated eight feet. That there had been a big flood in the Ruamahanga, I myself saw traces of it as there was debris lodged in tree forks eight or nine feet high. This was at the back of Collins's Te Ore Ore homestead. I was out shooting with Jack Lane, an old pioneer. We were on Potairau. He also told me that the Maoris had told him the same story as Paul had told me. Collins came to Te Ore Ore in 1846. They never saw any flood like that or they would have recorded it. Mr B. Iorns and I traced that taniwha's track from Waiohine to Ihuraua [*]. It is still quite visible. The Wellington geologists say it was caused by the 1855 earthquake. From what I have seen I don't believe it. The Maoris called the Pa where Paul's father lived Rua Taniwha. Some of the Masterton Maoris still own a small block of land there. Mrs Johnston owns that farm now.'

*The trace of the Wairarapa Fault.

According to Bagnall (1976 p348-9) Richard Collins took up Te Ore Ore in 1849-50, 3-4 years later than Bannister has assumed. The date of the earthquake and consequent landslide would then become 1841-42. Iorns (q.v.) gives the date as 1832. The only other account that refers to the landslide is that of Vennell (q.v.). Vennell attributes its occurrence to the 1855 earthquake, as does Crawford (q.v.), who sketched the slide in 1863. Neither mention eyewitness accounts of its occurrence, but Vennell was probably in the Wellington region in 1855. Crawford was overseas.

Note that Lyell (1856c) (q.v.) mentions an earthquake in 1832 that caused "alterations in the

relative level of land and sea" and another "violent convulsion" in 1841. The locations of these and the source of the information are unknown.

BASSETT, T.

Source: Bassett, T. 1925. War and Experiences - an old settlers recollections. *In*: *Marlborough Express,* June 25 1925.

Location: Hutt Valley

Keywords: primary/reminiscence, building damage, ground damage, mainshock, aftershocks

> Mr Bassett remembers the earthquakes of 1848 and 1856 [sic], and has vivid recollections of the latter. He was at the time working for Mr Biggs of Petone. Mr Biggs had gone to the races, and the young folk had retired to their rooms. Suddenly there came a terrific shake. The chimneys came tumbling down and the doors jammed. Young Bassett went to the servant girl and they tried to find their clothes, but could get nothing beyond what they were wearing. They tried to escape by the window, but were prevented by the fallen chimney. Both were terrified by the experience they were undergoing when the window blew open. To add to their terror came another violent shake and, blinded by tears they essayed to climb through the window. On looking through the lad found a great fissure had opened in the ground below it, but he believes the subsequent shake partially opened the door and they escaped from the house by squeezing through. The crack in the ground was so wide that they were unable to cross it, so they followed it down the road towards the river. While crossing the garden the lad fell into the crack some feet deep and was unable to get out. The girl went down and assisted him up and, lying at full length on the ground, she was just able to reach his fingers and pull him up, smothered in mud. In fear and trembling they managed to make the Whitewood Hotel, which was nearby. This place had been tossed about like a shuttlecock, and whiskey, rum and beer were running all over the ground, everything having been smashed. They went further on to the shop by the Hutt Bridge, only to find it had fallen in. They were in a terrible plight, for they only had the clothes they had escaped in, and were shivering with cold. An old man named Keys gave them a blanket each to wrap round them, and in this attire they made their way to a house in Waiwetu Road belonging to Sir Francis Bell's family. Here they were looked after, and next morning returned to the cottage and found some of their own clothes, Mr and Mrs Biggs having reached home. The earthquakes lasted six weeks, and the terrors of that time will never be forgotten.

BENNETT, William C.

Source: Bennett, W.C. 1855. Journal – earthquakes in Wellington 23 Jan-Feb 1855. MS–Papers-346-371B Alexander Turnbull Library, NLNZ.

Location: Wellington

Keywords: primary, mainshock, aftershocks, building damage, uplift/subsidence, casualty, tsunami/seiche

> [1855] Jan 23. 9-00 p.m. a sudden and severe shock of earthquake. I was sitting, previous to going to bed, with Mr Sherriff. It was blowing hard at the time, the house slightly rocking occasionally, and gusts of wind howling, but we suddenly felt a most unusual rock and loud rumble. He immediately looked over at me and cried out: "What

is that?" "An earthquake", I said, "let's rush out of the house". We did so and just had time to get into the garden when the ground commenced shaking in so violent a manner that I could scarcely keep my feet. Mr Sherriff caught me by the arms and held on to me, but for which both of us would have fallen. The shaking first was a lineal motion in NNW and SSE direction, succeeded by a transverse motion and then by a combination of both, which exactly resembled the motion of a very bad railway carriage on a bad line of rails at very high speed, continuing long enough to enable me to resolve to sit down, which I told Mr Sherriff to do, and proceeded to do myself when the shake ceased. I was then able to go into the house and see what the Woods were at and run upstairs to bring out the children. Remained up all night - a sharp quake about every half hour. All night tremblings continued.

Jan 24. Quarter to five another minor but severe shock. During the entire night people were passing and repassing, some with lights, others carrying their wives and families up on the hill as a place of refuge. Heard that immediately after the shock the sea had rolled in and flooded all the road along the beach. Every chimney or erection of brick in the town except a few built in cement was levelled to the ground; many wooden houses ruined; and the Baron Alzdorf's Hotel nearly destroyed and the Baron himself killed. Everyone comparing notes; all parties agreeing in the direction of the shock, and allowing it to be of much greater intensity than any previously felt. During the night the consumption of brandy and water and cigars was very great indeed and I must confess I did not think I could have felt so craven. I have been in much greater personal danger, but the sense of self-reliance was so completely obliterated in this instance that one felt completely prostrated.

Vibrations and small shocks all day at short intervals. Remained at home reading and ascertaining amounts of damage - had I been in bed I should have been killed, the chimney having fallen through the roof.

Jan 25. Thursday, 11-30 a.m. 1-00 p.m. smart shocks felt; earth continues almost all times in a tremor, and occasionally lifts, shakes and rolls for a few seconds at a time. 4-45 p.m. smart shock. 7-30 smart shock with a second in a moment. 9-05 another constant vibration.

Jan 26. Friday, 6-10 a.m. Slight shock. 6-40 a.m. another with a second in a moment. 8-45 a.m. another. 9.00 a.m. another. 10-5 p.m. smart shock, another succeeding it. 11-05 sharp shock. Met Mr Bell today and he then told me that I would have an affirmative answer to my application the moment matters were put to rights in the office - that the earthquake had thrown everything about, and that by the beginning of next week he would write me an affirmative answer to my application. I said that was I all I required.

Jan 27. Saturday. During last night several slight shocks - walking about looking as the effects of the earthquake - among the rest at the shore of the Bay which has been exposed for a considerable distance, the land appearing to have been upheaved 4 ft at least.

Jan 28. Sunday. 8-30 a.m. smart shock, 9 slight. 3-45 smart shock followed by a second. Protestant service held in the open air, *Royal Stewart* arrived and got

Fitzgerald's letters.

Jan 29. Monday. 10-00 p.m. smart shock. 10-09 p.m. slight shock. Tremblings all day - shocks at night. Went to Karori for my watch.

Jan 30. Tuesday. 4-30 a.m. a severe shock; several slight ones in the next four hours. 12-10 a smart shock. 4-30 a sharp shock. 11-00 p.m. sharp shock. News from up the coast the earthquake felt very much at Wanganui and Rangatiki [Rangitikei].

Jan 31. Wednesday. 8-00 a.m. shock. During the day several slight ones. People beginning to settle down; heard that the Hutt Bridge had been shaken down.

Feb 1. Thursday. Slight shocks during the night. 6-00 p.m. sharp shock. Reading, rather impatient for Bell's answer.

Feb 2. Friday. 3-30 p.m. severe shock. Saw Parke and Bell, when they told me I could not be engaged as the earthquake had shaken the office and public confidence. Requested Bell to write this down.

Feb 3. Saturday. 10-00 p.m. Smart shock. Walking about all day - almost resolved to sail at once to Sydney. No vessel now in port.

Feb 4. Sunday. Slight shocks at long intervals during day.

Feb 5. Monday. Waiting for some means of conveyance to Sydney.

Bennett was staying at boarding house near the site of the Roman Catholic Monastery above Oriental Bay. He had arrived in Lyttelton on January 4 1855 in the *Royal Stewart*. This ship returned to Wellington on January 28 1855.

BEVAN, Thomas
Source: Bevan, T. 1905. Reminiscences from an Old Colonist, Otaki. *In: Evening Post,* 1905.
Location: Otaki, Manawatu
Keywords: primary/reminiscence, building damage, ground damage, mainshock, tsunami/seiche, aftershocks, biological effects

It was on the night of the 23rd January, 1855, that the dreadful earthquake occurred. In our district it was preceded by a violent storm of rain, which fell in torrents, and the air was very hot and sulphurous. Then came a roaring noise and a terrible shock, followed by many others. Mr and Mrs Kebbell and two other travellers on their way to Wellington were at our accommodation house at the time. They had arrived just before the rain storm, and their horses had been put into the stable. When the first shock came I was seated by a large double brick chimney with a child on my knee. I ran outside, and was thrown on my face, the child falling some distance ahead of me. All in the room ran out of doors, and all were similarly thrown off their feet. Mr and Mrs Kebbell were in the parlour, and were unable to get out as the door was jammed, and would not open. The parlour chimney came down into the room, and they had a very narrow

escape. We had to knock the door in before they could get out. Mr Kebbell asked for a Bible, and began to read, but had not read far before another violent shock came. We all fled from the house, leaving the open Bible on the table. We were all in a terrible state of confusion, and could hear the cries of terrified animals and the horses neighing in the stable. The kitchen chimney, near where I had been sitting, was shaken to the ground, and the room was full of bricks. Next morning Mr and Mrs Kebbell returned to Manawatu to find what harm they had sustained. They found that their flour-mill was levelled to the ground, and decided not to rebuild it there so they removed such of the machinery that was not destroyed, and re-erected it in Wellington. We were so distracted that we could neither eat nor sleep. In the morning we saw that the sea-waves had come up to the front of the house, leaving hundreds of fish stranded on the sand. The hills were cracked in all directions, and our fine lake [Manga-Pirau Lagoon] had disappeared forever. All that remained of it were hundreds of eels, high and dry, where the beautiful expanse of water had been only a few hours before.

See Adkin (1948) for the location and identification of Manga Pirau Lagoon and his description of Te Paiaka. Mr & Mrs Kebbell lived at Te Paiaka, Manawatu

BIDWILL, C. R.

Source: Bidwill, W. E., Woodhouse, A. E. [resp. son & granddaughter of C. R. Bidwill] 1927. *Bidwill of Pihautea - The Life of Charles Robert Bidwill.* Coulls, Somerville, Wilkie Ltd., Christchurch, New Zealand.

Location: Hutt Valley, Wairarapa

Keywords: secondary, mainshock, ground damage, building damage, aftershocks, uplift/subsidence, background

p11-12 In February [sic], 1855, a series of severe earthquakes occurred. At this time Mr and Mrs John Orbell were staying in Wellington with Judge Stephens, on their way home to Waikouaiti after spending six months at Pihautea, the only visit they ever paid to their daughter, meeting her husband then for the first time. They have described how they were thrown out of their chairs by the force of the shock.

C.R. Bidwell was at Ludlam's house at the Hutt when the shocks commenced and was so worried about his wife and children, whom he had left at Pihautea, that he at once hastened over the Rimutakas, having perforce to walk the whole distance, jumping the fissures which had opened in the earth's surface, threading his way among the great landslides and cracks on the quaking hillside, but at length reaching his home in safety.

He found that his wife had had to leave the house at night, as she expected it to fall at any moment, and with her brother Edward Orbell, and her two small children, Kate aged two and John only a baby, had camped on the lawn in a tent, made of blankets, until the tremors subsided. The rumbling in the earth was like the sound of artillery, and the fissures in the ground were sometimes three or four feet in width. Mrs. Bidwill has told her children how she walked about examining these cracks and was unable to touch the bottom of them with the longest flax stick....

After two or three days they returned to the house, where the chimneys had fallen down and every door jammed. In fact, the building itself had been shaken off its piles, though it was still habitable. They had no sooner commenced their first meal, than another quake occurred and the table was completely overturned. The tremors went on for about six weeks, and there are traces on Pihautea today, showing where the ground opened and blue mud was thrown from a considerable depth.

p54 [part of a letter, written in 1885, by William Swainson to the authors describing his journey with Bidwill around the Muka Muka coast from Wellington on or about May 7-8 1844. They met F. Weld, with his sheep, on May 9 1844.]

Well, we got along very well until we reached the Mouka Mouka [sic] Rocks, which were the great obstacle in our road. There were three points of rock jutting out into the sea, two of which could be passed dry-footed at low-water, but the third was always washed by the sea (though Colonel Wakefield, the New Zealand Company's agent could not sanction the squatters going to the Wairarapa, still he did not see why he should not make a hole in the rock which they might use if they liked, so shortly previous a party was employed to make it passable, but they did very little good), and could only be passed at low water, and then only by getting a ducking if a wave higher than its fellows caught you. Indeed when blowing south-east it was impassable for days, and the hill at the back too precipitous to admit of being climbed over, and many a traveller had been detained there for days together. Subsequent earthquakes have, I understand, so raised the beach that this spot is passable at any time. Arrived here we had to catch every sheep, and standing in the water pass them from hand to hand round the point...

BLACKETT, John

Source: Blackett, J. 1855. Journal 1851-6. MS-Copy–Micro–0658, Alexander Turnbull Library, NLNZ.

Location: New Plymouth, Taranaki

Keywords: primary, mainshock, aftershocks, building damage

[1855 Jan 23] Very smart Earthquake at 9 P.M. lasting in its severity one and a half min. - but several minutes elapsed before quiet again - and continued small shocks occurred all during the night. W. Allan's chimney thrown down also Mr. Nash's.
Jan 24. Small shocks all day at intervals and during the evening.
April 28. Slight earthquake.
April 30. Slight earthquake during night, several small shocks occurring about this time.
May 2. Slight earthquake at 8 P.M.

BLAKE, A. Hope

Source: Blake, A.H. 1909. *Sixty Years In New Zealand. Stories of Peace and War.* Wellington: Gordon & Gotch Ltd, Wellington, New Zealand.

Location: Wellington

Keywords: primary/reminiscence, mainshock, aftershocks, ground damage, tsunami/seiche, building damage, uplift/subsidence

p45-49 My next experience was of a more serious description. Any of those now in Wellington who went through the ordeal must still have a lively remembrance of the scene on the 22nd [sic] January, 1855. It was on the night after the Burnham Water races. The town was merrily busy in consequence of the presence of numerous visitors from all parts of the province, who had witnessed the fifteenth anniversary sports and regatta. Shortly after nine o'clock I had retired to rest, and found my companions all in the land of dreams. When the sickening rumble commenced, and creaking of timbers mingled with it, I called loudly, "An earthquake!" The occupants of the house were soon up and staggering about in the endeavour to don their apparel. There was one exception - he had been to the races and had slept soundly. We went to see why he was not on the move with rest, and found him in the dark, kicking, and protesting in loud tones against the usurpation of his bunk which was taking place. Then we discovered that numerous packages - luckily soft ones -of various sizes had rolled off a stack right on top of him. We removed the cause of annoyance, when the festive one cooly said, "Lemmelone, 'ts on'y nuthquek." Our outside staircase had been demolished by a falling chimney, so that our retreat was cut off, and we were compelled to make our way as best we could out of the windows, along roof-ridge and outhouses, in order to reach the ground, which, during the whole time, was in a continual tremor.

Lambton Quay then consisted of but one street, which ran along the foot of the plateau called the Terrace. Out we rushed to see what damage was being done, and to escape damage to ourselves, when, oh horror! the sea was slowly but surely bubbling over the breastwork and into some of the establishments. Women and children, half clothed, were rushing to and for, wringing their hands, praying and crying, afraid to stay within their houses, and terrified at the sight of the encroaching tidal wave. Many immediately fled to the Terrace for fear of inundation, but soon returned upon finding that the sea had receded. The appearance the harbour presented next morning would lead the observer to imagine that it was being drained by some subterranean agency, so far had the tide ebbed. Boats, which had previously been anchored in comparatively deep water, were left high and dry.

The interiors of the business places were in an awful plight, and the odour arising form the sudden mixture of chemicals in the drug stores could be easily detected. As for the hotels, the destruction and loss of fermented and spirituous liquors therein was enough to satisfy the desire of the most ardent prohibitionist, if there had been any, or to bring tears of sorrow to the eyes of those who were less fond of Adam's ale. The various liquors of Hennessy, Kinahan, Bass, and Allsopp escaped from their crystal bondage, and, mingling, ran over floor and footpath. One could almost swim in them.

With the insatiable curiosity of youth, in company with my companions, I visited nearly every part of the city. In the course of our tour of inspection we met with an adventure that would have probably resulted in broken limbs, or necks, to any one but boys on the trot. As we turned up from the Quay, leaving what little light there was behind, we had put on a spurt in order to visit a distant part of Thorndon, and had just got abreast of the Government House, when we suddenly found ourselves sprawling in a crevice of about three feet wide and two deep, which had opened right across the road-way. However, as there were no bones broken, we continued our journey, rather elated than otherwise by the exciting incident. Fortunately brick buildings were scarce in the Empire city at the time. Brick chimneys were equally so on the morning following this event. Whole families might be seen camping on the green outside their houses with their blankets and wraps around them. This, however, was only in the case of those who were fortunate or unfortunate enough - I don't know which way to put it - to have their smoke stacks left standing, as such were in constant dread of their chimneys tumbling about their ears at any moment.

Numerous small muddy excrescences could be seen at various places along the foreshore beyond low water-mark, which had been changed now to high-water mark.

The only one of these springs, however, that caused anxiety or trouble, made its appearance near the corner of Boulcott and Willis Streets on the northern side. Of a pale bluish colour it oozed forth as though being forced by a pugmill, and slowly continued its course seaward. As repeated endeavours to gauge its depth had failed, it was at length stayed by placing a totara slab of very substantial dimensions over the outlet.

However, for the remainder of the night the earth behaved in a more rational manner, and, with the exception of a few slight tremors, extending over the space of two or three days, no disturbances of a violent nature occurred for many years after. The earthquakes of more recent years have never equalled in violence those of the early days

BOWEN, Charles C.
Source: Bowen, C. C. 1855. Letter from Charles C. Bowen dated February 16 1855. *In:* J. R. Godley Papers, Typescripts Vol. II, p564-5, Canterbury Museum, Christchurch, New Zealand.
Location: Canterbury, Lyttelton
Keywords: primary, mainshock

[At Lyttelton] ... The Steamer came down about a week ago from the North. You have heard by this time of the Earthquake at Wellington. It is the worst they have ever had and there is a regular panic. The destruction of property was very great. Down here we felt the end of the wave - merely a slight shake such as you have felt at Wellington. At Otago it was not felt at all. At Nelson rather sharply. At Taranaki slightly. At Auckland it was just felt. There is a centre of volcanic action somewhere in Cook's Straits. All the N. Zeald. Earthquakes radiate from that part of the Country. The consequence of the Earthquake will be that many colonists intending to settle at Wellington will come down here. The question of the Seat of Govt. is settled. Everyone has given up the idea of Wellington, so one cause of quarrel between the north and the south will be removed....

BRIGHTWELL, W. H.
Source: Brightwell, W. H. 1917. Article. *In: New Zealand Freelance*, April 20 1917.
Location: Wellington, Hutt Valley
Keywords: primary/reminiscence, uplift/subsidence, tsunami/seiche, biological effects

> Talking to a *Free Lancer* the other day, Mr Brightwell said: - "I well remember when the great earthquake in the fifties sent the sea right across land from Lyall Bay to Evans Bay, and left all the flat land that then existed there covered in fish. The sand hills that are there now have sprung up since that great earthquake. I recollect well when two schooners were wrecked, or got ashore, where the old racecourse now is at the Lower Hutt. These schooners were well out in the harbour at the time, and as a boy I and my schoolmates were able often at low water to wade out close to those schooners. The earthquake left them high and dry, and the beach where they were lying became dry and was later ploughed and laid down into paddocks; all the then deep rivers being left as mere streams compared with what they were before the earthquake.
>
> Wellington Harbour on the Hutt side shrank very much in area in consequence of the quake. In fact all round the harbour the water receded never to return. It was most noticeable all along the Hutt Valley frontage because of the shallow, sloping beach. I well remember sea-fish being caught daily up beyond the present Hutt Bridge. The tide used to go a long way past the Hutt Bridge and sea fish visited that part with every tide. The same applied to the second river [This was the name of the river, i.e. Second River], past McNab's Gardens. Many a good kahawai was caught from the bridge in those early days. Now that river is only a small stream and the settlers had then to cut a channel for more than a mile, I should say, to lead its dribble of water into the harbour. I will not dwell further on the early days of the old settlers, although I could write scores of pages of what might be of interest to present day people.

BRODIE, Walter
Source: Brodie, W. 1864. Article. *In: Wellington Independent*, July 28 1864.
Location: Auckland
Keywords: primary/reminiscence, mainshock

> Mr Walter Brodie ... 20 years resident in Auckland province, late member of the House of Representatives and J.P. of the Colony ... makes in the Australian and New Zealand Gazette of April 9th 1864 remarks why the seat of government should not be removed from Auckland to some place in Cooks Straits....
>
> At the time of the last dreadful earthquake at Wellington (1855) some of the inhabitants of Auckland did feel the shock and some did not, for instance, I was walking in front of my house at the time, but did not feel it, but my children who were in bed, did feel it, as when I went into their rooms to wish them good night, they asked me what I had been doing on the roof of the house: and it was only on the following morning, when some artillery men came to work in my garden, that they accounted for the remarks made on the previous evening by my children, as the military felt the shock in their stone (scoria) barracks, the most substantial stone building in New Zealand....

BROOKING, Francis Lang
Source: Brooking, F. L. 1855. Diary. Ms227, Taranaki Museum, New Plymouth, New Zealand. Original privately held in Auckland.
Location: Marlborough, at sea, Wellington
Keywords: primary, mainshock, building damage, aftershocks

> 1855 Tuesday 23.
> Sailed out of Blind Bay through Cloudy Bay and Queens Charlotte Sound (Captn Cook's favourite spot where he anchored his ships two winters.) We had to encounter violent puffs of wind which tore the sails like sheets of paper, and our flat-bottomed old Brig drawing only seven feet of water rendered our situation more dangerous; at 7 PM came to anchor near the coast under the lighthouse; at 20 minutes after nine PM the greatest fright was caused by a heavy shock of Earthquake which appeared to us as if the ship was thumping on the rocks which made her quiver from bow to stern; all on board were terribly alarmed, but after about five minutes the heavy shock abated, but we experienced slight shocks at intervals during the night; we landed in Wellington the following Friday when we found the best houses, walls and Chimneys down, and the Town a mass of ruins, with Soldiers guarding the Banks and other public buildings, most of the walls, Roofs, Plastering, windows and doors being gone....
>
> Saturday 3rd February 1855; Took passage again and came on board "The Onkaparinga" as she lay at anchor off Wellington; we experienced a shock of earthquake during the night....

BROWN, Rev A. N.
Source: Brown, A.N. 1855. Memoranda for journal, January 1855. Papers, folder 101. Tauranga District Council, Tauranga, New Zealand.
Location: Tauranga
Keywords: primary, mainshock

> [Jan] 23 An earthquake this Evg.'

Brown was a missionary with the Church Missionary Society at Tauranga.

BUICK, T. Lindsay
Source: Buick, T.L. 1903. *Old Manawatu.* Buick & Young, Palmerston North, New Zealand.
Location: Manawatu
Keywords: secondary, mainshock, building damage, ground damage, response/recovery

p149 At 9 o'clock on the night of January 29th [sic], the whole colony was shaken by one of the most severe seismic disturbances which had been felt since its establishment, or within the memory of the natives. Its vibrations were felt with especial severity in and around Wellington, and extended all over the Manawatu. In many places the face of the country was considerably altered by the upheavals, and the terror-stricken people rushed from their creaking houses only to be turned sick by the giddy motion of the earth. Huge gulches were torn in the hillsides, and long fissures were opened on the

flats, in some cases a few inches and in others many feet wide, which to-day may be traced as blind watercourses with no entrance and no outlet. Many of these gaping holes were seen upon the few cleared spaces, others were well within the bush and were not discovered for many years afterwards, but the most apparent effect of Nature's contortions was to be seen in the twisted and wrecked condition of the Paiaka township. Such rude houses as the settlers had already erected suffered considerably, not a few of the less substantial being thrown to the ground, while the remainder were left so inconveniently angular that their owner's only option was to demolish them with as little delay as possible. In the general wreck the mill of Messrs Kebbell Bros. seemed to suffer most, for steam-pipes were snapped in all directions and the machinery thrown out of level, to say nothing of the serpentine condition in which the long irregular building was left by the undulations of the land....

This decision [to transfer the mill to Wellington] together with the fact that the district immediately surrounding Paiaka had suffered more severely than that nearer to the mouth of the Manawatu River, caused the principal traders resident in the township to consider the advisability of moving to what they deemed to be safer quarters. Those houses which the earthquake had not destroyed were accordingly pulled down, and the pieces of those which had fallen were gathered together and transported to the site which is now Foxton.

Source: Buick, T.L. 1900. *Old Marlborough.* Hart & Heeling, Palmerston North, New Zealand. Reprinted in 1976 by Capper Press, Christchurch, New Zealand.
Location: Marlborough, Awatere Valley, Wairau Valley
Keywords: secondary, uplift/subsidence, faulting, building damage, background

p27 One of the remarkable evidences of the way in which this (Wairau) plain is being built up was the finding, some five years ago, of an old farm fence buried beneath ten feet of soil, in the neighbourhood of Foster's Channel. In this connection it is also worthy of note that many years ago, while some workmen were engaged in sinking a well in the Fairhall district, they came upon the partly decayed relics of a ancient raupo swamp, which at that time had flourished above the surface, like an oasis in the desert.

p36 To speak of the Awatere line of fault may not convey much to the average reader, but to mention the Awatere "earthquake crack" must sound strikingly familiar to every old resident of the province. This is by far the most important line of fracture, in the sense that owing to its being more frequently in activity during historical times, its course has been the most clearly observed. Between the Taylor Pass road and the coast it is not easily traced through the Dumgree paddocks, but the presence of the pond which has been dignified by the euphonious name of Lake Jasper, at once leads us on to the line on the other side, and from here it is never lost sight of until it intersects with the Flags fault at Glenwye. Finally we come to the line running from end to end of the Wairau Valley, which, in "the early days" was very energetic, as, for instance, during the year of 1855, a year of excessive earthquake activity. The land, which is now covered by the Vernon lagoons, was lowered at least twenty-four inches, and on the Benhopai Station the oscillations of the shocks were so acutely felt that a shepherd at once picked up his

swag and left, alleging as his reason for doing so that "it was time to go when his whare was first on one side of the gully then on the other".

p37 So far as the Wairau fault is concerned, its distinctive features have long since been obliterated by action of the rivers, but its presence is none the less pressed upon public notice by the frequency of the earth tremors felt in the vicinity of Blenheim, which lies between two of the most virulent fractures in the colony. That to the southward is, however, distinctly different, for in the Awatere the "fault" is clearly defined, sometimes and in some places more clearly than in others. For many years it was popularly supposed that this "crack" was first opened in 1848, or 1855, * years in which Marlborough was a rudely shaken by earthquakes as the Amuri was in 1888 by that remarkable series of shocks which destroyed buildings and fences at Glenwye.

*[Footnote on p37] A writer describing the effect of the 1855 earthquake upon the upper Awatere says "On Fairfield Downs (near Upcot Station), a fissure was opened as far as the eye could reach, and perfectly straight". [Sketch map of upper Awatere Valley in the notebooks of Frederick Weld shows Fairfield Downs below Mt. Gladstone and upstream of the place where Castle Stream enters the Awatere River].

p329 That the Boulder Bank was then [late 1840's-early 1850's] a centre of interest was due to the fact that shipping from the Wairau was just beginning to be established, and it was a convenient port of call for the bullock-punchers in passing to and from the stations in the Awatere. As yet no road has been made into that district, but the station supplies were carted along the beach and round the Bluff in the good old-fashioned bullock–drays. These journeys were often attended with a good deal of excitement and even danger, for not infrequently huge stones came bounding down the steep face of the cliff, and, striking some members of the team, caused a panic amongst the bullocks, and the driver was extremely fortunate if a capsize was not the result. Then again a driver, impatient of waiting, would sometimes attempt to pass the Bluff before the tide had fully retired, or if the delays of the road caused him to arrive after the tide had commenced to flow, he often punched his bullocks in the surf and chanced the consequences, which were seldom more serious than getting the wool or stores wet.

p331 But a great change was soon to take place in the mode of marine transportation, for it was discovered that the heavy earthquakes of 1855 had considerably improved the navigable condition of the rivers, and in 1860 some of the enterprising spirits conceived the idea of taking small crafts up the Opawa, thus superseding the slow and cumbrous system of conveying the ever increasing supply of wool to Port Underwood in barges and boats. Upon a trial of the new scheme being made it was found to be practicable, and vessels of from eighteen to forty tons initiated in that year what is now known as the river trade.

p338 Mr Gouland's neighbour on the Opawa River was Mr Budge, who, about the year 1848, came down from Nelson to conduct the survey of the plains after the land troubles had been settled. Mr Budge and his family lived on what is known as Budge's Island, upon which he kept a flock of sheep until its subsidence after the great January earthquake of 1855* caused the land to become so sodden that he was compelled to

leave it, and in succession to Mr Henry Redwood, senior, he took up a considerable stretch of country on the Bluff run, as well as a large area of farm land in a more elevated portion of the valley. Subsequently the run and the sheep thereon were leased by Mr Budge to Mr Redwood, who again took it up, and sent his second son down to manage it. Mr Thomas Redwood first saw the Wairau on the Christmas Day of 1847, having brought the pioneer mob of his father's sheep over from Waimea in company with Mr William McRae, who was one of the most intrepid explorers of the province, and who then began to stock the Blairich run.

*[Footnote on p338] The first shock of this earthquake occurred about one o'clock [the first 1855 shock occurred at 9:11 pm.] in the morning and was so severe that it demolished all the mud whares in the district [presumably in the Wairau Valley], and for three weeks afterwards the surface of the ground was in a state of constant movement.

p? A great sensation was created throughout New Zealand in March, 1855, by the reported discovery of an active volcano in Marlborough. It appears that while the Lady Grey, a steamer trading between the colony and the Chatham Islands, was nearing the coast, those on board noticed what was afterwards described as "wreaths of white vapour rising in a thin and unsteady column," from a high and conical shaped mountain in the Kaikoura range, culminating in "a canopy of smoke." The spectators of this phenomenon at once concluded that a new volcano had burst into activity, and although their report was not sustained by the passengers of the steamer Nelson, which arrived in Wellington shortly after the Lady Grey, they still maintained their ground. While the discussion was at its height Old Jack Guard came over from Port Underwood, and on being questioned he laughed at the idea of a volcano being in full swing on his side of the water and he not knowing anything about it, so to set the matter at rest a party went across the Strait in his whale boat, and proceeding to Flaxbourne, found that the cause of all the excitement was an old shepherd who had set fire to the fern on Ben More, and the flames ascending the mountain slopes had ignited a clump of white birch trees which then grew on the summit, hence the "wreaths of white vapour," and "the canopy of smoke," in which Marlborough's active volcano terminated.

BURNETT, R. I. M.

Source: Burnett, R .I. M. 1963. *The Paremata Barracks*. Published in conjunction with the National Historic Places Trust. R. E. Owen, Government Printer, Wellington, New Zealand.

Location: Pauatahanui, Wellington

Keywords: secondary, mainshock, building damage

However, to add further misfortunes to the barrack's already unhappy history, another earthquake in January 1855 damaged the building again.

The *Spectator* January 25 1855 is the source given for this information. However, there is no mention of the barracks or damage to them in this newspaper.

CAMERON, F.

Source: Cameron, F. 1940. Burtergill Station, Lower Awatere. *In*: Woodhouse, A. E. (ed.) 1940. *Tales of Pioneer Women collected by the Country Women's Institutes of New Zealand.* Reprinted in 1988. Silver Fern Books Ltd. Hamilton, New Zealand.

Location: Marlborough, Awatere valley

Keywords: secondary, mainshock, faulting, ground damage, background

p179-180

> Mr William Atkinson arrived in Nelson in 1841 by the ship *John Atkinson*, and in 1848 took up Burtergill run ...
>
> Two years later Mr and Mrs Atkinson rode from Nelson to their new home...
>
> Mrs Atkinson had another terrifying experience [other than being frightened by intruders] during the big earthquake of 1855. The whole house was shaking and the cradle was rocking so much that she could hardly pick up the baby before dashing outside. A great crack opened up in the ground, the remains of which can be seen today.

Information was apparently supplied to F. Cameron by E.G. Blick, grandson of Mr and Mrs Atkinson, and owner of Burtergill in 1988. The "great crack" probably refers to the Awatere Fault.

CAMERON, Norman & Jill

Source: Cameron, N, Cameron J. (ed.) (date unknown). *A History of the Camerons of Spring Hill* from notes by Dr Robert Cameron. Unpublished manuscript. Wairarapa Archives, Masterton, New Zealand.

Location: Marlborough, Wellington.

Keywords: secondary, mainshock, aftershocks, ground damage, building damage, tsunami/seiche, response/recovery

p5-7

> On Tuesday 23rd, January 1855, about 9.30-10.00pm, early settlers in the Wellington district and the northern part of the South Island - Marlborough - had their nerves tested by the commencement of a series of severe earthquakes. It was hard to keep one's balance and men staggered like drunken men. Minor shocks went on and then about midnight the most severe shock occurred. Shocks continued on the 24th with more rumbling. On the 25th, had three shocks more severe than previous ones. Rumbling like thunder but more unearthly - shocks seemed to be S.E. of the New Zealand. Horses staggered as if shot. In Wellington "Baron Alsdorf" hotel keeper was killed. Many broke arms and legs. Said to have been tides 20ft higher than usual. This seemed very questionable. Many houses and cottages shook down in Marlborough and a number in Wellington. Much cracking and fissures of land in Marlborough.
>
> My father was about 21-22 years old when these shakes occurred and was living in a "whare" overlooking Wellington harbour. He was in bed when the shocks, accompanied by loud rumbling started. In this Whare, my father had put up a loft where he used to keep fairly large quantities of stores, potatoes, flour etc. His bed was underneath this loft and when the shocks got very severe, potatoes and other stores

began to tumble down on top of him. Needless to say he came to the conclusion that it was time to get out of the cottage. He made for the door but found this jammed by the shaking, and that he could not open it. Then he remembered he had left a wood axe by the fireplace, so getting this he smashed the window of the hut out and got out that way. As the earthquake shocks still continued and he was uncertain how his whare would stand up to them, he decided to camp outside for the night. As it had commenced to rain, he remembered that he had a heavy farm cart which he had left on the side of the hill. As the result of the shock, it had moved some distance down the hill. However he got blocks of wood and thought he had made it secure. He then went back into his hut and collected more clothing and also his bedding, and sacks and tried to settle down for the night under the cart. As the shaking continued, sleep was practically impossible and to make matters worse, one terrific shock caused the cart to get away from the blocks. However he followed it up this time, found it more successfully and got his bedding under it once more and so passed the rest of the night, mostly listening to the thunder-like noises that accompanied the worst shocks. Much noise was also caused by rocks crashing down nearby cliffs.

Daylight brought some relief but shakes of varying intensity still went on. My father's first interests were to see how his hut had stood up to the shaking. Fortunately having been well built, it still stood up, although the loft inside had been badly knocked about and his stores scattered in all directions. Cracks had opened up in the land and although stock were in a state of terror, none of them had been injured. He then visited his relations living in the main homestead about half a mile away. Their house had stood up although the chimneys were down and a fair amount of other damage had been done. For about a week, so called terra firma bucked, kicked, winded, swayed and shivered. Regular work was practically out of the question and only essential work was undertaken, trying to quieten down the terror-stricken stock. A fair amount of time was spent visiting relations and the few neighbours within waking distance. A number of roads and tracks were blocked with rocks, slips and fallen trees along the cliffs facing the sea. My father did not seem to have been very frightened by the shaking, although he always described it as a "nasty experience". Asked why he kept so many stores up in his loft, and if he was afraid of the Maoris stealing it, he explained that he occasionally had stores stolen by escaped prisoners who used to make for the bush about his hut. He was not afraid of the Maoris stealing from him, for he said "the old time Maoris" were more likely to bring him food than to steal it from him.

At the time of this earthquake, my mother was just over 15 years of age and living with her parents who were in business in Lambton Quay, then practically the sea shore. Although she and most of the women folk in the household lived outside in tents for the duration of the shakes, she also did not seem especially frightened. She seemed to think it rather exciting, like many children, and frequently went exploring to see what was happening. One thing that seemed to interest her was a number of cracks that had opened up and were ejecting steam and nasty smelling gases. Her father, William Miller, had a saying that he would never live in a house where there wasn't a back door, due to his fear of earthquakes. Fortunately most of the settlers in Wellington had taken the lesson of the 1848 earthquake to heart and well built buildings stood to the strains well, although practically all chimneys, except those built of iron were down.

Included with the manuscript are notes about Dr. Robert Cameron whose notes have been used to write the history.

> The hand-written notes of Dr Robert Cameron (many on the backs of his prescription sheets) about his father Allan Cameron, who came to N.Z. in 1840 on the *Blenheim* aged about 7 (i.e. he was about 22 at the time of the earthquake). Some of the information also came from Allan Cameron's cousin Charlie aged about 18. They settled in Wellington and his father's first job was to act as a chain boy for surveyors. He later become a shepherd boy and saw a lot of the smuggling that went on around the Miramar Peninsula - Worser Bay area. The Camerons shifted to Wairarapa where Robert was born in 1876.

CARKEEK, S. Collector of Customs
Source: Carkeek, S. 1855. Letter to the Colonial Secretary, dated February 19 1855. IA 1, 1855/698, Internal Affairs, Series 1, Inwards Correspondence. National Archives of New Zealand, Wellington.
Location: Wellington
Keywords: primary, building damage, response/recovery

> I do myself the honour to report for the information of his Excellency the Officer Administering the Government that during the storm of earthquakes at this port on the night of the 23rd ultimo the warehouse known as "Hervey's" [Farish St] was completely shaken down, leaving the spirits, tobacco and other uncustomed goods exposed; another warehouse, known as "Loxley's" [Farish St] was so shaken as to render it quite impossible to abstract goods.
>
> I therefore deemed it absolutely necessary to establish an efficient watch for the protection of this Revenue, and determined that this important duty should be performed entirely by the Officers of the Establishment. I had all the Tide waiters landed from the several ships in harbour, and added to them the first and second Lockers and the weighers & Gangers, dividing them into nine watches of two hours each, from four o'clock in the afternoon until 10 o'clock the following morning, I then divided the Superior Officers into watches from 10 o'clock at night until four o'clock in the morning taking one of them myself - so that during the hours of darkness there might be a responsible officer present to act in case of need.
>
> The Tide waiters from being landed from their respective ships of course lost their extra pay of two shillings and sixpence per diem and taking into consideration the consternation of their wives and families during the repeated shocks, notwithstanding which they kept a most vigilant watch I venture to recommend to His Excellency that these officers be remunerated by receiving double pay for the period of ten days.

CARLE, Cyril Jordan

Source: Carle, C.J. 1945. *Wairarapa - The first one hundred years of development of a great district.* Wairarapa Times–Age, Masterton, New Zealand

Location: Wairarapa, Wellington, Makara, Palliser Bay

Keywords: secondary, building damage, uplift/subsidence

p17 Later in the year [1855], after a severe earthquake, Mr R. Torns [Iorns?], a son-in-law of Mr Masters, went to Wellington to see how his family had fared during their wait while he was building a house in Masterton for them ... and after seeing the devastation in Wellington he decided to take his family to Masterton....

The Chamberlain family came to Masterton also as a result of the 1855 earthquake, which wrecked their house at Makara.

p139 On January 22 [sic], 1855, a great earthquake occurred and had a pronounced bearing on the settling of the Wairarapa. A section of land covering about 4,600 square miles was tilted, and on the northern [sic] boundary a rise of 8 feet was registered, and in the west [sic] a rise of 9 feet occurred. The Muku Muku rocks were raised high and dry from the sea, and the anchorage at Te Kopi was dewatered. At Taita, Mr A.W. Renall, a member of the Wellington Provincial Council, had the foundations of his mill wrecked, and later, when in 1858 flooding wrecked the mill completely, he and other settlers petitioned Governor Grey for some relief, which was an impetus to settlement in the Wairarapa.

A rather garbled version of the uplift, possibly using Roberts (q.v.) and/or Lyell (q.v.) as sources.

CARTER C. R.

Source: Carter, C. R. 1849. Defective construction of the houses at Wellington. Letter to the editor. *In: New Zealand Journal* [London], May 19 1849.

Location: Wellington

Keywords: background, response/recovery, building damage

SIR, - As I notice from the latest despatch of the New Zealand Company's Agent, Mr. Fox that much of the damage done at Wellington, by the late earthquake [in October 1848], (or rather, earth tremor, for it is unworthy of the name of earthquake,) resulted from badly constructed buildings, perhaps you will permit one daily engaged in the art of building, in all its branches, to offer a few observations on those principles of construction best calculated to resist the effects of that oscillatory, undulating, or wave-like motion of earth, which occurred at Wellington. Want of time prevents me from entering into the subject in a complete manner, but thinking the few suggestions I have to give might render some little service, I give them with pleasure. The two principal things in building, which contribute most to stability, are good material, and good workmanship. Now after a careful examination of facts, I have no hesitation in saying that the greatest part of the damage sustained by the buildings in Wellington occurred from the discreditable and very inferior description of material used in their construction. A preparation of mud mixed with an exceedingly small portion of lime, in the proportion of "a bushel of lime to two barrowsfull of a substitute for sand," was

used with bad bricks in constructing the dwellings of Wellington. Chimneys constructed of English bricks and cement, withstood the shock. At Nelson the damage was a mere trifle; and, as the most part of the lime used at Wellington is brought from Nelson, we may infer that it is cheaper at Nelson, and therefore used in greater proportion than at Wellington which may account for the buildings at Nelson standing the shock so well. Good mortar in buildings, is of the utmost importance. Our old castles, through roughly constructed, often of unsquared stones, mere rubble-stone walls, yet such is the strength of the mortar used, that wind, rain and time, make an almost imperceptible progress in their destruction. In the over-hanging masses the principle of adhesion seems to rebel against the laws of gravitation.

Good mortar binds and holds all the different portions of a house together that enables a dwelling to withstand ordinary shock of an earthquake; for one part cannot fall without the other. Buildings in the city of Quito, in South America, must be constructed on this principle, for say Humoldt, in his Cosmos, "In the city of Quito, which stands at the foot of an active volcano – the Rucu Pinchincha, 8,950 feet above the level of the sea, and boasts of beautiful cupolas, lofty fans, and massive houses several stories high, I have frequently been surprised at the violence of the earthquakes by night, which nevertheless, very rarely occasion rents in the walls; whilst in the plains Peru, apparently much weaker oscillations injure lowly built houses of cane."

In accordance with the above, I would suggest to our friends in Wellington, to lay the foundations of their houses two or three feet below the natural surface of the ground on a concrete footing, and if it is to be a building wholly constructed of bricks, let the mortar be good, which will be the case if mixed in the proportion of one bushel of unslaked lime to 2 bushels of sharp sand; or even one bushel of lime to 2½ of sand will not make bad mortar, the lime should be stone lime, shell lime and chalk lime, are of an inferior quality. The stone lime that slakes quickest is the best; if it be scarce in the neighbourhood of Wellington, it is the duty of the authorities to make a search for some. Sand should be washed clear of the earthy or clayey particles. I should think it may be found in abundance in the beds of the rivers. Experience has proved, in England, that sea sand after it has been dried in the open air during the summer is equal, if not superior, to land sand; and when mixed with lime and coal ashes makes most excellent mortar. The bricks should be a good marl and dried in the sun, and then well burnt.

When the brick-work is three feet in height, from the foundation, and is fourteen or eighteen inches thick, lay pieces of hoop iron on its horizontal top, and at half the length of the wall, and each corner; take out of the surface of the wall, a brick, or two; and wrap each piece of hoop iron once around one brick, then replace the bricks level with the top of the wall, and carry up the wall three or four feet more; and than again adopt the same plan, and again, till the wall is the height required, and then the brickwork will be compact and firm. To strengthen it in height, iron hooping should be worked in diagonally; and if the first floor of joists are well spiked to the bond-timber, and the ceiling joists to the wall plate, a degree of stability will be insured capable of withstanding the shock of an ordinary earthquake.

This much for brick buildings; but as timber from its cheapness in New Zealand and from being easily worked, will always enter largely into the construction of buildings there, I shall devote a few remarks to buildings principally constructed of wood; through the use of timber from its liability to speeds decay, and to take fire, ought to be as much avoided as possible.

For a dwelling, the greatest part of which is to be build of timber, a brick foundation, and brick chimneys are essential, if not absolutely necessary; on this foundation, just above the level of the ground, wood-bond of a durable nature should be placed, which should be dovetailed together at the corners; then upright pieces of quarterns, four and a half inches by four inches, should be morticed into this bond, and kept, say, fourteen inches apart; the head, or tops of these quarterns should again be morticed in the bond of the second-floor, if any, or the wall plate, to carry the roof, and the interval between them filled in with a brick in width; care being taken to brace the quarterns with pieces of wood, at about every two feet in height, the ground floor joists, and ceiling joists, to be well spiked to the bond. The whole of the outside and inside of the dwelling should be plastered. The outside, if rough casted, would give the house the appearance of not being mostly built of wood. The method of rough casting is simple. Rough cast is a preparation thus made: a quantity of pure slaked lime is mixed with a quantity of sharp rough sand with water, and when in a liquid state, cast or dashed against the wall; directly the second coat of plaster is laid on, and while it is in a damp and soft state.

These hastily penned remarks are not altogether intended for the instruction of builders and workmen of Wellington; they, I should say, know their business as well as many in London, but to call the attention of the public of that town, and the local government, to the necessity of making some local building act as a guide to workmen, builders and architects, to which they must adhere.

The effect of the earthquake in New Zealand has been to alarm the inhabitants, and damage their property, a serious evil, but capable of being repaired. Those who are in new Zealand, and those who are going there, have no more to fear than people of other countries, all countries are liable to those convulsions of nature, and no one can say what part will be exempt from them, or what part will be visited by them. Their origin dates from the creation of the world; their source lies deeply buried in the bowels of the earth, and when or where they will convulse, shake or up heave the crust of the globe, is a mystery to all men. The damage in Wellington has been trifling as compared to similar visitations in other countries; or in 1693, Sicily, the city of Catania, and 140 towns or villages were destroyed, and 100,000 persons perished.

England is subject to them. In 1816 a smart shock rent the spire of the town of Mavern, in Inverness, and from the year 1048 to 1800, a period of 752 years, no less than forty-five earthquakes were recorded. So late as 1839 an earthquake was felt in the country town of Lancaster, which shattered chimneys, and alarmed the inhabitants. With these remarks, I conclude, and trust they will be received in the same good feeling as they are given, by one feeling a great interest in the welfare of New Zealand.

[Our correspondent might have added the earthquake which split the Eagle Tower of Caernarvon Castle, and did further damage in the mountain districts of North Wales. Perhaps no country is without similar instances. Earth tremors are also of common occurrence in the districts around Perth, and in other parts of Scotland. Our recent accounts from New Zealand show the whole affair to have been absurdly exaggerated, as would be seen on reference to our last Journal. – ED.N.Z.J.]

It should be noted that Carter was living in England when he wrote this letter and had never been to New Zealand. He was, however, a strong advocate of emigration, particularly to New Zealand.

Source: Carter, C. R. 1866. *Life and recollections of a New Zealand colonist Vol. II.* R. Madley, London, England.
Location: Wellington, Wairarapa, Palliser Bay
Keywords: primary/reminiscence, background, uplift/subsidence

p89-93. [Description of the coastal route May, 1853]
I now resumed my journey, and pushed on towards the much-dreaded Muku Muku rocks, for the day was far spent. As I arrived at each rugged point, I imagined it to be "the rocks" but I was soon undeceived, when passing them so easily. I walked on and on till the sun had declined below the horizon, and the shades of evening were closing around me - then I dimly discerned, at a short distance, a huge black mass of rocks rising up before me, and projecting from the high hills at the back far into the sea. Sure enough, this mass was the Muku Muku rocks, and I was now about twenty-five miles from Wellington. To pass these rocks safely it had to be done at low water. The sea was moderately smooth; the stars were shining, and the moon's bright rays were reflected on the waters of the ocean. Close to the huge perpendicular and overhanging rocks, which in places intercepted and prevented the moon's rays from reaching the water, all was shrouded in the deep gloom of darkness. It was not low tide, and the water was up to the rocks, slowly ebbing and flowing with each receding and advancing wave. Outside the main body of the rocks great flattish boulder stones and rugged crags rose out of the sand and sea here and there, and appeared as if one could leap from one to the other, and thus pass round the projecting mass. At some places I could see the bottom by the light of the moon, at others, in the shade and sheltered by rocks, the water looked so still, black and dark, that I could scarcely distinguish it from the flat-topped boulders in its midst.

What was to be done? If there were but one point to pass I might risk a great deal. I tried to climb up the sides of this rocky barrier; this was out of my power, I stood at the sea of it, and by springing from rock to rock, I got in front of it; when beyond it, I saw many other rocky points and hollows, and white surf here and there dashing against, them. All appeared water and rocks, rocks and water. To retrace my steps was possible - to go on dangerous. I decided to return; but to where? In the dark I could not find my way back to Mr Riddiford's. I now disagreed with Byron on the charms of solitude by the seashore (perhaps the poet had not experienced them at night, as I now did)....

Where I stood was the naked stony beach - that was too hard and exposed for a bed. I looked up at the great mass of rocks before me. I saw there no cave or hollow in which I could coil myself up for a few hours.

I turned my eyes to the hills at the back; they looked more inviting, there was bush on them, and bush was shelter. I walked up towards them, and on one of their slopes, composed of loose stones and earth, I found a fine clump of New Zealand laurels, not shrubs but laurel trees, with umbrageous tops, foliage ever green, and with fine large leaves, of a bright dark green colour, and looking day by day, to my mind, far more noble and beautiful than any European laurel I had ever seen....

At last the day dawned, and after it came the revivifying rays of the sun, but I rose from my hard bed, cold, sore, and hungry. I went down to the rocks once more, I found the tide low and the sea but slightly ruffled. I had now day-light, but still there was some danger; I felt thankful I had not attempted the passage of the Muku Muku rocks* during the previous evening, for now I had to crawl through holes in the rocks, and jump or wade from rock to rock. Sometimes I scrambled over projecting cliffs, or walked in the water by their perpendicular sides. Perhaps I did not keep in the usual track; this would make it all the worse for me. At all events, I got round them, and then came upon a fine wide beach of soft sand, which continued for nearly two miles, and brought me to a high piece of table land, at the corner of which I ascended by means of a well-beaten pathway, an d which brought me to the farmhouse of Mr C. Matthews (Warapapa station) [Wharepapa]....

*[Carter's footnote to above text] This part of the coast, and these rocks in particular, were up-heaved out of the water from 5 to 8 feet by the earthquake of 1855. So that passage round them is now comparatively easy to what it was when I passed them in 1853.'

p98-99 [And the return journey.] We landed, the boatmen scraped my horse, wiped him dry, and then saddled him, and I made the best of my way to the Muku Muku rocks.

'The weather was stormy, and the sea rough and angrily lashing the shore with its waves, for the wind was south-east and blowing in-shore. My horse was a small, but a compact, stockhorse, used to the coast and cattle mustering. I arrived at the rocks at nearly low water, but the sea was running-in, breast high, against the first rock, which was about 5 feet high, and nearly perpendicular. I rashly rode into the surf - which at one moment was knee-deep and one or two minutes after as high as the five foot-rock - when a huge roller dashed in, and ran up the side of the cliffs, and buried me and the horse for the space (I should say) of half a minute. I then saw nothing and, for the instant, I was half-blinded and smothered with foam and water, and also nearly washed out to sea by the reflux of waters. My little horse threw himself against the rock and as it were clung to it, and when the sea receded for moment he turned his head and quickly and safely brought me back to a high and dry part of the beach.

Being very anxious to continue my journey, I next mounted to the top of the rock, and, rein in hand, I endeavoured to lead - by coaxing and threats - the horse round it; but he appeared so alarmed at the boiling surf about him that he would not move an inch. Just at this moment, another roller came fiercely in, burying the horse and immersing myself - where I was standing on the rock - up to my middle in spray and water. After this, I gave up any further attempts to pass the rocks, and made my way to Mr Matthew's station, where Mr M kindly supplied me with dry clothes and warm food, and where I remained for the night. The next morning the wind was blowing hard, and the sea still up; I therefore remained where I was.

Source: Carter, C. R. 1866. *Life and recollections of a New Zealand colonist.* R Madley, London, England.
Location: Wellington, Hutt Valley, Nelson
Keywords: primary/reminiscence, mainshock, building damage, tsunami/seiche, response/recovery, casualty, uplift/subsidence

During the remainder of the year 1854, but little occurred to interest the reader; the commencement of the year 1855, however, was of more importance, it was marked by a great event; a serious earthquake which took place, as near as can be ascertained, at fifteen minutes past nine o'clock, on Tuesday night, January 23rd, 1855. During the day the weather had been stormy, and the wind blowing hard from the N.W. It threatened to rain all day, and at noon a heavy shower fell. The day, too, was the race-day, and when the shock occurred, there were still persons returning from the "Burnham Water Races." I had not been to the races, but being anxious to know what horses had won, I went a little before nine o'clock in the evening, to the Royal Hotel (once Munn's) [Mulgrave St], to hear from the landlord the race news. I had been seated but a short time, when suddenly the whole of the hotel began to move violently, as if some great force were exerted at each of its ends to pull it rapidly and horizontally backwards and forwards. The first thought that instantly occurred to me was to get out of the house and run home to see how my wife and child had fared. I jumped up from my seat in the little back parlour, and admidst the din and noise of breaking and jingling bottles and glasses, which were packed close together on the shelves of the bar, I hurried out, on to the road; I could see but little that was going on; I could hear the waves dashing on the beach, and I could feel the ground heaving and rolling, as it were under me; and when, as I bounded along and my feet were off the ground, the earth seemed to me to rise up and meet them half -way. When I had run about a hundred yards, I stopped in front of the Council Chamber *, for I heard a crashing noise, and I saw it enveloped in a cloud of dust - the ground was still heaving and shaking - and as the dust partially cleared away, I distinguished through the gloom of night sufficient to convince me that this two storied building had settled down into one, and that the upper story now rested on the broken timbers and ruins of the lower one. I should think that I remained in front of it while the earthquake continued, about one minute; altogether I should say, that the duration of the shake was about two minutes.

*[Carter's footnote to the above text] Well might this building fall, for when I afterwards officially examined it, I found the ground plates on the brick foundation, entirely rotted away, as were also nearly the whole of the lower end of the studs. The upper story was a very heavy one, and the wonder was to me, that it had not given way and settled down before. It was one the oldest buildings in Wellington and imported from England.

When I reached home, [corner of Bowen St/The Terrace] I found my wife in a great state of alarm, but the chimneys to my house were uninjured. I had one or two bottles containing wine, a little crockery, and two or three chimney ornaments broken, but no other damage done. My house was built on a good foundation.

About two o'clock on the morning after the shock, I went down to the beach and there found alarm and confusion prevailing amongst the inhabitants, and very considerable damage done to property, and that the waters of the harbour had risen from two to three feet higher than they had ever been known to do, and had flooded some of the houses on the low beach. For a detailed account of the damage done, &c., I refer my readers to the Report on the Earthquake, page i. No. I. of the Appendix [see Mills & Carter]. I may here state that (on March 15), after the earthquake, I was (with Messrs. Roberts and Mills), appointed a Member of the Earthquake Commission. Mr Roberts being obliged to leave the colony - being ordered home - the duties devolved on Mr. Mills and myself; the amount of labour that fell to my share is explained at the end of the Report. For several nights after the earthquake, some of the inhabitants slept in tents on the lower slopes of the adjoining hills, and slight shocks occurred at intervals, but the very day after this awful night - when the worst was past - confidence began to be restored. Repairs were effected, business was resumed, the newspapers were published as usual, and what was more noticeable and strange, the virulence of politics - mitigated for a night - resumed its sway. A few days previous to the earthquake, exciting public meetings had been held to discuss the question of Education. During the earthquake and for several days after it, party feeling on these discussions and other disputes, ran very high; and from the earnestness and bitter feelings displayed, and personalities indulged in - in the Provincial Council and the two Wellington newspapers - no one would have imagined that such a fearful visitation as an earthquake had occurred.

The day after the earthquake took place, the *Independent,* wishing probably, to inspire confidence by speaking of the event lightly, published a very meagre and inadequate account of it; in fact, under-rated the grave character of the calamity. The following is the account in question:

"On Tuesday evening, a little before ten o'clock, the community were alarmed by a smart shock of an earthquake, which lasted several seconds, and was succeeded at intervals by tremors of less violence. The first shock knocked down many chimneys; by the falling of one of which, we regret to say, one old colonist, Baron Von Alsdorf, who was infirm and unable to get out of the way, was killed. At the hour of our going to press, there is every appearance of all commotion having ceased, and we trust that the partial damage above referred to, will prove to be all that we shall suffer. We have before cautioned our readers against the insufficient character of the brickwork of their chimneys and other erections, and we trust that for the future, some better model will be adopted." - *Wellington Independent,* Jan. 23rd, 1855. [Repeated in *Wellington Independent* extract]

The *Spectator* was at this time the vigorous opponent of the *Wellington Independent.* Its proprietor and editor, Mr Stokes - an able man - was unfortunately a gentleman whose language, in speaking of those opposed to him, was saturated with bitterness, and whose smiles appeared more calculated to repel than captivate. These peculiarities of the editor of the *Spectator* imparted additional asperity to the dispute, as to the correctness of the two accounts of the earthquake, given by the two newspapers. As the *Independent* had drawn its statement very mild, it was to be expected the *Spectator* would "come out" very strong, and so it did, for it published all the information about

the earthquake that it could collect - good and bad, exaggerated and impartial. At the same time as the earthquake occurred, the *Pandora,* H.M. surveying ship, was laying at anchor in the harbour, and experienced the sea effects of the earthquake. Immediately after the earthquake took place, the "Commander" of this vessel, Byron Drury, ordered his boat and went a-shore, where, on the beach, he was an eye-witness on a darkish night, to the excitement and great alarm of some of the inhabitants, and also to the serious injury done.

On the third day after this, the 25th, he weighed anchor, and crossed over to Nelson, which place had felt the earthquake severely, as may be gathered from the *Nelson Examiner* of January 27th 1855. By the time Commander Drury arrived in Nelson, the inhabitants of that place had had sufficient time to clear away from Commander Drury's view, the debris from the brick houses which were nearly shaken down, the chimneys which were entirely down, and the crockery ware, &c., that was smashed; and, as might be expected, Commander Drury saw the effects, or results of the earthquake in the two towns, under totally different circumstances, which will account for his speaking so lightly on the extent of the damage done by the earthquake at Nelson, and so sensationally of its effects in Wellington. This he did in a long letter he published in the *Nelson Examiner,* which letter, I have no hesitation in saying was an exaggerated one. Even the *Spectator* characterised it as conveying a "strong impression." As if to counteract this "account" in the *Nelson Examiner,* at the request of the editor of the *Spectator,* Commander Drury, on the 20th of February, inserted a letter** in the *Spectator*, which was much more rational and impartial than his previous one inserted in the *Nelson Examiner.*

**[Carter's footnote to above text] I think the following extracts from this letter will prove interesting to the reader: "We find the extent of the upheaving not to exceed two feet.... [Not included here, see *Spectator* Feb. 24 1855 extract]

A great deal of damage was done to property in the town of Wellington, and also to the roads and bridges in the country; particularly the Hutt bridge - of one span - which was shaken from its abutment at its southern end, and afterwards rendered completely useless by a flood in the river. I, by contract with the Hutt Bridge Committee, erected a new 40-ft. span bridge, for the sum of £1,458, and it was opened for traffic, January 1st, 1856. My friend, John Roy, at this time the Provincial Engineer, estimated the cost of repairing the damage done to the main roads at £1,750. I am of opinion, in which I receive support from Commander Drury, that the whole damage to public and private property in town and country, was much more than compensated for by the upheaval of the shores of Wellington harbour, to the extent of two feet (up the coast was more than this, at the Muku Muku rocks for instance); prior to the earthquake of 1855, the road from Wellington to the Hutt was, in many places, liable to be washed away; now it is high and dry. The drainage on the beach in the city of Wellington was attended with difficulties, it can now be easily effected.

CAVERHILL, Hannah Rebecca Frances

Source: Caverhill, H.R. 1855. Diary May 7 1853-March 19 1855. *In:* Caverhill, H. R. F. Diaries of family life in North Canterbury. Canterbury Museum, Christchurch, New Zealand.

Location: North Canterbury

Keywords: primary, mainshock, aftershocks

> 1855 Tuesday [January] 23rd. [Near Motunau] Fine. Mr Caverhill from the country we all went up to Mr Waitt's this evening. There was a severe earthquake felt at 10 minutes past 9 which lasted two minutes.
>
> Wednesday 24th. Fine. I understand that there was another earthquake in the night and one this morning but I did not perceive them....
>
> Thursday 25th. Fine. We felt another earthquake last night about half past eleven....

CHAPMAN, Edward Palmer

Source: Chapman, Edward Palmer 1855. Diary August 19 1854 - December 26 1856. Canterbury Museum, Christchurch, New Zealand.

Location: Christchurch

Keywords: primary, mainshock, aftershocks

> Tuesday 23rd. Very hot and sultry all day. About 9pm occurred a very strong shock of an earthquake which continued several minutes, and was repeated several times during the night. It was so strong at first that we could scarcely stand up right. Wind NW. Very warm.

CLARKE, Rev W. B

Source: Clarke, W. B. 1855. Account of the earthquake in New Zealand of 23rd January 1855. *In: Sydney Morning Herald* [Australia] March 12 1855. *Also in: Spectator May 02 1855.*

Location: Auckland, Wellington, Taranaki, Lyttelton, Christchurch, Wairarapa, Marlborough, Wairau Valley, at sea, Palliser Bay, Nelson

Keywords: secondary, mainshock, aftershocks, uplift/subsidence, tsunami/seiche, atmospheric effects

> The recent statements respecting the earthquake in New Zealand naturally induce some reflections upon the phenomenon and its physical consequences; and situate as this colony is in relation with New Zealand, these reflections may not be without interest.
>
> It has already been stated elsewhere that there is good ground for concluding, that Australia and New Zealand stand upon the same submarine base, and that formerly the coast of the former country extended much further to the eastward that it now does; and that by oscillations of the sea bottom, great changes in the relative extent and elevation above the sea of various tracts of land in this part of the Pacific Ocean have taken place.
>
> The facts, that Norfolk Island is covered by boulders of a rock which must have come from a considerable distance, either drifted by ocean currents or lodged by ice; that Howe's Island exhibits unmistakable evidences of coral deposits round its base; that

soundings exist in places between Australia and New Zealand; the Kerguelen's land to the westward contains a coal deposit, and is covered by a living vegetation which is identical with that of very distant regions now separated by wide tracts of ocean; and that New Caledonia also exhibits a relationship with New South Wales in its living flora, and in its identity of rocks, minerals, and metals; all tend to one general conclusions, that these so regions were once connected, and that the summits of the ranges in the islands in this portion of the Ocean are merely the outline peaks of the once, perhaps more extensive continental tracts of which the present lands are distinct and separated fragments.

The proofs of this deduction are not necessary to be adduced to this place, though they are at hand. The argument for the supposed oscillation of the sea bottom is strengthened by the well-known fact, that the barrier reefs of the north-east coast of Australia, and New Guinea, and New Caledonia rest on the slopes of land that must have been submerged.

It has also been very ably argued by Mr Daus, that the parts elevated or depressed lie along the region where modern, or not very ancient, igneous action has been at work, and that the general trend of the line in which this action has occurred is N.W. and S.E., though N.E. and S.W. is also a line of trend which is very prominent in the Pacific. Mr Darwin, and Mr Daus, have each given lists of islands that have been subject to this oscillation; and have shown, that the changes of level have had un-equal force, varying in elevation from 20 inches to 150 feet, and in a few instances to double that amount, whilst the subsidence has taken place through many thousands vertical feet. Numerous examples, amidst the groups of islands to the N. and N.W. of New Zealand, are recorded by explorers.

It would be rash to assign subsidence to the direct action of any igneous forces; but it is not rash to look to such forces, especially where there is no apparent sensible connection, as the immediate agents of elevation in some localities, and reasoning from known instances in modern times, it is not unfair to presume that in epochs anterior to the present, though geologically comparatively recent, similar effects arose from similar causes. Thus over wide areas, in probably, the tertiary epoch, fully a thousand centres of eruption were in action; though in the present day, there are perhaps not more than ten in all Polynesia and Melanesia. Of these, one is on the north island of New Zealand; one at Tanna [?]; and one S.W. of New Caledonia. But Sir James Ross, we know, also discovered two vast active volcanoes in the Antarctic land south of New Zealand, in the midst of perpetual snow.

It is to be inferred that the subsidence in the Pacific Ocean has generally ceased; and that elevation is the most prominent feature of the oscillation of the present epoch; and it will occur to the reader, that whatever may have been the amount of such elevation in very ancient geological epochs, its present amount is not considerable, and rather paroxysmal that continuous.

Now all volcanic eruptions are not mediately or immediately connected with elevation, and this can only take place by the agency of which earthquakes are one evidenced.

Many volcanic eruptions are unattended by earthquakes, such as that of Moana Loa in 1840; other though slight, are preceded and accompanied by fearful earthquakes over enormous area, producing visible changes of level in existing coasts. Such was that of 1832, when the coast of Chilli was elevated for more than 1000 miles in extent, several feet above the usual level. Those that require further examples are referred to the popular treatises on Geology, especially "The Principles" by Sir C. Lyell. But Mr. Darwin in his "Observations on Volcanic Phenomena in South America, "(G.T., vol. V) has brought together the earthquakes of Chile, the activity of the volcanoes in the Andes, the submarine eruption of Juan Fernandez, and the elevation of the land around Conception in the year 1835, as contemporaneous. In 1837, as a similar elevation took place in the same neighbourhood, in connection with similar phenomena. These instances suffice to show one agent of elevation in modern times.

It cannot, therefore, be considered merely theoretical to assume, that the late earthquake in New Zealand accompanied by elevation of the coast was connected with a volcanic eruption at some distance; and if the examination could be make, it would, probably, be found that Mount Erebus or Mount Terror in the Antarctic region were in eruption at the time.

The active principle is still, no doubt, at work in New Zealand; but such facts as we have before us, show that the shock was propagated probably from the South; though its force was connected with an extension of activity even under New Zealand. The distance is not too great. In the year 1755, that of the famous Lisbon earthquake, all Europe and much of America and Africa were shaken the dame day by the concussions of Hecla in Iceland – a distance not less than that between the Antarctic region and New Zealand. So far as my observations and researches made in New South Wales have led me, I am induced to consider that in this colony at least, all the earthquakes which have been felt by myself, or by other persons, since the country has been occupied, have been secondary, the result of some eruption at a distance; and in one instance I felt a shock here which I afterwards ascertained to have been contemporaneous with an eruption at St. Matthews, at a distance of many miles more than that between Tomboro, in the island of Sumbawa, which in 1815 was in eruption, and Sumatra, 970 geographical miles from that volcano, where *the sound was heard.*

No conclusions can be drawn, therefore, as to probable damage to this colony by eruptions beyond New Zealand, or by earthquakes therein; and though in earlier epochs New South Wales must have been shaken by some violent shocks, the paroxysmal throes that have left their traces of former existence in her shattered and elevated lands seem now to have subsided. But the distance between Australia and New Zealand is not so considerable as to render the occurrence of an elevating shock a matter of total indifference. The recurrence of a series of violent damaging earthquakes in the same part of the island in 1855 as was shaken and injured in 1848 seems to prove, that the forces which have so changed the face of the Pacific in ancient times are not dormant, and some yet living may, perhaps, be witness of the repetition of a larger scale of the phenomena by which the old continent of the Pacific was broken up, and numerous islands have been lifted from the ocean.

In regarding the earthquake in an altogether physical point of view, we shall best comprehend its effects. For, the falling of buildings, and the loss of property, or even of human lift, in those catastrophes, however affecting and solemn in a commercial or social light, are not the criteria by which we judge of a natural phenomenon, though they may be of the calamity which is produced thereby.

Unfortunately the actually recorded facts are few. We read the *Pandora*, man-or-war, was shaken violently and thrown on her side during the shock. This proves, that the sea bottom was affected for some distance from the land, and it is not improbable that we shall hear in time of other vessels similarly affected far more to the westward than the *Pandora's* anchorage. Captain Denham has recently struck soundings in the meridian of Norfolk Island; it would be interesting to discover whether the earthquake has elevated the submarine summits off New Zealand as well as the coast of that island.

The first accounts of a catastrophe are generally somewhat distorted. But if the published narratives may be relied on, the height to which the coast has been elevated is about four feet. The extent, through which this change of level has place is not stated. But the shock was felt over nearly the greater part of New Zealand.

One writer says "the tide came over the quay at Wellington during the earthquakes, and since then has receded, and the tides at least six feet lower since the first shock". This is very vaguely expressed, but he adds "So that it is evident there has been an uplifting of the land." Another writer says, in the *New Zealand Spectator*, of the 27 February, that "the earthquake seems to have been generally felt *about the same time* throughout New Zealand; and that "*the Josephine Willis*, which had arrived at Taranaki, felt the shock about 9pm., of the 23rd, at the distance of 150 miles from the coast of New Zealand." He further states, that "from measurements which have since been made, it has been ascertained that the land has been raised to a height of from three feet six inches to four feet." He mentions the death of "shell fish' attached to dry rocks; and that Bally [sic] Rock, off Point Jerningham, which was formerly 18 inches below low water (spring tides) is now two feet above low water. Hey says, a great wave, 12 feet high, preceded the first shock; and that two coasters passed an immense quantity of dead fish. These are common phenomena in coast earthquakes. The minor shocks up to the end of January were probably due to the settling of the lifted area. Vast cracks traversed the flat country and the Wairarapa Range.

The first shock it, is said, by a careful observer, took place at 9h. 17m. 30s p.m. and lasted 50 seconds, and was followed closely by another. This observer says the shock came from E.S.E and went towards E.N.E describing an area of 40 degrees. This is curious if true, for earthquake shocks usually progress in given directions. So vague are the notions of *time* with most people, that we need not be surprised to be told by a writer at Wanganui, that he should think the shock lasted two minutes, i.e. 120 seconds! He says the bed of the river at low water looked like a ploughed field!

At Te Kopi, the earthquake did good; for the beach now extends a considerable distance beyond the Muka Muka rocks above the level of high water, and these rocks were dangerous.

Captain Drury, R.N. says the shock occurred at 9h. 11m. All agree it was about nine o'clock and another observer differs 6.5 minutes only. He says the shock lasted more than a minute, which agrees with the two shocks of the former observer, closely following so as to be confounded. The Pandora was in 6 fathoms. Captain Drury makes the "elemental wave come from W.N.W. to E.S.E.," and says, mud was thrown up from the fissures? The barometer was not affected (29-30 to 30.00 inches), before or after the shock.

The tide, he says, for eight hours subsequent, rose and fell every 20 minutes, rising from 8 to 10 feet and falling 4 feet below spring tides. One ship grounded four times at anchor. The tide scarce rose at all on the 24th. A tremulous motion, with occasional shocks, was continuous all the 24th. On the 25th, at 0h 55m A.M. there was a sharp shock: and at noon, off Sinclair Head, in Cook's Strait, one shock was felt in 26 fathoms, and a slighter shock at 80 fathoms, off Queen Charlotte's Sound.

At Lyttelton, says the Times, the shocks were felt at 9a.m.; noon, 23rd; and about 7a.m., 24th and these were of long duration.

At Nelson, says the Examiner, the shock was felt at a quarter-past 9, and appeared to come from the N.E., and is believed to have lasted from 3 to 4 minutes. But the writer adds, there were, probably, several continued shocks in that time.

Mud and sand were ejected at Wairau.

At Taranaki the shock is said to have commenced "about 9 o'clock," and to have continued with considerable severity for nearly 5 minutes!!!

At Auckland it is said to have occurred at a quarter past 9 p.m.; duration of shocks one minute; direction, from E. to W.

We may observe that, from the above data, the shock occurred, no doubt , as Captain Drury says, at 9 h. 11 m. p.m. His time was correct.

There is a discrepancy about the duration – 50 seconds; one minute; two minutes; three to four minutes; nearly five minutes. All this is mere guess; about one minute is the nearest approximation of the two most careful observers.

Then again, the direction of the shock is stated to have been from N.W.; from E.S.E; from N.N.W.; from N.E.; and from E.

If these be true results of observation, they would imply a vorticose, or circular motion, which is probably the case from the supposed curve of 40 degrees said by one observer to be taken by the shock; but much reliance ought not to be placed on private sensations; one good observation on a basin of treacle, or soap and water, would have settled the question. As all New Zealand was shaken, the shock must have been

progressive in a given direction, and further testimony will perhaps, show this and there must have been a vertical movement to elevate the land.

During this earthquake the wind was from N.W. at Wellington, from 8 p.m., 22nd, blowing hard, as it does, I believe, almost always there, with some rain; on the 23rd, it was clam at night. At Lyttelton [sic] it was from N.W. with sultry weather. At Auckland it was calm, and sultry weather – barometer also high.

Captain Drury thinks the earthquake affected the air after but not before the shock, which was independent of the wind. The meteorological registers will serve to illustrate this. The prevalent wind of Wellington is, I believe, for at least nine months in the year, from N.W. The barometer was equally high on the east coast of New South Wales; and the weather was equally hot and sultry, and the three fearful last days of January will long be remembered. The N.W. wind had probably nothing to do with the earthquake. Captain Drury notices that it blew strongly at the time of the shock, and was calm preceding the earthquake, i.e. on the 22nd but that every variety of wind and weather succeeded in the next 24 hours after the earthquake, with numerous smaller shocks.

Now, in Italy, the wind is generally W. and S.W. preceding an earthquake; it lulls entirely during the catastrophe, and returns with violence after it. There is no instance known there of any wind blowing during a shock, and the instant the slightest breeze is felt the trembling stops. There must, therefore, have been something independent of the atmosphere in this New Zealand earthquake, and coupling with the circular motion and the land slips the actual elevation of the land and the outpouring of the mud the conclusion must be, from the known phenomena of earthquakes, that there was a secondary combined with an immediate shock, thus confirming my opinion that the earthquake was propagated from a distance.

With respect to the relative force of this earthquake, the elevation of the land was strictly in accordance with other cases on record. Bylandt says that an undulatory shock cannot elevate a continental tract more than from four to five feet. In 1835, the land was raised on the coast of Chilli [sic], from two to ten feet. In 1822, the height of the raised land was from three to four feet. There are several particulars in which the earthquake in New Zealand agrees which that of 1822 in Chilli [sic]. Mrs. Graham, who first stated the particulars of that phenomenon, was doubted and contradicted at the time: but subsequent observers have confirmed her narrative, and it is pleasant to see the progress of observation. Men will now not doubt such facts. Looking at the list of elevation to which the coral islands in the Pacific have been subjected, out of 48 such instances, there are 12 of less elevation than that which took place on 23rd January in New Zealand.

As to the duration of the principal shock, taking it, as above, at one minute only, that time is about six times as long as that of the shock which overthrew Lisbon in 1755. It may therefore, be called a considerable earthquake. The shocks as Martinique in 1839 lasted only 30 seconds, those of Guadaloupe in 1843, 90 seconds. The noise during the fearful shocks in Syria in 1837 lasted 15 seconds.

I will venture one word more as to the direction of the shock. It is known that in many other earthquakes, an undulation, propagated in one kind of soil or formation of rocks on meeting with another in its course, is momentarily checked, producing a lateral, in combination with the direct shock. It may have been so on the 23 January. The prevalent directions noticed vis: N.W., W.N.W., and E.S.E., seem to point to an undulation from about S.E.. or E.S.E., for it must be remembered that the shock felt generally indicates motion from the opposite direction below the surface; and the shocks from N.E. and E. look very like lateral motions rectangled to the main line of undulation. If there had not been mention of a supposed curve, from E.S.E. to E.N.E., this conclusion might have been adopted at once; and in fact, the apparent curving may have been nothing but the effect of the undulation on a hard mass of rock resisting the motion which had struck it at a great depth.

The examination of the nature of the formations in the places indicated would determine whether there is not a mass of granite, or some hard rock about the locality indicated.

If, as is most probable, the earthquakes are generally due to the effect of pent up steam, the action of boiling springs at the time will, perhaps, lead to some other influences. With further records, the present conclusions may require modification; but so far as the facts have been recorded, such appear to be the legitimate conclusions.

A few words may be added on the earthquake of 1848. It occurred in nearly the same district as in 1855, which is in agreement with the known occurrences of earthquakes elsewhere – they are repeated in the same localities till, probably, the land shaken is elevated sufficiently to allow the earthquake force to expand itself unimpeded, as this is, perhaps, on cause of the seeing stability of the present surface of New South Wales. In May, 1773, a shock was felt by Captain Furneaux; and between the boiling springs of Taupo and Cook's Strait, many shocks have been felt since the settlement of Wellington in 1839.

In 1848 the wind was chiefly from the East which is unusual, that to, like the present, was a wet season. Violent S.E. winds and floods preceded the shocks of the 16th of October in that year. These followed at intervals of 36 hours. Captain Drury mentions the regular flux and reflex of the tide at intervals of twenty minutes, and calls it extraordinary. But it is a common fact that in earthquakes the phenomena have regular intervals of time.

In 1848 the shocks were attended by rain which generally in other countries accompanies dangerous earthquakes. They were marked by violent winds, which in agreement with one phenomenon mentioned above, were instantly suppressed at the time of the shock. The noise is said to have come from the northward. The earth, as in 1855, was moved in waves. During the third shock on the 19th October, 1848, "a terrific S.E. storm" was blowing but the wind lulled as in the first shock.

The times assigned to the three principal shocks were, for the first two minutes; and for the two last 90 seconds each. The shocks are said to have been horizontal concussions,

as well as vertical undulations. Reports like the discharge of ordnance, or gas, were heard to the northward, succeeded by concussions; and during the three great shocks there was a loud roaring. Any one who has placed his head to the waste pipe of a steam apparatus blowing off the vapour, will understand the resemblance of these earthquake sounds, to the tearing and roaring concussions of the steam in its passage from confinement.

As in 1855, so in 1848, no change in the barometer was noticed; and the shocks occurred in all kinds of weather. This is again, a proof that the atmosphere is unconcerned in these earthquakes. The occurrences of both years show as has been hinted at by the author of an account of those of 1848, that the shocks are connected with the explosion of gas (steam?) in the neighbourhood of Cook's Strait. There were cracks in the loose soil as in 1855, but in 1848 it does not appear that there were any jets of mud, or any actual elevation of the land. Even the tide does not appear in 1848 to have been affected, except in once instance, and that only by the wind and rain.

The general conclusion is, that the earthquake of the 23rd January, 1855, is the most severe one that has happened in modern times in New Zealand: and its character has more of permanent influence in its bearing upon the relations of the land and sea, than any observed in the Pacific by competent witnesses of the present age. But even admitting that these last shocks may have some bearing upon the probable future condition of the coast of New Zealand, how utterly insignificant do such elevations of a few feet appear in comparison with the majestic rise of the coast further to the south, during the old geological epochs, in which the land was vertically lifted above a still almost fathomless sea washing its base; till cliffs were formed with perpendicular walls rising in clear precipices of 7,500 feet, with scarcely a break or ledge to mark the paroxysms of the forces by which they were produced!

W. B. C.

This extract is Clarke's interpretation of reports in New Zealand newspapers. Clearly he had a good background in geological texts and knowledge of his era.

CLIFFORD, Charles
SOURCE: Clifford, C. 1844. Letter to Colonel Wakefield from Charles Clifford, dated April 03 1844. *In:* Bagnall, A. G. MS-papers-88-103-4/08 Alexander Turnbull Library, NLNZ.
Location: Wairarapa, Palliser Bay
Keywords: primary, background, uplift/subsidence

As you are present anxious for information concerning the various routes from here to the Wairarapa Plains, perhaps a short sketch of my late journey round the coast [in 1844] may be interesting to you.

On the 13th of March in company with three others I was landed, after about an hours sail from Wellington, at Okiwi, and proceeded on horseback across the Hills known as Rhode's station, on to the Sea Beach, at the fresh water lake, about half a mile on this side of Wairangipiri, passed the native Pa's at Parangerau & Orongorongo & rode to

within about a mile and a half of Muka Muka a distance of 14 or 15 miles from Okiwi, without any impediment – At this point we had to climb to another level, up a steep bank of gravel about 15 ft high, resting on 4 or 5 feet of rock. Here 2 or 3 men in a very short time with pick axes and spades would form an incline that sheep & Cattle would easily pass, more especially as the Gravel is of an adhesive nature – about a mile further is a deep narrow gully, down which a Pathway would have to be cut in a slanting direction, & another up the opposite side, which 2 or 3 men would do in a day. We then passed the Muka Muka stream & a little further on the River Matanehunehu at both of which places there is good feed for sheep and cattle. A short distance from this we came to the furthermost point of Muka Muka Bay at which place is the first serious impediment to the road, a good sandy beach leads to the top of a ledge of Rocks about 15ft high adjoining the Perpendicular Cliffs on one side and running a considerable way out to sea on the other. This would require blasting so as to form an incline to the beach below; there are then in close succession four other jutting rocks which at present obstruct the road. The first has a natural tunnel through it, which a very little trouble would render practicable for cattle. The 2nd rock extends from the perpendicular Cliff about 20 yds out to Sea, and is about 15ft. high & 10 yds wide at the narrowest part, thro' wh. a passage might easily be blasted, so that cattle or sheep might pass. The 3rd Rock would require nothing doing to it, being passable at half tide, and the last one, being merely a narrow point running into the sea, might be made passable at very trifling cost. The whole of these impediments occur within the space of three quarters of a mile, and I estimate that 40 or 50£ would be sufficient to form a road by which cattle and sheep would pass at half tide. It would be impossible to form a road passable at high water, as the sea rushes up against the cliffs - On rounding the last rock we came again on to an open Beach which was for a short distance covered with large stones but after that was fine sand all the way to the Bar between the lake and the Sea, which on our arrival was closed and afforded a good passage to the opposite side of the Lake. Tho' there are many points of the coast, along which stock could not be got along at high water especially in a South Easter still there are so many small valleys in which they could take refuge for several days that the only real obstructions are the rocks before specified. There is good feed for stock all along the coast, but no place after passing Orongorong in which it would be worth while to settle till you arrive at the hills this side of the Lake. Being detained at the Pa Pokirikiri on the opposite side of the Lake for 2 or 3 days, I took the opportunity of walking along the Beach to Te Kopi the Whaling station in Palliser Bay, it is distant about 7 or 8 miles from Pokokirikiri, & for three quarters of the way is an open sandy Beach. The road is then impeded by large stones and is for about 100 yards impassable at high water. It would be easy to bring a bullock sledge this far, unyoke the Bullocks bring the goods on their backs from Te Kopi to the sledge, and on getting a load return with it. The cliffs are from 150 to 200 ft high, and on the top is a fine level grazing country, but owing to the deep gullies with which it is intersected near the coast and the rough nature of the ground near Te Kopi it would be difficult to take a road that way and quite impossible to get inland water carriage. A curious circumstance occurred in these cliffs. About 30 ft below the surface is a strata of sand in which large trees are imbedded lying in horizontal position.

After remaining 2 or 3 days at the Pah Pokokirikiri we accompanied the natives in their canoes up the Lake wh. was much flooded and enabled them by dragging the canoe

over a Bank about 200 yards wide to get into the Ruamahanga without going into the upper Lake into which that River runs. On entering the River we found it about 4 or 5 chains broad and from 12 to 15 ft. deep with low banks of alluvial deposit covered with a luxuriant vegetation of shrubs of various sorts. This continued for 4 or 5 miles up the river when the banks became higher and are covered with forest trees, of all sorts: principally Totara, Tawa, and white Pine – On the left side as you ascend are extensive woods on the right a narrow belt continues as far as I ascended being 10 or 12 miles up the river. We disembarked at a beautiful spot on the right hand side, where thro' an opening in the woods the grassy plain came down to the waters edge. At this point the river is about 3 chains broad, and 6 to 8 ft deep, but further up, about 7 or 8 miles, there is a ford which except in time of flood is to be crossed about knee deep. From this point the river runs about N. N. E., for 10 or 12 miles till it reaches a range of hills running in an easterly direction, and closing in what I denominate the valley of the Ruamahanga. It then takes the east side of the Wairarapa valley and at some distance up crosses it in a northerly direction, and I believe takes its rise in the hills to the Northward of Waikanai [Waikanae]. The spot where we disembarked from the canoe is where the river approaches near to the hills, running about north an south, and between 2 and 3 miles from them; the nature of the ground is gently undulating and covered with short sweet grass admirably adapted for sheep pasture. Further up, the valley widens out into an extensive plain, covered with rich grass and to the E. S. E. is an opening in the Hills, leading one days journey to a Pah on the East Coast called Otaukuha, from thence the natives say there is a good open beach to Hawkes Bay, passable at any tide – while we were waiting here, 3 natives came from Otaukuha heavily laded with potatoes and other food. On my return I walked to the Pah Pokokirikiri at the bottom of the Lake, and crossed over some of the richest land I have seen in New Zealand. In many of the lower parts the grasses, there are numerous kinds, are of so luxuriant a growth that a cow lying down would hardly be seen in them; the higher parts and the hills are covered with excellent sheep pasture and with the exception of the land immediately adjoining the Lake, there is not so much swampy land in comparison with the sound land, as I noticed in my last years trip to the valley of the Wairarapa thereby causing this district to be preferable for sheep farming tho' I apprehended the other will be better adapted to general agricultural purposes. I estimate that the plains to the Eastward of the lake and the Ruamahanga and which I have called the valley of the Ruamahanga contains about 120,000 acres of good pasture land, and this is quite distinct from what has hitherto been considered the Wairarapa Plains. I may here state that from what I saw of the country I am convinced that with the exception of the rocks at Muka Muka there is at present no impediment in the route I have pointed out to any person riding from Wellington to Hawkes Bay in a week. The natives have informed me that a river called the Huangarua, nearly as large as the Ruamahanga takes its rise in Aurangi mountains, near the sea to the eastward of the Ruamahanga valley, and running in a northerly direction joined the Manawatu. On pointing to an opening in the Hills to the N.E., through which we saw a considerable smoke, they said it was a Pah on this River. The probability is there are considerable tracts of level country on its Banks. Trusting that the Colonists of this settlement may soon be able to take advantage of the rich Plains here opened out to them.

COLENSO, Rev. William

Source: Colenso, W. 1855. Letter, dated February 23 1855, from William Colenso at Waitangi, Hawke's Bay, to Joseph Hooker. Original manuscripts held by the Royal Botanic Gardens, Kew, Surrey, England. Microfilm Reel 15 Frame 450-457, Alexander Turnbull Library, NLNZ.

Location: Hawke's Bay, Napier

Keywords: primary, mainshock, aftershocks, building damage, ground damage

p4

We have very recently been again visited by shocks of earthquake and even now are scarcely free twice or thrice weekly from the 23rd Jan down to date being about the average. The first shock of the present series (which occurred after 11p.m. on the 23rd ult. was a very severe one, and sent us all a spinning! (You, perhaps, might be able to compare it to pounding on a floe or ? or even to your perilous gale in the pack, from which you had such a miraculous escape) I was, as usual at that hour in my little study quietly reading, when the first shock came. Instinctively, following my unvarying practice, I rushed out, and it was most providential that I did so, or perhaps I should not now be writing; as it was, I had to get round the table at which I was sitting, and open 2 doors of the reeling and creaking house. The instant I sprang out, down came all my books - 4,500 volumes - shelves and all! together with several other matters which happened to be "stowed away overhead" - (such as Boxes of specimens, a portable writing desk, oak case of Pistols, Jars, Bottles, etc etc) and these all came "down with a will"! and with a terrible crash - I really thought the chimney had come down. Meanwhile I was on the outside, holding on to Mother Earth, earnestly viewing the scene which was awfully grand without however admiring it. I have experienced many shocks, and am not (I think) quite destitute of either natural or moral courage; but I must avidly confess, that both to admire and to feel at ease during Nature's throes is beyond my present ability. - The Earth moved up and down irregularly - joltingly, or ?, if you will, not alter altogether unlike that retrograde uneasy motion a person feels on board a steamer (that is the steamers of '33 - '34, - they may have been wondrously improved since) only, and of course, of so many extra myriads of horse power!

- I was alone! the tall weeping willows with which I was surrounded threw their long drooping branches about in an imploring frantic way - now lashing the earth, and now sweeping the sky, from which the swimming stars most erratically careering about looked brightly down reminding me of a deck scene in a pitching ship during a clear night on the tropical ocean, - the post and rail fence too, which were very dry, joined in with their unnatural notes and creaked and clattered prodigiously; while the neighbouring rivers (2, Waitangi and Ngaruroro) and sea resurfed in a superlatively angry mood, instantaneously rising and falling several feet apparently as real, if not as great a chafe as even the classical Seamander and Simois were when enraged at Peleus' God-like son and last, not least, a stream of pale lambent fire glided along, only a very few feet from me, accompanied by successive reports as of distant feu-de-joie. This fire was very peculiar: in it and through ? I could plainly see the ... [bottom of page - text lost] trees in the garden; the sheet or body of flame did not rise higher than 3, 4 feet from the ground and its edges were blue and ragged (flame-pointed); it momentarily affected my sight, as for a few seconds after it had passed, I was in total darkness, and I began to fear that my eyes had received serious injury. Bye and bye, Dame Earth

becoming again tranquil after her strange reel, I ventured into my hut, cautiously groping my way, my candle having been extinguished during the shocks; after a few long minutes of ghostly trepidation I succeeded in laying hold of a box of Lucifers and soon saw how horribly my whole colony of Muses - Arts, Sciences and Celestials - had been routed and thrown hors de combat by the infernals. The table and chair which I had recently left, was set smack into the chimney: a portable desk, Reeves 2 guinea box of colours and some stout china jars, etc, completely smashed up: while the larger and heavier of the 2 bookcases had come down entire with its 7 tiers of books (from the Encyclop. Britannica to the little pocket Horace) without one of them being started from its place! falling as it were in one piece - as we have seen mountbanks and other actors throw themselves most unarthritically flat on the stage. Another curious circumstance which revealed (if I may say so) the torsion of the shock, was displayed in a large and heavy single shelf - a Kauri board 6 feet by 1 foot and 1½ in thick - which had been fixed transversely over the door through which I had so lately passed; this board was both thrown down and out longitudinally 4 feet into the outer room! in the very contrary direction to that in which the other shelves etc. had fallen. This unique feature still excited my thinking powers; and it serves to convince me more and more of the truth of my old opinion, viz., that while we almost invariably speak of shocks proceeding E and W or N and S as the case may be, more or less of a gyrating power accompanies shocks in general.

From Wellington papers just to hand I gather that the shock of the 23rd ult.; has been pretty generally felt in the colony - from Auckland N to Canterbury S - perhaps further but so far certain. Unfortunately Wellington has had, as usual, a superlatively heavy shock only <u>one</u> person killed which appears almost wonderful. Nearly all the Brickwork of the town is down and some of the folks are rather glum - ? in consequence and talk of leaving no doubt if these frequent earthquakes will prove a heavy ? upon the neck of this aspiring colony ...

COLLEY, Mrs Lucy (nee PETRE)

Source: Colley, L. 1907. The life of the Hon. Henry W. Petre and Eleanor Walmesley, his wife, written by their eldest daughter, Mrs Phillip Wellesley Colley (Lucy Petre) with notes on their children and grandchildren from authentic sources and family papers. Privately printed. MS-0593, Alexander Turnbull Library, NLNZ.

Location: Hutt Valley

Keywords: secondary, mainshock, ground damage, uplift/subsidence

The great earthquake in 1855 quite upset all Father's plans; he lost confidence in New Zealand's future, and made up his mind to return to England. He sold his farm of forty six acres of cleared land, and the house, for £2,300. Father said that a country subject to such visitations of earthquakes of the worst kind would never become a populated one. However I think he made a mistake, for at the present day the population is 768,910 - true, the earthquakes are now things of the past, and whereas formerly houses had to be built of wood now they raise magnificent stone ones, cathedrals and elegant churches.

The effects of the earthquake were experienced in their worst form along the territory by the Tarama [Tararua] ranges, on which immense slips had taken place. The valley of the Hutt was considerably raised and the stream left almost dry.

This shock of 1855 was much more severe than any previous earthquake. All the inmates of Woburn had to escape from the house at midnight, for it was rocking and rolling heavily with most appalling noises of breaking glass. The earth was heaving up all the time, and when a fresh shock came, the house appeared almost to bend to the ground. The bridge over the Hutt river rose in the air, and then fell with a crash into the water.

A number of Maories came to Woburn to see if their help was needed to dig anyone out; the priest came and heard Confessions.

All the farm and stable servants gathered round Father and Mother, in their fright, refusing to leave us, sitting on the lawn with the family. The old chief Epuni came to see if Father and Mother were safe and remained with them some time.

It was a most dreadful night. The terrified women wailing, natives whining doleful lamentations, horses galloping wildly about, snorting and neighing, cocks crowing, and birds fluttering.

Oh! What a night that was; the very heavens seemed willing to add to the confusion, the stars shooting in all directions.

Father had to rush here and their helping everyone; and his little daughter Alice was born during this awful night. Our dear Mother, so patient and sweet, never once forgot the human souls who cast themselves upon her that night for help.

She had so calm a strength for their fears and such compassion for their weakness, that all felt comforted in being near her. She begged them all to confess to the priest; to thank God for their present safety and to call on Him for protection. She related to them how the people of Anitoch arrested a very violent earthquake, by writing on their door posts the words "Hold! Christ is with us!"

In the end, all were tranquillized and gained confidence by prayer and the Sacraments, which brought with them a wonderful peace and calm.

One poor man, who had come from England as Father's servant, had not been to his duties for years, made his peace with God that dreadful night, and ever after remained a faithful Catholic.

It is possible Colley confuses some effects with events in 1848. In particular, the time is incorrect. The first 1848 earthquake did occur after midnight, and also in 1848 an auroral display was seen on several nights following the first earthquake on October 16, this possibly accounting for the comment on "stars shooting".

COLONIAL SURGEON, NEW PLYMOUTH

Source: Colonial Surgeon. 1855. Letter from the Colonial Surgeon, New Plymouth Colonial Hospital to Resident Magistrate New Plymouth, dated January 26 1855. IA 1, 1855/447, Internal Affairs, Series 1, Inwards Correspondence. National Archives of New Zealand, Wellington, New Zealand

Location: New Plymouth

Keywords: primary, mainshock, building damage

> I beg to communicate to you that the flue of the kitchen chimney of this hospital [Colonial Hospital, New Plymouth], has been shaken considerably by the recent oscillations. As it is quite uncertain when another such visitation may occur, but very probable that, when, the heavy brick wall of the said flue will fall on and smash the roof of the kitchen portion of the Institution, I venture to suggest to you the economy and safety of having the shaken shaft taken down and reconstructed.

COOTE, R. C.

Source: Coote, R.C. 1855. Extracts from Diary 1853-67. MS-Papers-1248-2A, Alexander Turnbull, Library, NLNZ.

Location: Wellington

Keywords: primary, secondary, mainshock, aftershocks, building damage, tsunami/seiche, casualty response/recovery, ground damage, uplift/subsidence

> January, 1855 we experienced a severe earthquake, which was a great shock to our appreciation of New Zealand and truly alarming.
>
> On January 23rd after a very windy and boisterous day, about 9 o'clock in the evening we were startled by a rumbling noise, followed instantly by a tremendous shaking of everything about us. Floor upheaving, tables and chairs rocking and everything breakable crashing. The first shock lasted several minutes they say, and threw down every chimney in Wellington as well as many buildings and did a great deal of damage in the town. We were in a low wooden house close under the hill, so it only threw down our chimney and broke our lamps and most of our glass, but so severe were the shocks that we left the house and stayed outside a great part of the night, though it was raining slightly. The animals were greatly frightened, horses galloped about and the fowls began cackling, and our poor servant Eliza came in to us and we stayed out for several hours. A party of soldiers came over from the barracks to see if we wanted help and Colonel McCleverty kindly came to ask after us. The shocks continued more or less violent, but not like the first, till between 3 and 4 o'clock, and then became less frequent, and morning broke to gladden our hearts but to reveal a miserable picture. The first thing we noticed was the extreme lowness of the tide; the sand extended far beyond its usual limits, and then all at once it was covered again by the sea, this advancing and receding of the tide took place three times in twenty minutes, and eventually left the harbour raised about three feet. The Beach where all the shops are situated was a miserable picture, few houses uninjured whilst many were perfect wrecks, and the contents of many of the shops were floating about on the water or thrown up on the shore. But only one life was lost and that was Baron Dalzdorf [sic] of the hotel, and he was in a very delicate state and the shock may have affected his heart,

not but which the wall of the room he was in fell. The Clifford's house was left with only one room safe, and they went to the McCleverty's - the Featherstones was also very shaky and Mrs. Featherstone and the baby came to us, but the Dr. would not move.

Government House and the Bank, only just finished were much damaged, and all through the town scarcely any escaped. From the country strange stories came of the ground opening and engulfing cows etc., but I believe imagination was very active in originating most of the mischief reported, but it was quite terrible enough, and for days the earth continued to vibrate every now and then and we did not dare undress and go to bed for three nights. Then by degrees the shocks became very light and less frequent and we resumed our usual mode of life.

Sunday 28th. The effect of the earthquake was still so great on the nerves of the good people of Wellington that the Service this morning was held outside the Church, the Clergyman thinking it right to be prepared for what might happen, which I thought a very bad example to set to his Congregation, but we had a very good sermon, it seems, with a short service. It was the same in the afternoon, the people were all outside the church - happily it was fine. I have not mentioned that finding houses so scarce and extravagant in price, Henry sent home for one soon after we arrived, and just about this time we heard of the arrival of the ship the "Royal Stuart", in which it was, first at Canterbury and now on January 29 it reached Wellington and was pronounced to be of all kinds the most suited to stand the shock of earthquakes, wooden walls with iron posts. Strange indeed that it should have come at such an opportune time. It was some time before we could get either plan or model of it so that days elapsed without anything being done, and now alas a very disagreeable quarrel arose between the Provincial Government and Military Authorities about some tents required for the people rendered houseless by the earthquake, which led to a most uncalled for attack of the former on Colonel McCleverty. This became so warm that the cause of it all was forgotten, making this time most trying in every way to the society of the place, which never quite recovered the moral shock though the physical one soon passed off....

February 1st We had a Thanksgiving Service in the Church for our preservation from so great a danger, but there were not many present, I regret to see.

February 2nd. There were several shocks to-day, one in the afternoon rather severe, but the nights were quiet. News arrives of a new Governor being appointed for New Zealand, Colonel Gore Brown, a military Governor, not much to the delight of the Provincial Council. We hear that the earthquake was felt even as far north as Auckland and at Nelson so severely that all the brick buildings had been thrown down.

CORDING, Clara

Source: Cording, C. 1950. New Zealand Public Radio recording of Mrs. Cording in 1950 on her 100th birthday. Supplied by Stephen Riley, Chief Archivist, Sound Archives, Kent House P.O Box 1484, Christchurch, New Zealand.

Location: Wellington

Keywords: primary/reminiscence, mainshock

> There was an earthquake when I was between 4 and 5 years old and all my sisters - we all slept together in one bed in one room, - and they jumped out of bed and ran down the stairs and left me screaming on the stairs. The stairs were built with a wall each side and no handrail or anything to hold onto and I screamed and father came to me and said you naughty girl to make such noise and your mother so ill and he gave me a box on the ears and I sobbed bitterly over it. I never forgot that because father never whipped us. He was such a good dadda to us all. Well, when we got into the bedroom, father said, "where's the candle Lissie, and she said "under the bed". Well, I [was to] put the child on the bed then and the mattress gone I don't know where [?] with my hands on the floor and my feet on the wall [? The tape at this point is very difficult to understand]. So he found the matches at last and got a light and then we got a candle from under the bed.
>
> Well, that was one experience when I was a little girly, you see. I suppose I would be only a little over five years old when that happened. It happened when we went to Cuba Street, [we] lived in Cuba Street [during] that earthquake. And it kept on all the week through every now and then an earthquake. We never forgot it. And mother said, "What did you bring us all to this terrible country for".

COX, Charles Percy

Source: Cox, C. P. 1915. Personal notes and reminiscences of an early Canterbury settler. Facsimile edition. Kiwi Publishers, Christchurch, New Zealand. First published, 1915, Canterbury Publishing Company, Christchurch, New Zealand.

Location: Canterbury, Christchurch, Wellington, Flaxbourne

Keywords: primary/reminiscence, mainshock, aftershocks, building damage, uplift/subsidence

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> I lived at Double Corner [at Hunter-Brown's station, near Amberley, Canterbury] from January, 1854, to June, 1856. During that time occurred the great earthquake of January, 1855. We had just finished dinner, about 8 o'clock, when it began. There was no need to tell us what it was. We all rushed out of the house, fearing for the chimneys, which, however, did not fall, but the wooden house creaked freely like a ship in a gale, and the brake chains on the dray outside clanked ominously. For some three and a-half minutes the 'quake continued, and was (I believe) one of the longest on record. It caused us no more harm than a bad scare, but other places did not fare so well. In Christchurch nearly all the chimneys were shaken down and numbers of people became seasick. In Wellington the harbour shoaled some two or thee feet, buildings were thrown down, and many narrow escapes from death occurred. At Flaxbourne, in the north of this island, a man was getting something out of a heavy sea-chest. He rushed away, and when he returned, declared that the chest had been

turned over on its lid. On the two following evenings the earthquake recurred at the same time, but not nearly so severely nor so long as the first one.

CRAWFORD, Hon. J. Coutts

Source: Crawford, J. C. 1858. Diary 1858. MS-Papers-1001-006, Alexander Turnbull Library, NLNZ.

Location: Wellington, Wairarapa, Marlborough, Wairarapa, Hutt Valley, Palliser Bay

Keywords: primary, uplift/subsidence, biological effects

January 20 1858.

At Wellington I found great improvements not withstanding the earthquakes. The roads and street are now good and passable in all weathers and there are a great many new houses. But the great improvement has been in the opening up of the country which I shall see bye and bye.

The town ensemble looks much more like business - bales of wool are lying on the wharves and hardy looking settlers riding in from the country.

Geologically I found the town risen about 4ft and the harbour bottom raised to a corresponding height, a shallow bank extending off from Thorndon Quay making it impossible for boats to land at high water and the Hutt road raised beyond the reach of damage from the waves. The rise of the land as described to me by Mr Park (Surveyor General of the Province) is greatest at the end of the Rimutaka Range where it runs into Palliser Bay about the MukaMuka rocks. The land was there risen about 9 feet - from thence in a slope to a rise of about 4ft in Port Nicholson and the rise extending to the Gorge of The Manawatu where it seems to cease. The opposite coast of the Middle Island, about the Wairau, is said to have had a slight fall and it is suspected that some if not all of the Wairarapa Valley also sunk - the Hutt Valley was raised so much that the tide ceased to run into the river - and my tunnel is now 4ft 9/10ths above the reach of high water in Evans Bay. The shock came from the direction of the Kaikouras - dead marine shells including many barnacles now repose above high water mark and vegetation has already commenced on the old sea bottom. The restless settler too has commenced embanking and selling at a high price the raised land.

9th April. Contracted to lower end of tunnel at Burnham water - 3ft at outer, 2ft at inner end for £60 - afterwards to take one additional foot for £70.

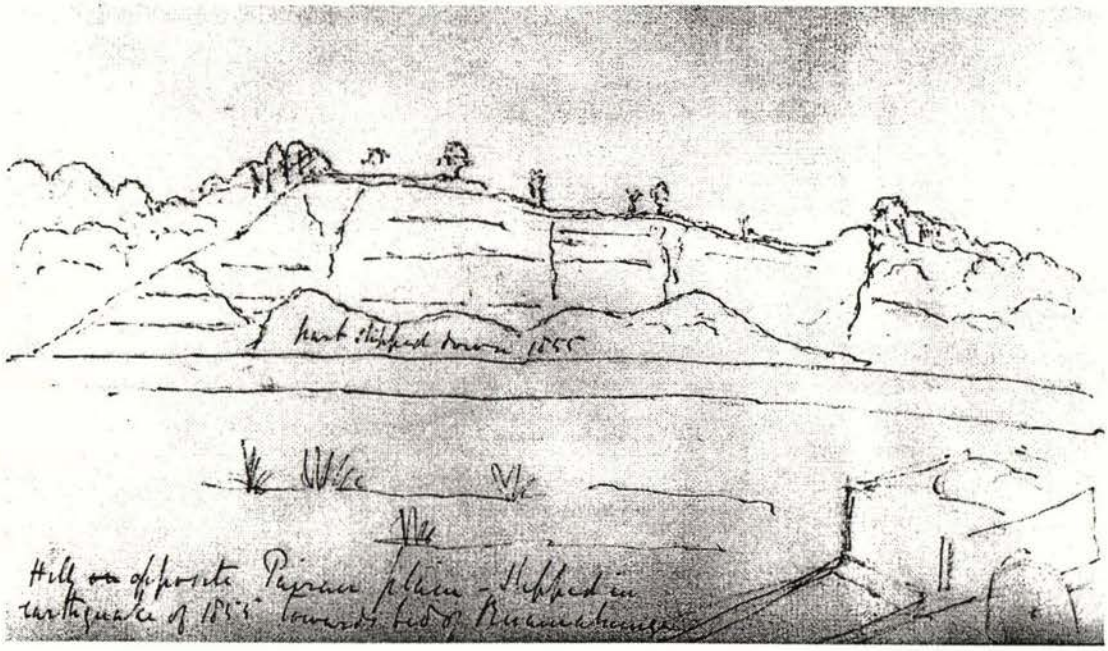
This extract was written on Crawford's return to Wellington from England.

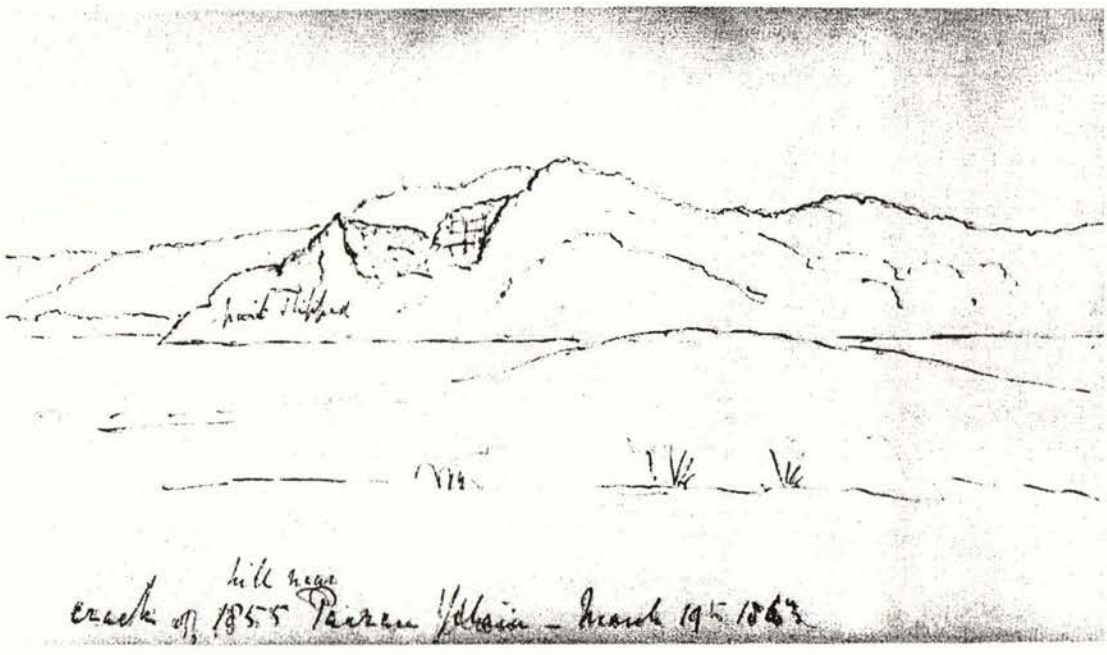
Crawford was active in local affairs in Wellington and owned a large farm at Miramar on which he built a tunnel to drain Burnham Water, the lake that once occupied much of Miramar, into Evans Bay. He was appointed provincial geologist in 1861. (See Dictionary of New Zealand Biography Volume 1 1769-1869. 1993. Bridget Williams Books Ltd & Department of Internal Affairs, Wellington, New Zealand)

Source: Crawford, J.C. 1863. Sketches dated March 1863, of the landslide at Kopuaranga, Wairarapa. F147860-1/2, F147529-1/2, Alexander Turnbull Library, NLNZ.
Location: Wairarapa
Keywords: primary, ground damage, artworks

> F147860-1/2 is annotated "crack of 1855 hill near Pairau plain- March 19 1863".
> F147529-1/2 is annotated, "Hill opposite Pairau Plain – slipped in earthquake of 1855 towards bed of Ruamahanga [River].

Refer to hard copy version of this database.





Source: Crawford, J.C. 1868. Essay on the Geology of the North Island of New Zealand. *Transactions of the New Zealand Institute 1*: 305-328.
Location: Wairarapa, Wellington, Kaikoura, Palliser Bay, Otago, Canterbury
Keywords: secondary, uplift/subsidence, tsunami/seiche

p321

... At this point also was the greatest rise of land caused by the earthquake of 1855 (viz. 9 feet), and here the coast road, which was before that time almost impassable except at low tide, has now a broad stretch of rocky beach between it and the sea.

p325-327

The severest shocks of earthquakes that have been felt in New Zealand since the arrival of the settlers took place in 1843, in October 1848, in January 1855, and in February 1863. These three latter shocks appear to have been felt more or less over at all events a large part, if not the whole, of the islands; but no systematic attempts have hitherto been made to record earthquake shocks throughout the colony. The three former ones were most severe in Cook Strait, the last at Napier. The greatest force of the earthquakes of 1848 and 1855 appears to have been exerted near the Kaikoura mountains, in the South Island. Wellington suffered severely from the earthquake of 1848, and that of 1855 raised the land in its vicinity to a height of from nine to four feet above its former level. Nelson felt both shocks perhaps less severely than Wellington. The impression is that during the earthquake of 1855, while the land at Wellington rose, that on the south side of the Strait was depressed, and of this there appears to be good evidence. The earthquake of 1863 was felt severely in some parts of the Hawke Bay Province, and considerable local changes of level there appear to have taken place. A description of several of these earthquakes may be found in Taylor's work, page 226 et seq. [Rev R. Taylor (q.v.)]

The natives have traditions of many earthquakes having happened before the arrival of the settlers.

The present information as to earthquakes in New Zealand may be summarised as follows: - ... Mr Mantell collected information from the Maoris, that very severe shocks had formerly been felt in Otago.

The earthquake of 1855 was marked in this latter province by a great sea wave, and since then various slight shocks have been felt at different times by the settlers.

In Canterbury the information with regard to earthquakes is imperfect, but many minor shocks have been felt, and the earthquake of 1855 was felt severely.

In Cook Strait earthquake shocks have been more numerous than elsewhere since the settlers arrived. The severest shocks, as before stated, were in the years 1848 and 1855....

Source: Crawford, J. C. 1870. On the geology of the Province of Wellington. *Transactions of the New Zealand Institute 2*: 343-360.
Location: Wellington, Wairarapa
Keywords: primary, faulting, uplift/subsidence, ground damage

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The following notes were made during a geological survey of the Province of Wellington, undertaken for the Provincial Government, between 1861 and 1864.

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In the upper part of the Wairarapa valley, at the gorge of the Ruamahunga, the formation is gravel of large size, resting upon the blue clay, and in the river bed below may be seen the point of junction, where these tertiaries abut on the old and highly inclined rocks. The rise from Masterton is tolerably rapid, and on the Opaki plain, and the adjoining hills, are very palpable marks of the earthquake of 1855 and perhaps of other shocks; at one point there being a lift in the plain of perhaps thirty feet, and a tertiary hill having been split in two, and the western part having slipped down towards the river bed.

Source: Crawford, J. C. 1880. *Recollections of travel in New Zealand and Australia.* Trubner, London, England.
Location: Wairarapa, Manawatu
Keywords: primary, secondary, faulting, uplift/subsidence, ground damage

[During a journey to the Wairarapa and Manawatu in March 1863 Crawford stayed at Woodside (Potsdam) Farm of Mr. Chalmer. One the south side of the Waiohine River near the gorge he noted:]

p191

Here the split or fissure may be observed which was caused by the earthquake of 1855 and the western side of which, or that nearest the mountains, stands at a height of several feet above the rest of the plain. The fissure may be observed all along the western side of the Wairarapa Valley for a distance of 60 miles, and was clearly produced by the rise of the main range and not by the sinking of the plain.

p193

On the Opaki Plain (north of Masterton) strong evidences of earthquake action appear. The plains are severely fissured, and a mountain or large hill has (in 1855 probably) been split from top to bottom, while the western part has slipped down (into the Ruamahanga River.

[When travelling down the Rangitikei River, Manawatu, Crawford noted:]

p118

I was informed that at a place called Ekipi the cliff being thrown down by earthquake of the year 1855, had blocked up the river for two days, during which time a lake had formed and the river became dry below.

DAVIE, C.

Source: Davie, C. 1870. On the earlier earthquake waves observed on the coast of New Zealand. *Transactions of the New Zealand Institute 2:* 222-223.

Location: Nelson, Christchurch, Canterbury

Keywords: primary, secondary, tsunami/seiche

> At Nelson the shocks appeared to come from in a N.E. direction. At Canterbury, where the shock was severe, no damage whatever was done; nor do I believe that any tidal wave was noticed on the sea coast. A wave, however, came up the Avon to within two miles of Christchurch. I was at the time living close to the river, and heard the rushing sound of the water; I did not however know what it was until the next morning when I noticed that the river weeds had been washed on to the grass, for about one foot in height. It may be worth recording that a heavy rain from the north-west fell on the day of the earthquake; this is a very rare occurrence in the neighbourhood of Christchurch.
>
> It is worthy of notice that earthquakes happened along the coast of South America at the same time, and were felt by different ships at sea in the neighbourhood of New Zealand. The earthquake waves in Palliser Bay were about 30 feet high, and showed a white crest although the night was cloudy; they succeeded the shocks. One family would certainly have been drowned had not some sailor, who had been on the South American coast, recognized the character of the approaching wave the moment it became visible.

C. Davie was Chief Surveyor, Province of Canterbury.

DEANE, Juiliette

Source: Deane, J. 1855. Reminiscences 1842-1855. MS-papers-2379, Alexander Turnbull Library, NLNZ.

Location: Hutt Valley

Keywords: primary, mainshock, aftershocks, building damage, response/recovery

> When I was twelve years old it was decided that Mama, Allen and I should go to England for his and my education. I hated the idea so much, and was so miserable at leaving everything, that Mama, exasperated with me, suggested leaving me behind - but this could not be - How I felt parting with everything - the horses, gardens, friends and my dear little Skye "Patty" who had to be given to our friends, the Hunters.
>
> About six or eight weeks before we left, I had just gone to bed when a terrifying earthquake shook the house - all the windows were broken, the chimneys thrown down, plaster peeled from the walls and the furniture flung all over the place. Lawrie, who had come to stay from the Rangitiki Station, managed to get into my room, which I shared with Allen. My bed being situated near the chimney-stack, Lawrie feared I should be buried by the bricks. He pulled me up and we were flung across the room, together with a chest of drawers. We three got on to the landing to see a rent in the roof, through which we saw the sky. We all staggered down to the hall, and Papa collected blankets and mattresses - and there we stayed with the front door wide open, huddled together all night. As the house was of wood, and very well made, there was no fear it would collapse - but it rocked and creaked in a terrifying way, while shock

after shock continued. A Cornish man-servant, Maddlin by name, slept in a room over the Kitchen, and when he was got at explained that as he left his bed the Kitchen chimney came through the roof on to it. He had been to the Dairy and found all the milk swung out of the pans - which were actually standing and unbroken; they were solid white china ones.

Throughout the succession of shocks the horses neighed and galloped wildly about, but the dogs were silent. We could hear the cocks crowing far away. About an hour after the first, and worst shock, the Clergyman (Mr Hutton) and three or four other men carrying lanterns arrived to see how we had fared. We never lived in that house again. Some of these earthquake shocks seemed to bump upwards and were accompanied by noise - others swayed like a gentle sway at sea. That first night was one of terror to me. I confess that I clung to Papa murmuring "Oh - oh" - Mama was speechless - Allen soon sound asleep, Lawrie calm and silent as the rest. Fires were lighted out-of-doors for boiling water and doing what cooking could be managed. We went next night to sleep in the stable - a safe refuge as there were no chimney-stack or plastered walls or ceilings. One horse was not well, and we lay on mattresses in adjoining stalls - and before any of us felt anything she used to utter a low whinny - very weird and melancholy. After a few nights we all took up our sleeping quarters in the loft, which was strewn with hay, mattresses and blankets. We were housed thus for six weeks, until Mama, Allen and I left New Zealand....

The Deanes lived on the opposite side of the Hutt River to the Petres (q.v.) and were friends of the Riddifords (q.v.).

DRUMMOND, John
Source: Christie, H. C. 1953. Lyall Bay, 1900 – Rongotai to be – changes in 36 years – a waste of sand. *In: Dominion* August 13 1953.
Location: Wellington
Keywords: secondary, mainshock, biological effects, tsunami/seiche

Mr Drummond, living at Kilbirnie in the 1850's, had seen fish cast ashore beyond where the Bitumen Plant stood, and that a large surf boat was carried by the tidal wave from Evans Bay and left half way across the isthmus where it was found three weeks later hidden amongst toe toe [toi toi] and flax.

H. C. Christie was a well-known Wellington amateur ethnologist/naturalist, who knew Drummond. The Bitumen Plant (Maranui Depot) was located against the hill slope on the western side of Lyall Bay, shoreward of Queens Drive.

DRURY, Byron, Commander of the H. M. S. *Pandora.*

Source: Drury, B. 1855. Letter dated 13 February 1855 from Commander Drury to Captain Washington, Hydrographer, British Admiralty. Letter held at Ministry of Defence, Taunton, Somerset, England.

Location: Wellington, Hawke's Bay, Christchurch, Lyttelton, Nelson, Taranaki, Marlborough, Otago, Wairarapa

Keywords: primary, secondary, mainshock, uplift/subsidence, casualty, ground damage, aftershocks, biological effects

We arrived in Wellington on January 21st and before I proceed to detail our proceedings, I have to report to you the disastrous earthquake that visited that town - and in a lesser degree - Nelson and Taranaki - on January 23rd at 9 h 11 min p.m. It was just felt at Auckland, but in so slight a degree as not to be generally known. We were moored in six fathoms off Government House. The effect on the ship was as if she was grating heavily over rocks and many thought she was striking. The severest portions of the shock lasted a minute but it was a full three minutes before it was over.

It appears from all accounts that the centre of this convulsion must have been near the termination of the Rimutaka Range probably between that and Cape Campbell in the Middle Island - that from Cape Campbell south it decreased in intensity - was severely but not seriously felt in Christchurch, - and less in Lyttelton being on rock foundations. From Otago we have as yet no accounts - but it will probably be feeble. About Port Underwood and the Wairau - probably worse than at Wellington. At Nelson, several chimneys were shaken down - but altogether far less severe than at Wellington. At Taranaki less again, and becoming feebler as it approached the north. At Auckland it was only even known to some. Again on the East Coast as we approach to the north, it began to decrease - for the accounts from Hawkes Bay represent it as comparatively mild there - whereas in the Wairarapa Valley under the eastern boundary of the Rimutaka Range - (as Wellington is on the west) - the shocks were very severe burying four natives in a mud hut.

It appears to be generally established that the lower ground has been most disturbed. That elevated houses - on rock on solid bases have had comparative exemptions, but only comparative - as is proved by the appearance of the lofty Rimutaka's from Wellington - whole sides from the summits are chequered with land slips.

Among others affected it appears that land in the vicinity of Wellington at all events, has risen about four feet. - laying bare rocks and shoaling the harbour to that extent I consider no harm is done to the harbour by this. Rather otherwise - for land may be reclaimed where it would be of great advantage to the present rather narrow site - whereas the depth of the harbour is by no means the worse for being reclaimed.

The shocks still continue (Feb 12) but wearing away. I enclose a published extract from my remark book - and as it appears to be acknowledged as the most honest account yet in Wellington - I herewith show it as Enclosure No. 1. - and as to changes in the harbour, I will ascertain them on our return from Hawkes Bay....

Drury's published account to which he refers was printed in the *Spectator,* February 7 1855. In a later dispatch to the British Admiralty Hydrographer from the HMS *Pandora* at Hauraki dated May 3 1855, Drury mentions that "the earthquake shocks according to the last accounts continue at Wellington - but they are comparatively slight, apparently wearing off".

Source: Drury, B. 1855. Meteorological Register, Jan 23 1855. Alexander Turnbull Library, NLNZ.
Location: Wellington, Nelson, at sea, Hutt Valley, Taranaki, Auckland, Canterbury, Otago
Keywords: primary, secondary, mainshock, aftershocks, tsunami/seiche, ground damage, building damage, casualty, uplift/subsidence, atmosheric effects

> At Wellington
> On Tuesday evening 23 January at quarter past 9 o'clock a severe earthquake was felt; the shock came without any warning and lasted nearly three minutes and in that short time did immense injury to the town; mainly to the brick chimneys and several houses were thrown down. Fortunately very few accidents to the population happened, only one person was killed and less than half a dozen were wounded by the falling buildings and bricks from the chimneys. After the first shock the earth continued in a tremulous state during the next twenty four hours with shocks of greater or less intensity occurring at regular intervals - each shock preceded by a low rumbling noise and then in a few seconds the earth heaved like the waves of the sea with a shaking motion from side to side, an interval of a few seconds followed and then a gust of wind - The wind before the great shock was blowing hard from the NNW (force 9) it then died away to almost a calm. The tide at the time of the first shock was high and immediately rose several feet and flooded the streets facing the sea several feet deep; it then receded lower than it was ever before known to do and afterwards for eight hours kept ebbing and flowing every half hour. The shocks appeared to travel from NW to SE or WNW to ESE. The earth opened in many places in the Hutt Valley in crevices of two or three feet in width and numerous landslips occurred on the steep hill sides; and in the forests trees were thrown down. All houses that had an upper storey suffered more than others of less elevation - those that had but a ground floor and were? well? built of wood suffered but slightly - brickwork and plaster everywhere came down more or less. The earthquake was felt severely at Taranaki and Nelson - but slightly at Auckland and Canterbury and not at all at Otago.
>
> [At Nelson]
> Many chimneys and some brick houses have been thrown down by the earthquake but no lives have been lost.

EATON, Mrs Edward Farmer
Source: Eaton, Mrs E. F. (date unknown). Recollections and diary quoted by "Poneke". *In: Evening Post* August 05 1961.
Location: Masterton, Wairarapa
Keywords: primary/reminiscence, mainshock, aftershocks, building damage

> The family had just finished supper at about 9.30pm on Tuesday January 23, when the earthquake occurred.
>
> Our house (a 20' x 10' unlined cottage) seemed to be riding along with the greatest possible fury. I took one child and Edward the other. We, going down to Dixon's, met

them with their ten children making for our house. They were all in their night clothes. Adam and his wife came later in the same scanty attire. The night was very dark, and the shocks continuous. We all got the children to bed, and some of the adults laid down while others walked about outside. There were 22 persons in all....

Bagnall (1976, reference given below) records that, "The Eaton family arrived in Masterton early in January 1855, and once there, Eaton, of course, erected a cottage, at first a hasty shell 20'x10'. The floor was loosely laid, and a chimney not built until some time after. The windows were of calico, and it was unlined. The furniture was primitive, consisting of a few blocks of Matai for seats, and a table and bedstead of rough scantling and boards."

Bagnall, A. G. 1976. *Wairarapa – an historical excursion.* Hedley's Bookshop Ltd., Masterton, New Zealand.

FEATHERSTON, Isaac Earl

Source: Featherston, I. E. 1855. Letter to Colonial Secretary, Auckland, dated February 19 1855. IA 1, 1855/645, Internal Affairs, Series 1, Inwards Correspondence. National Archives of New Zealand, Head Office, Wellington, New Zealand.

Location: Wellington

Keywords: primary, building damage

All the offices of the Provincial Government having been destroyed by the recent earthquake, and many papers and documents lost....

Source: Featherston, I. E. 1855. Letter to Commander Byron Drury, Auckland, dated February 13 1855. National Archives of New Zealand, Head Office, Wellington, New Zealand. The reference for this extract has been found to be incorrect. It will be corrected as soon as possible. Please contact the authors.

Location: Wellington

Keywords: primary, uplift/subsidence

In consequence of certain changes supported to have been affected by the recent earthquakes, a very general impression prevails, especially amongst the mercantile community, that a re-survey of the harbour is absolutely necessary for the safety of vessels frequenting it.

Having yourself been present when the chief and only severe shock recurred, and having carefully observed and recorded its effects, you are probably already in a position to say how far this impression is well founded.

Should you be of opinion that this has been such an unheaving the bed of the harbour, as will permanently affect the depth of water, you will, I trust, kindly pardon me for suggesting, that. As you would confer a very just obligation upon the inhabitants of Wellington, if you could, consistently with the discharge of your other ? and important duties, cause such a survey to be made, as might satisfy the public mind on this point.

FIELD, H. C.

Source: Field, H. C. 1891. On earthquakes in the vicinity of Wanganui. *Transactions of the New Zealand Institute 24:* 569-573.

Location: Waitotara, Wanganui, Rangitikei, Manawatu, Marlborough

Keywords: primary, secondary, mainshock, aftershocks, building damage, ground damage, uplift/subsidence

The shock of the 23rd January, 1855, seems, however, to have been the most severe that has been experienced since the foundation of the settlement - at any rate, there has been nothing since that could be compared with it. I was building a mill for the Maoris at Waitotara at the time, and was living in a toitoi whare, which I fully expected would be shaken to pieces over my head. There was a very peculiar condition of the atmosphere that day - I never experienced anything like it before or since; though, of course, I cannot say whether it was connected in any way with the earthquake. The day was perfectly calm, and unusually cold for the time of year. Dull leaden clouds hung low, threatening rain. Altogether it seemed a day specially suited to hard work, and yet no one could work. I had a job on hand which I was anxious to complete, yet found it impossible to work at it for more than two or three minutes at a time, with long intervals between, owing to restlessness and lassitude. Every one in Wanganui seemed to have felt the same. The poultry crept about, with their wings and tails drooping, as if they were all ill. There was a herd of forty or fifty wild goats grazing near where I was at work. Ordinarily they ran like deer if any one approached within a hundred yards of them; but that day I had repeatedly to drive them out of the house or mill, and they even let me handle them. About 6 p.m. a steady drizzly rain began to fall, and continued up to the time of the earthquake, when it ceased quite suddenly. I had just turned in, at about 9 p.m., when I heard a very loud earthquake-explosion, which was followed by a sharp upheaval and violent shakes, accompanied by loud rumbling. I at once lighted a candle to see what was happening, and found everything rocking in a most alarming manner. There seemed to be three shocks joined together. Twice the motion slackened, and then became more violent again. The third time the motion was so violent that my table (a small one, and perhaps a little top-heavy with a pile of English papers which I had just received, and which stood on top of it) was turned completely upside down. This was the culmination of the shock, which then gradually subsided, the gyratory action being so violent as to produce a feeling like sea-sickness. Altogether the shock must have lasted fully three minutes. It was succeeded by another, and then by a third, after which others occurred at longer intervals. There was a Wesleyan Mission family living about half a mile from me. The missionary had been away from home for some days, but had returned that evening, though I was not aware of his having done so. Thinking his wife and sister must be greatly alarmed, I dressed myself and started in the dark for their house. The track was merely a native path through high fern; and several times, as I went along, I was fairly thrown right and left into the fern, and could hardly keep my feet. On reaching the house, I found the family sitting with the doors open, ready to rush out if the house should be actually falling. The ladies were to carry blankets, which lay ready folded on the table, and the missionary was to snatch up the little girl, who was sleeping on a sofa. I remained there till morning. When daylight came, we found that the ground was cracked in all directions, and that on an alluvial flat just in front of the house there was a crack fully

50 yards long, through which sand and water had been thrown up from a depth of 15ft. or 20ft., and scattered on the surface to a width of about 20ft., and to a depth of several inches. After taking a cup of coffee, I started for Wanganui, to see how my wife and children had fared. On reaching the pa where the track to Wanganui crossed the Waitotara River, I found the Maoris sitting outside their huts in great alarm. The ground was cracked in all directions, and, as the slight shocks passed along, the cracks could be seen to open and close - a thing which the Maoris said they had never known to occur previously. The Maori mailman was just on the point of starting for Wanganui, so we travelled together. On reaching the sea-beach, along which our route ran for about five miles, we found that the whole face of the cliff was thrown down, and that further small slips were constantly occurring. An isolated mass of shell-rock, called "Te Ihonga," similar to the Pulpit Rock at the Isle of Wight, which had stood at the op of the cliff for ages marked the place at which to turn off from the beach to go across the sandhills to the Waitotara crossing, had been thrown down and dashed to pieces. On reaching Wanganui, I found that, though my own folks and property were safe, immense damage had been done, particularly in the stores and hotels. The ground was cracked in many places. The foreshore of the river fronting Taupo Quay (which faces south-east), from the quay roadway to low-water mark, was like an ill-ploughed field; and the alluvial flats beside the river were specially fissured. At what is known as "Sutherland's Flat," about five miles above the town, two cracks, fully 100 yards long, and from 30ft. to 50ft. asunder, extended from the river back into the flat, and the interval between them had sunk down fully 6ft., so that at high water boats could be taken into the flat. Except two low double ones, which were so built into the framework of a house that they could not move, every brick chimney in the neighbourhood was destroyed; but the pumice chimneys and houses, of which there were many at that time, all escaped injury. There was a brick church at Putiki, with walls about 8ft. high and a heavy roof. Though built with a mortar of shell-lime, specially burnt for the purpose, scarcely two bricks were left adhering to each other. This extraordinary disintegration was no doubt due to the weight of the roof, which had come down en masse, grinding the brickwork to pieces. A brick wall at the adjacent mission-station was also thrown down and broken to pieces. Prior to this earthquake, a good many houses had been what was called "brick-nogged" -i.e., the intervals between the studs had been filled with brickwork, and the inner facing plastered. Nearly the whole of this brick-nogging was shaken down, and what was not so was so loosened as to be unsafe, and had to be removed.

There was no loss of life or limb, but several narrow escapes. In one case an old bed-ridden woman had just been carried into the next room while her bed was made, and all the brick-nogging beside it was shaken down on to the bed from which she had been removed. In another case a nurse and several children had to huddle together at one end of a room while the chimney fell between them and the door, and then scramble over the fallen brickwork to make their escape. The Rev. R. Taylor, too, and his family The Rev. Taylor was en route for London at this time, but some of his family remained behind] had rushed out of the doors on feeling the shock and had only just passed the brick wall when it fell and covered the path which they had traversed. A certain amount of good was done by the shock in draining swamps. These had been formed by layers of ironsand becoming rusted together and forming a pan, which prevented the

surface-water from soaking downwards. The shock cracked these pans, and enabled the water to escape.

Shocks occurred at frequent intervals for some time afterwards - in fact, for several months it could never be said that the earth was still. Even when it was dead calm there was always a long, low swell running up the Wanganui River, and as we lay in bed at night we could feel that we were being gently rolled from side to side. It seemed as if every wave which broke on the beach continued its course through the land. This continued till the equinoctial gales of March and April rendered it no longer noticeable. Wanganui was upheaved by the shock to the extent of from 1ft. to 15in.; but all but about 6 in. was gradually lost afterwards.
It was asserted that a fire, supposed to be volcanic, was observed in the vicinity of the Inland Kaikouras; and vessels sailing south of Wellington reported the sea covered with dead fish. The people on board a vessel, which reached Wellington a few days after the earthquake, reported having felt the shock fully 150 miles west of New Zealand. They had been much alarmed, as they thought the vessel was dragging over a shoal or reef not marked on the charts.

A friend, who had camped by the mouth of the Rangitikei River, with a herd of cattle, on the night of the earthquake, lately told me that the ground there was extensively and very deeply fissured, and that a sulphurous smell was distinctly perceptible. A similar smell was said to have been perceived at Wanganui, but I did not observe it at Waitotara.

Source: Field, H. C. ca. 1904. Wanganui earthquakes *In:* Transcribed in Burnet, J. H. 1904. Scrapbook in Extracts Book B. Whanganui Regional Museum Collection, Wanganui, New Zealand.

Location: Waitotara, Wanganui, Rangitikei, Manawatu, Wellington, Wairarapa, Wairau Valley, Marlborough

Keywords: primary, secondary, mainshock, aftershocks, ground damage, building damage, faulting, uplift/subsidence, biological effects, casualty

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The next heavy shock occurred on January 23, 1855. I was at Waitotara at the time, just finishing a mill which I had built for the Maoris. The weather was most peculiar, cold and cloudy, apparently just suited to steady work, and yet knows one could settle to it. Poultry crept about with their wings and tails drooping, and a number of wild goats which fed near where I lived, and which generally ran like deer if anyone went within a hundred yards of them, could on that day hardly be kept out of the house or mill. About 6 p.m. a drizzly rain began to fall, and lasted till early morning. It was at about 9 p.m. that the shock occurred. I had just "turned in" but I re-lighted my candle, and saw everything swaying and swinging about. I quite thought the house (a large Maori whare) would come down, and I had just made up my mind that if I saw it falling I would blow the out light and drop down between my bed and the table so as to prevent the rafters falling on me, when the table (a small one) was turned upside down into the fireplace. After this the vibration slackened, and at the end of about three minutes had ceased. In a minute or two there was another violent shock, though not so

bad as the first, and then another. A Wesleyan Missionary, the Rev. J. Stannard, lived rather more than half a mile away, but had been absent from home for some days. He had returned that evening, but I did not know this, and thinking his wife and sister must be much alarmed, I dressed myself and went to offer assistance. As I went along the path between the two residences (a Maori track through high fern) I was several times thrown right and left off the track, and could hardly keep my feet. On reaching the house, I found the family sitting with the doors open, and a pile of blankets on the table, their arrangement being that if they saw the house falling Mr. Stannard was to catch up the little girl and the ladies blankets, and so make their escape. I remained there till daylight, when we were able to see that a crack about 100 yards long had opened in the paddock in front of the house, and sand and water forced up from a depth of 20 ft. or so had scattered several inches deep and perhaps 10 ft. wide along its course. After a cup of tea, I started for town, and on reaching Te Hupuku Pah, I found the ground much cracked, and the Maoris sitting outside under their watas, watching the cracks opening and closing as the shocks occurred. The Maori who carried the mail was just about to start for Wanganui, and so we travelled together.

We found that the whole face of the cliff had been shaken down, and that a large mass of shell rock called "Te Honga" which marked the turning in place (and which resembled the Pulpit Rock at the Isle Wight) had been thrown down and dashed to pieces on the beach. As we came along the beach, repeated shocks occurred, and the policeman had a narrow escape from a mass of the cliff which was shaken down just as he was passing it.

At Te Rapanui, Mrs. Treweek had lost all her milk, which was thrown from the pans on to the dairy floor. When I reached town I found that only two brick chimneys had been left standing. These were large double ones of no great height, and put together with a mortar of equal parts of clay and fresh cow dung, which makes a far better cement than most of the lime mortar used here. The chimneys of squared pumice, of which there were many in those days, had, however, entirely escaped injury, as had also old Mr. Parke's house which was built of pumice. The brick church at Putiki was shaken to pieces, scarcely two bricks adhering to each other, and a brick wall by the mission garden had also been destroyed; while a small brick building at the corner of Harrison Place and Church Place was badly cracked.

The whole foreshore of the river from Taupo Quay to low-water mark looked like an ill-ploughed field, there being cracks parallel with the water at every few inches, while the whole had evidently slipped outwards. At Sutherland's Flat, half a mile above the Aramoho Pah, two cracks about 20 ft. apart, had opened from the river into the flat, and the space between them had sunk down several feet, so that a high tide a boat could be taken many yards from the river.

At Alma Farm, beyond the Racecourse, there was a deep swamp, caused by a seam of ironsand, which being rusted together, formed a pan. This pan was cracked by the shock, and the water sank down and disappeared. The same thing occurred in some swamps between the Turakina and Rangitikei rivers. This shock was very severely felt at Wellington, where the site of the town was upheaved, to the several feet. The whole

Rimutaka range of mountains was also upheaved, to the extent of 9 ft. at its southern end, the upheaval being traceable northwards for a distance of nearly 70 miles.

Hereabouts we were upheaved about a foot, but the upheaval was greater inland, as the tide which at high spring used previously to reach Karatia, has since only extended to Parakino. The earthquake crack in Marlborough was much enlarged, the ground east of it subsiding several feet, so that people whose houses stood on the flat in the Wairau Valley had to shift to higher ground to avoid being flooded out. Vessels passing through the straits a few days later reported the whole water for miles as being covered with dead fish, and the people on board a ship bound for Wellington felt the shock 150 miles west of Cape Egmont, and fancied they had struck on a reef or shoal. One person (Baron Alzdorf) was killed at Wellington through the plaster centre-piece of a ceiling falling on his head, and several persons here had narrow escapes. In one case a nurse and a family of children had to crouch in the corner of a room while the chimney fell between them and the door, and then to scramble out over the fallen brickwork. At the time of the shock a man was returning from town to Newton Lees, and as he rode over the flat behind Putiki his horse stopped, and staggered, apparently unable to keep its feet. This occurred two or three times, and the rider (a new chum who new nothing of earthquakes) fancied the animal was ill. He therefore dismounted, and having hidden his saddle, and bridle behind a toi bush he walked on home. As he did so he found himself several times staggering in a way for which he could not account, but it was only on reaching the farm that he learned the cause.

One or two amusing incidents occurred. A person who had always made a great parade of infidelity, fell on his knees and began praying to the Virgin Mary and the Saints, and an old gentleman exhibited considerable coolness and presence of mind. He was spending the evening with some friends and there was a square bottle of gin on the table from which toddy was being made. When the shock occurred everyone rushed out of the house except the old gentleman, who carefully corked the bottle and laid it on its side before he retired. Frequent sharp shocks occurred for certainly three or four weeks afterwards, and it was several months before the ground could be said to be still. Even if there was no wind there was always a long swell running up the river, and at night we could feel ourselves rocking gently from side to side.

This is apparently another version of H. C. Field's 1891 paper (q.v.), hand-written but perhaps transcribed from a 1904 newspaper. The wording differs from Field's paper in many small details.

FILDES Collection
Source: Fildes newspaper clippings Vol.640 p65. 1922. *In:* Fildes collection, Victoria University of Wellington, Wellington, New Zealand.
Location: Wellington, Wairarapa, Hutt Valley, Pauatahanui
Keywords: secondary, mainshock, uplift/subsidence

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Note. -It should be noted that in the earlier days the bulk of the "stores" for settlers was taken by water, there being a fairly regular service of whaleboats from Port Nicholson

to Te Kopi, and thence inland; by the same means the wool and produce were brought to Port Nicholson. The effect of the earthquake of 1855 to our coast was to make the passage round the Muku Muku rocks quite easy; it also rendered the "harbour" at Te Kopi quite useless, owing to an insufficiency of depth of water. -W.A.E. Post 7.1.22.

W.A Edwards, of the Early Settlers Association, appended this explanatory note to an article (*Evening Post* Jan 7 1922), which may have been written by C. R. Carter, on the coastal route between Wellington and the Wairarapa and on the appearance of the Wairarapa Valley in 1853. The rest of the article provides no information relevant to the 1855 earthquake.

Source: Fildes newspaper clippings Vol.636 (various dates, generally unknown) *In:* Fildes collection, Victoria University of Wellington, Wellington, New Zealand.
Location: Wellington, Wairarapa, Hutt Valley, Pauatahanui
Keywords: primary/reminiscence, secondary, mainshock, uplift/subsidence, casualty, building damage, background, tsunami/seiche, ground damage

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An earthquake in 1848 did some injury to the reputation of the young centre. Chimneys were thrown down, houses cracked, crockery and bottles broken, and the quiver of the earth was so great that people had difficulty in keeping their footing. This shock, however, did not do so much damage as one in 1855, principally because the town was not so large. Mr F. Brady, who arrived at Wellington with his father, Mr Francis Brady, in 1840, has given an interesting account of the occurrence of 1855. Races had been held at Burnham during the day, and at night a drizzly rain was falling. About 9.30 p.m. Mr Brady was walking along Lambton Quay when the first of three shocks took place. He was thrown to the ground, and while trying to rise the sea, carrying logs of wood and debris, rushed in, and lifted him off his feet. The nearest house seemed to be at such an angle that it must topple over, and shivered like a straw. Following was the sound from along the street of people screaming as they hurried from their houses, and then a tremendous crash of falling chimneys. A cloud of dust rose from the buildings like a white sheet, heightening the fantastic appearance of the quivering town. At the corner of Willis and Manners streets on reclaimed ground a shallow fissure was made, from which white mud issued and ran down Willis street. The Te Aro flat was raised three or four feet, making habitable land out of a bog. Acres of earth were shaken from the hills behind Day's bay and to this day the bare patches are to be seen. Some damage was done among the farms, and at Paramatta there was a subsidence of parts of the harbour, boats that had been pulled up on the sand floating over several feet of water. The sea rushed into houses in Lambton Quay. Only two or three deaths were recorded, and fortunately no serious earthquake has since occurred.

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It was after one of these picnics that many a wearied sleeper was awakened by one of the worst earthquake visitations the country has ever experienced. Buildings rocked alarmingly, chimneys crashed through roofs, crockery and general goods were hurled off shelves, and to add to the general consternation the sea poured over the road on Lambton-quay, and entered the buildings along the waterfront. It was a terrifying experience and in most houses parents and children, scantily clad, fled to the hills, quite

a little village camping under blanket and sheet-tents towards the top of Bolton street, above the cemetery. But the full story of the earthquake would run to much space.

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The Wairarapa.

The Wairarapa was unknown to the settlers in the early days. The first who ventured there were obliged to ford the Hutt River at the bar and travel round the coast at low water to Palliser Bay. Then those who settled on the East Coast crossed the lake, and continued their journey on the beach. Those who settled up the valley travelled up the lake towards where Featherston now is. All the light goods were packed on mules and donkeys imported from South America for the purpose of packing. Later on, when there were a number of settlers in the valley, small schooners of 4 and 5 tons took the goods, from Wellington and landed them on the beach at Palliser Bay, and the settlers would pack from there to their different homesteads.

When they got a few bales of wool to send to Wellington, they cut tracks through the bush and scrub and sledged it, two bales at a time, from the different stations down to Palliser Bay and shipped them into the small schooners. Those who lived at the head of the lake would load their wool into whaleboats and take it down the lake to be transhipped into the small Wellington schooners. A few years later, when a bridle track was made from the Hutt to Featherston, through the bush, and over the hills, the settlers would pack their goods from Wellington over the Rimutakas to all parts of the Wairarapa Valley.

Travelling Methods

That was the mode of travelling up till '55 [1855] when the road was opened for dray traffic over the Rimutakas. For many years the goods were brought by drays and carts as far as the Upper Hutt, and the father of the Brown family, who built the first house at the Hutt and ran the Criterion Hotel at Upper Hutt for many years, stored all these goods, and they were packed from there to the Wairarapa.

Petone, as far as Alicetown, was covered with flax and raupo. From there to Featherston was a dense forest which it was impossible for anyone to penetrate. The only means of getting up the Valley was to follow the bank of the Hutt River, and there was not a break in the bank nor a sandbank from the harbour to the source in the Rimutakas, and small boats could even get as far as Belmont.

A great Earthquake

The second great shake we had was in the end of '55 [1855]. It was even more severe than the one in '47 [sic]. The whole of the district of Wellington was heaved up from 5 to 7 feet. After that time there was no difficulty in travelling along the coast to Palliser Bay, as the high water did not come near the base of the hill. The present Hutt Park was under water until that time and two years afterwards it was so dry that it was turned into the racecourse and the Wellington Racing Club occupied it till two years ago. It was this disturbance which ended the possibility of converting the Basin Reserve area into a dock - it rose from a swamp into dry land.

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The visitation of the heavy earthquakes in 1855 made a great difference to the Hutt Valley generally. At Mason's Gardens, where the Waiwetu branched off from the Hutt river, the land was lifted up by the earthquakes, and the water that formerly ran across the road at this point was diverted into the Hutt river. The old course of the Waiwetu can still be distinctly seen, and there was always the danger of the river breaking through there again until the stream was controlled. Those who had made their homes in the Waiwetu and Nai Nai [Naenae] had their lands practically immune from flood through the good offices of earthquakes, but while they lasted residents had anything but an enviable experience. On account of the nature of the soil; the earthquake shocks were extremely severe. In Stokes's Valley, where the late Mr Hart Udy had a sawmill, the whole structure was razed to the ground by an earthquake. Mr Udy at once made for Lower Hutt to see how Mrs Udy was faring. He was chagrined to find the house in a state of collapse. A search for Mrs Udy was made, and he was much relieved to find that she had made good her escape through a window. Mrs Udy, in an injured condition, had gone to a neighbour's, where she received medical aid. The lady is now living at Petone, and though advanced in years is still enjoying excellent health. There was not a chimney standing in Lower Hutt in those days, and numbers of the inhabitants slept in the open for many weeks. The water became oily and unfit for drinking purposes, and when a "shake" was in progress the violence of the shock was such that huge trees were almost bent to the ground, and most persons suffered from earthquake sickness.

FLORANCE, A. C.

Source: Florance, A. C. ca.1858. Notebooks. MS-786-0792, Alexander Turnbull Library, NLNZ.
Location: Wellington, Hutt Valley, Wairarapa
Keywords: secondary, mainshock, aftershocks, uplift/subsidence

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The natives of N.Z. sometimes designated an earthquake "thunder in the bowels of the earth". - This reminds us of an account a friend of ours [other extracts suggest that it was Mr Hayden of Wellington Terrace] gave of the great shakes as they took place on the night (9pm) of the 23 January 1855. There were no warnings heralding their advent. The sounds and the shakes were couate [?] - i.e. with each terrific shake came an equally terrific report, - followed up by continual volleys, - closely resembling the loud reports of very distant large pieces of ordinance. - Such sounds were incessant throughout that never-to-be-forgotten night to use my friend's own words.... There were about 47 shocks in the course of 24 hours.... During these great events the Maoris are in the habit of taking to the mountains - where from the number of fires which they light many highly interesting night scenes are produced.

p81

Another of my N. Zealand acquaintances describing the last great shakes said that many people he could name, like himself, were thrown at right angles from the position they occupied. Another individual [Mr James Wilson of the Fern ground, Upper Hutt in other similar extracts] alluding to the event assured me that when it was at its height while he was in the act of attempting to remove his infant from its cradle, fearful lest

the bricks from the falling chimney might injure it, - he was repeatedly pitched forward with great violence. At the first effort he was hurled over the cradle and twice he was thrown back again on his repeated efforts to regain his erect posture. But of all the painful effects of such scenes it is considered that nothing is more touching to any sensitive mind than the plaintive sounds and bemoanings of the panic stricken cattle.

p83

It is a curious fact that the Maories have often been heard to remark that the earthquakes prior to the two last great shakes were never thought anything of by them they were so slight and never injurious but that each recurrence of these phenomena is more and more severe.

p85

The great Mungaroah [Mangaroa] Swamp in the Upper Valley of the Hutt was raised to an altitude of not less than 20 feet [very clearly written and repeated elsewhere in his notes] above its old level by the great earthquake of 1854 [sic]. An elevation of the same extent took place at the same time in and about the harbour of Port Nich. [Nicholson]. So well is this understood that many consider before many years people will be able to walk on dry land to Some's [Somes] Island. - The seaboard to the south of the Rimutaka Range was the site of the greatest volcanic activity in the Wellington province during the last great shakes. - A quarter acre of land in that direction and about 20 acres or more were added to the seaboard side of farmer Braithwaite's land in the Wai-awai-tou [Waiwhetu] district

Dr. Florance repeats the same information in several places in his notes, although not word for word. In some cases names have been included. He arrived in New Zealand about 2-3 years after the earthquake.

FOX, William

Source: Fox, W. 1855 Letter from W. Fox to J. R. Godley dated February 26 1855. *In:* J. R. Godley papers, Typescripts Vol. II, p678-9, Canterbury Museum, Christchurch, New Zealand.
Location: Wellington, Wairarapa, Palliser Bay
Keywords: primary, mainshock, aftershocks, building damage, ground damage, uplift/subsidence, tsunami/seiche, response/recovery

The late Earthquake has done little damage. About £2000 worth on our new road over the hills to the Wiararapa [Wairarapa], owing to heavy landslips, and the fall of the Hutt bridge another £1000, is the public injury. The private is confined to chimneys, which are now nearly all rebuilt. It has created no panic, and not one soul has left in consequence. It was I think more severe than the shake of 1848, but not succeeded by such smart or such frequent shocks. We have still one or two a day, (now 5 weeks since the great one) but mere ... [page torn] of no consequence. The accounts in the papers have been great exaggerations, particularly Captn. Drury's in the Nelson paper [see *Spectator* extracts], of which he is now ashamed. It was felt pretty smartly at Canterbury; as strong at Nelson as here; slightly at Auckland; and probably more or less all through the islands. It is true that the level of the harbour here is elevated probably 4 feet; and the rise of high and low water is very different to the eye, the former not

coming up on the beach by eight or ten yards of its old mark. The tidal wave, (which did not occur in 1848) was very evident; thirty or 40 feet high in the straits, and Palliser bay; and even in the harbour 8 or 10 - flowing into houses across the road, some 20 or 30 yards above high water mark. If we take the hint and reject brick and stone in building it will probably never do as much harm, though undoubtedly N. Z.d. must rank henceforth as an "Earthquake country." We are living in a Pisa House and had a rather narrow escape from the fall of the chimney and brick wall close to which we were sitting. The next 4 weeks we were reduced to live in a calf pen; but the weather being fine, it was no great hardship, and we are now getting into a new house we were building close at hand. I still continue to address you in Dublin, as I do not know your English address but presume my letters will reach you.

The comment that Drury was ashamed of his report is not borne out by Drury (q.v.) himself. Even after several months he considers his report to be the most complete one available.

Source: Fox, W. 1855. Letter to the editor. *In: Wellington Independent*, January 24 1855.
Location: Wellington
Keywords: primary, mainshock, building damage, background

Before the sufferers by the late shock commence rebuilding brick chimneys, will you allow me to suggest the American practice of portable stoves with a cylindrical pipe carried through the wall, in place of the large and wasteful fireplace, and huge overpiled chimneys which have hitherto been in this place. They are in universal use in that country, and on many parts of the Continent of Europe, for the purpose of economising fuel, (an object worthy or consideration here). They are made of all sorts of patterns and sizes - at a cost varying from 20 or 30 shillings up to £10 or 15. Similar stoves are continually used in entrance halls in England, and can no doubt be procured in London or Birmingham in any quantity. I intend to adopt them myself in a house I am now building. I shall have no chimney in it; and in addition to the greater security, shall save from £75 to 100 of brickwork. Trusting that you will not consider it an insult to take a hint from America.

FURKETT, F. W.
Source: Furkett, F. W. 1953. *Early New Zealand engineers.* A H & A W Reed, New Zealand.
Location: Wairau Valley, Marlborough
Keywords: secondary, uplift/subsidence

p73-74

In April, 1861, the overflow of the Wairau River into the Opawa caused alarm (and well it might).... It had been the writer's [i.e. Furkett's] opinion that the prevalence of the flooding in the lower Wairau Plain, including Blenheim, was due in part to the lowering of the alluvial lands by the shaking of the 1855 earthquake, the river from the Omaka Junction seawards having become navigable after that earthquake, but William Bridge, a surveyor giving evidence on the question of a bridge site, stated that in a flood of 1854 he had seen two feet of water over the town site. On 22nd September, 1860, Dobson had referred to the Opawa "having been flowing out of the Wairau for some years". It seems probable that the earthquake of 1855 so compacted the deltaic and fluviatile material in the lower reaches that the river's banks became lower than they

fluviatile material in the lower reaches that the river's banks became lower than they had been, thus facilitating overflow towards the Opawa. Navigational evidence [*] shows clearly that the seaward 12 miles of the Opawa was considerably lower after this earthquake.

* Sources for the navigational evidence are not given.

FYFFE, George

Source: Fyffe, G. 1855. Diaries, notebooks, correspondence 1855. *In:* Fyffe Family papers -- Papers relating to Kaikoura 1845-1869. Accn 49/55 Canterbury Museum, Christchurch, New Zealand

Location: Kaikoura

Keywords: primary, mainshock

[1855] Apr 6 Wrote to Cecelia giving her an acct of earthquakes.

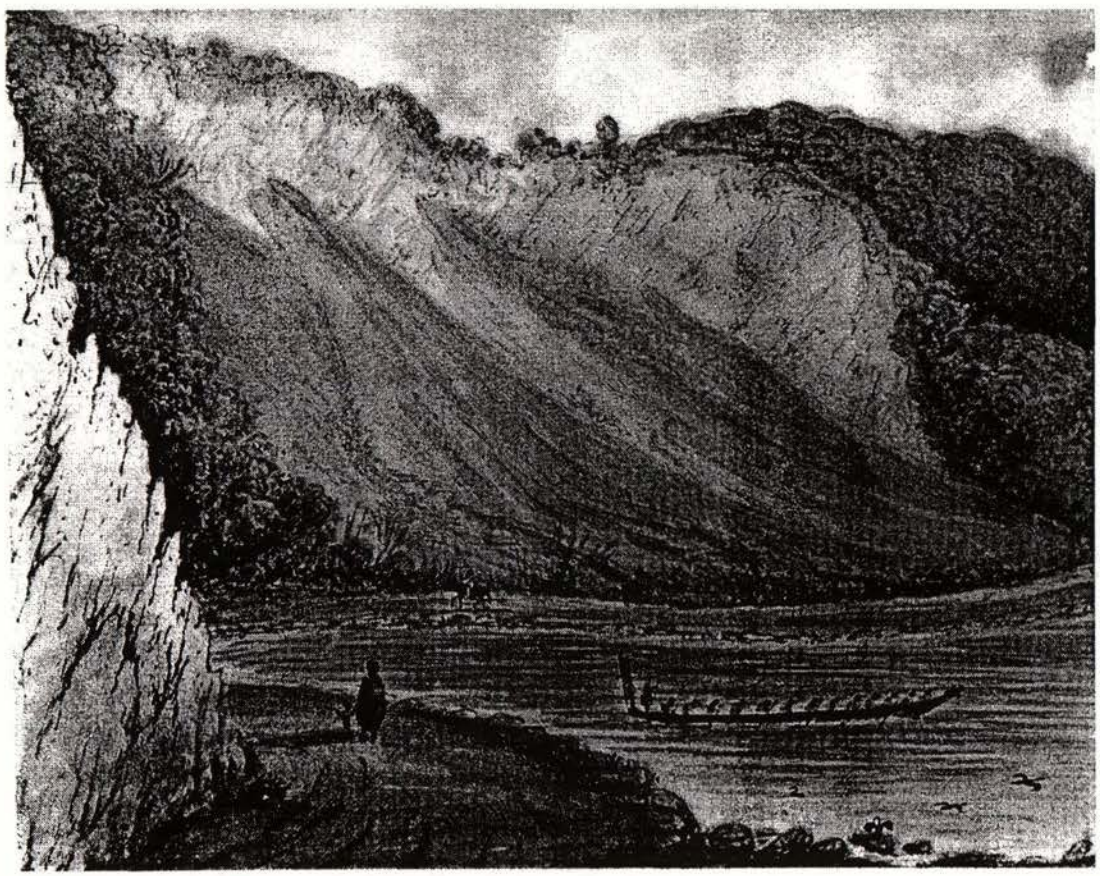
GOLD, Charles Emilius

Source: Gold, C. E. 1855. Painting of a landslide on the Wellington-Petone road caused by the 1855 earthquake. F53309-½, Alexander Turnbull Library, NLNZ.

Location: Wellington

Keywords: primary, ground damage, artworks

Refer to hard copy version of this database.



GOULAND, Henry Godfrey

Source: Gouland, H. G. 1855. Diary. Marlborough Historical Society Inc., Blenheim, New Zealand

Location: Marlborough, at sea

Keywords: primary, mainshock

> Jany 21. Started at Midday for the Wairau in the *Necromancer*.
> Jany 23. At 9 PM, being anchr'd off White's Bay, felt the great Earthquake.

The *Necromancer* plied between Nelson and the Wairau with passengers and cargo. Henry Gouland was a colourful character who lived at what is now Spring Creek.

HAAST, Julius von

Source: Haast, J. von 1862. Letter from J. Haast to C. Lyell, dated July 3 1862. Micro-MS-Coll-20-1676, Alexander Turnbull Library, NLNZ.

Location: Wellington

Keywords: primary, uplift/subsidence, response/recovery, background

> There is not a year in which some slight shocks are not felt in Wellington, but as generally they do not do any damage, even the newspapers do not speak of them, principally under the apprehension that it would deter people from coming there to settle. The raised beaches at the entrance of that [Wellington] Harbour are most conspicuous.

HADFIELD, Octavius

Source: Hadfield, O. 1855, Letter 1855. *In:* Letters to the Church Missionary Society, 1838-68. MS-0895, Alexander Turnbull Library, NLNZ.

Location: Otaki, Kapiti Coast

Keywords: primary, mainshock, building damage, ground damage

p121

> The earthquake which happened early in the year occasioned much confusion. The boys were so alarmed by the fate of one of the chimneys that they could not be induced to sleep in the house for some weeks after it.... The injury done to fences, more especially to a ditch and bank, by the earthquake enabled a large number of cattle into the grain crops.

HALL, John.

Source: Hall, J. 1894. *Experience of Thirty Years in the Provincial district of Wellington.* R. Burrett, Wellington, New Zealand.

Location: Hutt Valley, Wairarapa

Keywords: primary, mainshock, aftershocks, building damage

p10

> We made good progress during January [1855] and beginning of February, one day being neither rain nor fine. In the evening, just after retiring to rest, I suddenly felt as if standing upright, the next moment on my head, and such a commotion all round that I

thought we were all going to the regions below, some 300 feet; when I called to my partner, he said; "lay still John, don't get up" Eh! and I would lay still if I could. The shocks continued all night. When day light came we found everything right, excepting our chimney. This was the cause of the great noise I heard at the first shock. The rocking and tossing continued for several days, so that we could do nothing. We tried to rebuild our chimney, but as often as we did, it came down again for the first week. After a while things smoothed down a little, but the continued vibration lasted for three weeks more.

At Christmas 1853 John Hall selected a portion of land at Greytown. John Hall and his partner had a contract for constructing 28 chains of the Rimutaka road. They stored some goods at Pakuratahi and walked to and from their work on the road, a distance of about seven miles, until they had built a hut. They were in this hut when the earthquake occurred.

HALL, Sir John.
Source: Hall J. 1855. Letter from Sir John Hall to Alexander Vidler of Christchurch, dated June 7 1855. MS-Papers-2940. Alexander Turnbull Library, NLNZ.
Location: Christchurch, Canterbury
Keywords: primary, mainshock, aftershocks

[the earthquakes] did no damage in Canterbury beyond breaking a few teacups.... I was at a meeting here about 8 in the evening, when the first shock was felt, the houses seemed to sway to and fro, somewhat like a ship in a large rolling lurch, there were some lamps suspended from the ceiling, which swung to and fro as if we had been at sea ... although we continued to have slight shocks, just perceptible for a fortnight, none of them were so severe as the first.

HAMILTON, William John Warburton
Source: Hamilton, William John Warburton 1855. Letter from J. W. Hamilton to J. R. Godley, dated February 6 1855. *In:* J. R. Godley papers, Typescripts Vol. III, p176, Canterbury Museum, Christchurch, New Zealand.
Location: Christchurch, Waiau, Canterbury
Keywords: primary, mainshock, aftershocks, building damage, tsunami/seiche

I write a line in haste to say we've just read news of a very severe shake at Wellington - we expected it. For the last 10 days slight tremors (I wont call them shocks) such as we used to have day after day when the *Acheron* was lying off Wellington were felt here. On the Plain they were certainly sharper, but no damage has been heard of nearer than Lee's station - at Waiau-ua 80 or 90 miles north of this - where a chimney was shaken down. The Courtenay rose in our first shock (the one wh. did all the mischief at W. [presumably Wellington]) "6 feet" (?4) and fell again - Now at the Heathcote ferry the water washed up the sloping road only 4 to 6 feet wh. would give a vertical rise of certainly not more than one foot. So I think the Courtenay may have risen perhaps 4 as the undulations were felt more severely northwards - so far as Canterbury is concerned, I certainly used to feel on board ship at Wellington many sharper shocks than any which occurred here. So I thought nothing of it nor could it have been really severe as our tall 2 storied timber and brick built church shows not one sign of being moved.

HAMLIN, James Rev.

Source: Hamlin, J. 1855. Letters and Journal of James Hamlin, 1835-1862. MS-0067-68. Hocken Library. University of Otago, Dunedin, New Zealand. Copy in Hawkes Bay Cultural Trust Library, Napier, New Zealand.

Location: Wairoa, Hawke's Bay

Keywords: primary, mainshock, aftershocks, tsunami/seiche

22 [sic] January 1855 Tuesday ... In the evening about 9 o'clock the wind from the W. blowing rather fresh all day, the weather was very warm, as we were at our evening's prayers the earthquake commenced first slight but afterwards increasing in severity - it lasted from 5 to 7 minutes. The motion was as though we were aboard ship everyone's appearance head was aching, inclined to be sick. Two of the children's faces were as white as a sheet. We left the house and went out of doors. The water of the river was dashing on the bank two or three yards about its usual height from the motion. It was the longest we have ever felt and only exceeded in severity by one. We are thankful to say we are all preserved intact and neither the chimney or house appear to have sustained any damage. One or two slight shocks in the night, in fact the earth seemed scarcely to have lost its tremulous motion during the night.

23 [sic] January Wednesday. At a little past 7 o'clock while we were at our family prayers another shock was felt rather sharp but not long, breakfast being concluded a native arrived from Nuhaka to enquire the cause of the severe discharge of musketry which was heard in the night shortly after the earthquake. The natives of Tahaenui and Nuhaka supposed that we had all been buried by the earthquake beneath our house and that the natives here were firing as an expression of sorrow for us, or that there was a severe fight between two parties. We did not hear anything of the kind ourselves but all the natives about us here heard it and they supposed Mohaka natives had been secretly invaded and a battle fought, and were actually supposing to receive an attack from some quarter themselves. Mohaka is about 20 miles distant and the wind in the opposite direction. So that if the sound had been heard by our natives from Mohaka which is hardly possible, it could not have been heard at Tahaenui 15 miles farther off. Perhaps we shall hear that the sound was heard at all places near here and is the accompaniment of the earthquake...

At or nearly 10 o'clock [night of Jan 24 or 25] another and two more between this and 21 o'clock and one or two slight ones during the night...

[Feb] 10th Saturday, ... At the last earthquake [i.e. Jan 23] he [Mr William Attwood] said he was afraid he should be hurled [?] out of time unprepared to meet his Goodness.

[Feb] 11 Sunday, ... About half past 12 o'clock this night a very severe earthquake. I did not feel too much at Table Cape [Mahia Peninsula?] but at the station [Mahia?] it created great alarm. It was not so long as the lst but much more severe. The sea roared and the water [was] thrown up much beyond its usual height on the beach. There [were] 7 more earthquake shocks between then and 10 o'clock the next morning, but they were slight, we have never known so many earthquakes in such close succession before this year....

> [Feb] 13 Tuesday – Here [at Wairoa] I was informed that the earthquake yesterday morning was very severe indeed....
>
> [Feb] 17 Saturday. Another shock of an earthquake four o'clock in the morning -- rather sharp but nothing to be compared to the one last Sunday midnight...
>
> [Feb] 19 Monday. At about quarter past four another shock of an earthquake ... In the evening about 8 o'clock another smart shock of an earthquake

According to Wilson (1976; p172): "it was not until the close of 1844 that James Hamlin was established at Wairoa and William Colenso at Waitangi, near Clive. Mr Hamlin remained at Wairoa for twenty years, when he returned to Auckland, where he died in 1865 after a connection of forty years with the C. M. S. [Church Missionary Society]".

Wilson, J. G. 1976. *The History of Hawke's Bay*. Capper Press Christchurch, New Zealand. First printed by A. H and A. W. Reed, Wellington, New Zealand.

HARWOOD, Mercy
Source: Millar, J. H. 1943. *Beyond the Marble Mountain*. R. Lucas & Son (*Nelson Mail*) Ltd, Nelson, New Zealand
Location: Golden Bay
Keywords: primary/reminiscence, mainshock, tsunami/seiche

> There were several severe earthquakes in Golden Bay in the very early years of white settlement. The worst one Mrs. Harwood could recall occurred when she was a girl. She was crossing a paddock near the river when the shake started and, like others who were in the vicinity, was thrown to the ground, which was rocking in waves.
>
> They had to cling to tall grass to keep themselves steady. Water in the river slapped from side to side against the banks and anything that was not anchored in place was thrown down. Ornaments and kitchen utensils were displaced from their hooks and all the goats' milk in the wide, flat pans were used for the collection of cream was spilt.

Mrs Harwood was the first white person to be born in Golden Bay (in 1843, as Mercy Lovell). She would have been 12 years old in 1855. Although the date of the earthquake is not given in this extract, its severity, the similarity of the description to that given by James Rout of ground near Takaka moving in waves and the occurrence of seiching in the river suggest that it was the 1855 earthquake rather than the 1848 Marlborough or 1868 Cape Farewell earthquakes (See Downes 1995). Both these events occurred after midnight, when few people would be walking in the fields, - certainly not a 5 year old child. The Lovells lived at Motupipi where James Lovell (Mrs Harwood's father) had established a sawmill near the present bridge over the Motupipi River. The river referred to by Mrs. Harwood is probably the Motupipi River.

Mrs Harwood died in 1936 when she was 93. At the age of 90 she began to write the story of her father's life. This manuscript is probably the source of the information contained in the above extract.

HEAPHY, Charles

Source: Heaphy, C. 1879. Notes on Port Nicholson and the natives in 1839. *Transactions of the New Zealand Institute 12:* 32-39.

Location: Wellington

Keywords: primary, background, uplift/subsidence, ground damage

p33

> Along the eastern shore, from the mouth of the Hutt River to outside of Ward Island, the forest was uninterrupted, and the trees overhung the water, giving shelter to great numbers of wild fowls. About Kaiwhara, Ngahauranga, and the Korokoro, the earthquakes had not then raised the coast, and caused the beach, now occupied by the railway, to appear, and there, also, the trees overhung the water, leaving only at the ebb of the tide a space sufficient for a pathway....

p35

> A pa stood at the mouth of the [Hutt] river on the eastern side with large war canoes drawn up on the beach, while at the hill-foot were tall stages, from which hung great quantities of fish in the process of sun-drying.

p36-37

> From the pa [at the mouth of the Hutt River] we pulled up the Waiwhetu River, which there had lofty pine trees on its banks. The various bends were very beautiful and secluded, and seemed to be the home of the grey duck and teal, and numerous other wild fowl. Here and there, on the bank, was a patch of cultivation, and the luxuriant growth of potatoes, taros, and kumeras, indicated the richness of the soil. As seen from the ship, or the hills, a lofty pine wood appeared to occupy the whole breadth and length of the Hutt Valley, broken only by the stream and its stony margin. This wood commenced about a mile from the sea, the intervening space being a sandy flat and a flax marsh...
>
> From Mr. James' [near Kumutoto stream, Lambton Quay] to the Court House the beach was so narrow as barely to afford room for passage at high-water, between the sea and the cottages that were built close under the hill, or on sites dug out of its foot. Where the Bank of New Zealand stands there was a short reef of rocks, at the foot of "Windy Point" [Clay Point]. The site of the present cricket ground was a deep morass, arranged by the surveyors for a dock reserve [Basin Reserve]; after the earthquake of 1848 [sic] raised the land, generally, about the harbour, it became drainable. The land-slips on the Orongo range {Rimutaka Range], to the eastward of Port Nicholson, were not existing in 1839; they are said, and I believe correctly, to have been caused by the great earthquake of 1848. This was thirty-one years ago, and vegetable growth has not yet concealed the clay and sandstone that was then laid bare. As there were no such slips anywhere about Port Nicholson in 1839, it is, I think, a fair deduction that no shake of equal severity had occurred for at least thirty-one years prior to that date.

Heaphy has incorrectly ascribed the landslides and uplift to the 1848 earthquake, although some landslides may have also occurred in the 1848 earthquake.

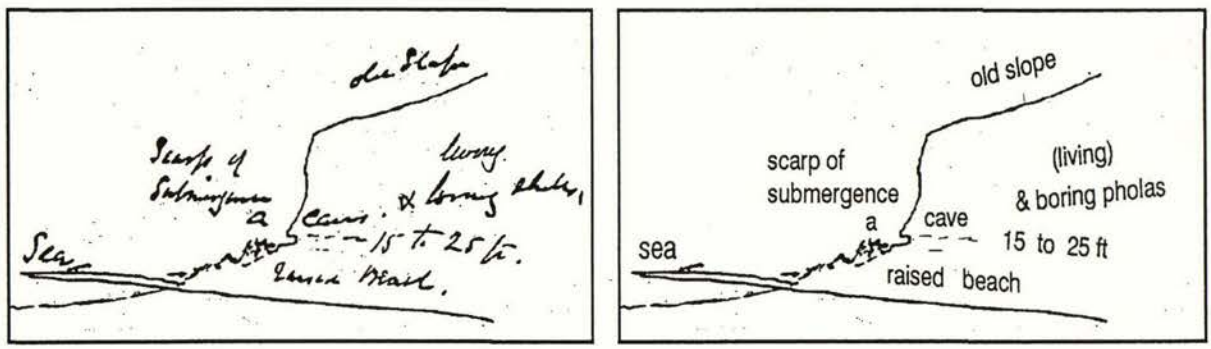
HECTOR, James Sir

Source: Hector, J. 1868. Letter, dated June 8 1868, from James Hector to Joseph Hooker. *In:* AJCP Micro-Coll-10, Reel 16, Letter 524. Alexander Turnbull Library, NLNZ.

Location: Wellington

Keywords: background, uplift/subsidence

> ... I have only time to say that I have both Lyell's Vol. II and Darwin's Book & ? ? I am sorry that Lyell has enlarged so much on the NZ earthquakes. I think there must have been a good deal of imagination in the comments. Previous to 25 feet ago, whatever that may represent in time, the coast of New Zealand was everywhere undergoing submergence – not elevation.
>
> Wellington Harbour is underlaid by Lacustrine beds with only 4-8ft of marine silt on top. The spur descending to the harbour are all [the next word or words have been cut off during microfilming].
>
> [Diagram. See Hard copy version of this manuscript]



Hector's diagram (left), and our interpretation of it (right). J. Hobbs and J. Yaldhurst suggest that the word "living" is Hooker's attempt at deciphering Hector's handwriting.
("Pholas" - a burrowing bivalve mollusc (The Shorter Oxford Dictionary Vol.II N-Z))

> Nothing but depression could have formed a scarp in the part of the deposit this way. Now that there has been a slight elevation the sea fails to get at the base of the cliff. I have discussed the matter in my paper on the Lakes which I have not been able to finish yet. Can you find out for me the best plans for seismometers?

The above has been transcribed primarily by Juliet Hobbs and John Yaldwyn (Museum of New Zealand), with additions and some reinterpretation by the authors. Hector's writing is extremely difficult to decipher.

Source: Hector, J. 1868. A further Notice of the Earthquake Wave. *Transactions of the New Zealand Institute 1:* 449-51.
Location: Wairarapa
Keywords: primary, tsunami/seiche

> Mr Travers alluded to the New Zealand earthquake of 1855 as having caused an immense wave, over thirty feet in height, which did much damage along the east coast of this province, and expressed a wish that any one who knew the particulars of that event would communicate them to the Society.
>
> Mr Mantell and Mr R Pharazyn [son of C J Pharazyn of Whatarangi, Palliser Bay] both remembered the occurrence, and spoke of the wave being about the height represented, and as having done much injury along the east coast.

The discussion on tsunamis that had occurred in New Zealand was instigated by the August 1868 tsunami, which originated in South America. This tsunami affected the whole of the New Zealand coast, destroyed e village on the Chatham Islands and caused one death there.

Source: Hector, J. 1890. Progress Report. Marlborough District (earthquake rents). *Colonial Museum and Geological Survey Reports of Geological Explorations 20:36-53*
Location: Marlborough, Awatere Valley
Keywords: secondary, faulting, ground damage

p41

> It has till now always been considered that this Awatere earthquake-rent had its origin in and was caused by earthquakes of 1855. Mrs. Mouat, of Altimarlock [Altimarloch], informed Mr. McKay that the open rents and fissures yet seen on the surface along the line of fracture were not produced by the disturbances of 1855, but were caused by the earthquakes of 1848. It may have been as thus stated, but it is equally probable that fresh fractures may have taken place on both dates. Mr. McKay came to the conclusion, and both here and further up the valley obtained distinct proof, that the earthquakes of 1848 and 1855 did but open afresh an old line of dislocation, and produced meagre results compared with the total movement which has taken place along this line.

p43

> Everywhere along the line as far as traced there is evidence of recent movements – so recent that it may be credited that some of the rents and fractures have been formed within the past forty or fifty years, as testified to by the older residents in the district.

Source: Hector, J. 1891. Report of the Committee appointed to investigate and report upon seismological phenomena in Australasia. *Australasian Association for the Advancement of Science 3:* 505-532.
Location: Wellington, Marlborough
Keywords: primary, secondary, mainshock, aftershocks, uplift/subsidence

p521-522

> The following information respecting the earthquakes of 1848 and 1855 is reprinted from documents that are now very rare, copies of which having been lent to me by the Hon. W. B. D. Mantell, F.G.S. -
>
> ... On the 23rd January, at 8.50 p.m. as in 1848, it [the earthquake] appears to have had a direction from north-east to south-west, accompanied by a fearful noise. The motion was violent, and sharply changed at right angles, and from north-east to north-west. Still increasing, it partook of both motions, with a sensible upward impulse. The duration was about a minute and a half. The vibration continued at intervals throughout the night from north-east to south-west, and slight shocks were frequent to the 11th April, on forty-seven days. The first shock was felt a hundred and fifty miles from the coast, and affected New Zealand from the extreme south to the East Cape, about 360,000 square miles or three times as large as the British Isles. An area of 4,600 [square] miles was estimated to have been raised from 1 ft. to 9 ft the greatest elevation being on the western side of the Wairarapa Valley, the vicinity of Porirua Harbour not being affected, and the west side of Cloudy Bay, north of Blenheim, having actually been depressed to the extent of 5 ft.

The latter part of this passage seems to have been extracted from Lyell (1868). The source for the first part is not known.

In the following section of Hector's paper questions are posed in the text and then answered. While the given replies for the 1848 earthquake can be assumed to be taken from Judge Chapman's papers, the respondent regarding 1855 is not stated. However, the text is very similar to that of Mallet (q.v.).

p529-530

> Was there evidence of strong vertical shock, or torsion of loose objects?
> 1855. 23rd January: - This (the backward- and forward- and side-to-side motion) was followed by a continuation of both, a sort of vorticose motion, exactly like the motion felt in an ill-adjusted railway-carriage on a badly laid railway at very high speed, where one is swayed rapidly from side to side. This was accompanied by a sensible elevatory impulse. It gradually subsided, and the above, constituting the first and greatest shock, lasted altogether, I should say, one minute twenty seconds or one and a half minutes, at Wellington....
>
> Was the area of activity circular or elliptical, and, if latter, what was the direction of the major axis?
> 1855 - Direction north-east to south-west....

How many shocks? Were first or last strongest?
1855 - The motion increased in violence, and then gradually subsided. The earth continued to vibrate all night like the panting of a tired horse, with occasional shocks of some violence, decreasing in frequency and violence towards morning, and nearly all in the north-east and south-west direction; some of them a single jerk back and forwards like that of one railway carriage touching another, but generally they were followed by a vibration gradually decreasing.

HERON, H. A.
Source: Heron, H. A. 1929. *Early Wairarapa - an account of the nature and development of the Wairarapa district of New Zealand from the advent of the white man to the year 1860.* (Adapted by A. Clemas & J. H. Fieldhouse) Palamontain & Petherick, Masterton, New Zealand.
Location: Wairarapa, Marlborough
Keywords: secondary, uplift/subsidence

p45

The road designed by Dr Deiffenbach had at last been constructed, the track round the beach had been improved to make it passable at half tide, and was soon to be placed high and dry out of the ocean's reach. In 1855 a severe earthquake disturbed that part of New Zealand bordering on Cook Strait. So violent was the movement, that a section of the land comprising some four thousand six hundred square miles, was tilted. On the northern boundary in the Wairarapa, a rise of eight feet elevation resulted, while at Cloudy Bay, the southern portion of the area affected, a depression of five feet was recorded. The permanent rise in the north was later discovered to be only five feet,. a subsidence having occurred, but in the western Wairarapa a permanent rise of nine feet was experienced.

This upward movement in the district was productive of two changes. Firstly, the Muku Muku Rocks were found to be quite a distance from the sea even at high tide, while secondly, an anchorage at Te Kopi was rendered useless owing to lack of depth of water.

Heron does not state the source of his information, particularly the 8 ft on the northern boundary of the Wairarapa which later subsided.

HILL, Henry
Source: Hill, H. 1889. On Artesian Wells. *Transactions of the New Zealand Institute 22:429-438*
Location: Hawkes' Bay
Keywords: secondary, ground damage

That the Heretaunga Plain, the Kidnapper conglomerates, and the area around Pakipaki have been disturbed by earth-movements, even within the memory of living evidence is beyond question. In the great earthquake of 1853 [sic], which was felt over the larger portion of the colony, I am informed by our ex-president, the Rev. William Colenso, F.R.S., that the Ngaruroro River overflowed its banks at Waitangi, near Clive, and the ground showed a rift 10in. to 12in. wide, running north-west and south-east across the plain, through which rift a lambent flame flickered for some time. A similar

> phenomenon was noticed at Pakipaki, and the land in some places was raised several feet in height. It was during this earthquake that the Kidnapper conglomerates were riven and torn in many places. These rifts may still be seen, and they can even be distinguished by an observer standing on the Napier hills be the circumstance of the conglomerates falling in sections towards the north-west, and by the greater slope of the north-west side of each rift than of the south-east side.

Hill refers to William Colenso's observations several times in his publications and his private papers (see following extracts). The dates given for various events differ. In this extract some effects seem to belong to the 1855 earthquake (see Colenso extracts) and some possibly to a large Hawke's Bay earthquake in 1863. However, there may also be confusion with an earthquake in July 1843, thought to be centred close to Wanganui or within 50km to the northeast (Eiby 1968, reference given below). Evidence (from Colenso's 1843 papers) has recently been found (January 1999) indicating hat this earthquake was possibly responsible for landslides and fissuring in the Hawke's Bay area.

Eiby, G. A. 1968. A descriptive catalogue of New Zealand earthquakes Part 1 - shocks felt before the end of 1845. *New Zealand journal of geology and geophysics* 11: 16-40.

Source: Hill, H. ca.1897. Folder 97. MS-papers-0172, Alexander Turnbull Library, NLNZ.
Location: Hawke's Bay
Keywords: secondary, ground damage

> ... my mind went back to the story told me by the late Rev William Colenso FRS of the earthquake he experienced in the district following his arrival at Waitangi in 1844 as a missionary to the Maoris...
>
> The year following his arrival a great quake occurred when the earth opened and the hills along the west side of the inner lagoon were raised and lambent flame appeared along the swamp areas from Waitangi towards Poraite.
>
> In 1855 or 10 years later a more serious quake occurred but it was much more general. In Hawke's Bay, Mr Colenso said that the Kidnappers underwent a great shaking and the deep canyon-like openings appeared as a result of the shake. It was the year when Napier sections were sold by public auction but there being few people in Hawke's Bay at the time other than natives, the quake was soon forgotten and no records of destruction have been kept. This account of the breaking of the Kidnapper conglomerate was given to me by Mr Colenso following a somewhat severe shake at Dannevirke. It was in 1898....

Wilson (1976) records that William Colenso (q.v.) arrived in Hawke's Bay in December 1843. The settlement at Napier was surveyed in 1853 and land was made available for sale in 1855, as correctly recorded by Hill in this extract. See previous extract re possible confusion of earthquakes.

Wilson, J.G. 1976. *The History of Hawke's Bay.* Capper Press, Christchurch, New Zealand. First printed by A.H. & A.W. Reed, Wellington. New Zealand.

Source: Hill, H. (c. 1904) Notebook 61. MS-papers-0172, Alexander Turnbull Library, NLNZ.
Location: Hawke's Bay
Keywords: secondary, ground damage

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> In 1844 the natives reported fire from the earth at Poraite after a severe earthquake.
> In 1854 [sic] he himself [Colenso] saw lambient flame in the Waitangi Creek following a great earthquake.

Another of Hill's records of his meetings with William Colenso (see previous extract) on various occasions from about 1897-1900.

HOCHSTETTER, Ferdinand von
Source: Hochstetter, F. von 1859. Report on a lecture given at the Mechanics Institute, Auckland. *In: Wellington Independent* August 9 1859.
Location: Mount Tongariro
Keywords: secondary, ground damage

> Of the three well known northern mountains; Tongariro, Ruapehu and Taranaki, the two latter are extinct. On the first mentioned the Doctor distinguished five craters which are to a certain extent active, steam always issuing from them, accompanied by occasional eruptions of black ashes and dust from the principal one, and by loud subterranean noises. The shape of the cone is changing; the western side, for instance, having fallen in at the last earthquakes [i.e. 1855].

Source: Hochstetter, F. von 1864. *Geology of New Zealand. Contributions to the geology of the Provinces of Auckland and Nelson.* Translated from the German and edited by C. A. Fleming, 1959, Government Printer, Wellington, New Zealand.
Location: Wellington, Palliser Bay, Wairarapa, Wairau Valley, Awatere Valley, Taupo, Marlborough
Keywords: secondary, mainshock, uplift/subsidence, tsunami/seiche, ground damage, biological effects

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> The first strong earthquake since the foundation of the town of Wellington took place on 16-19 October 1848 and caused great damage to the buildings. Twice as violent a quake on 23 January 1855 was associated with highly remarkable phenomenon and could be felt over the whole of New Zealand. A sea wave caused by it rolled from Cook Strait into Wellington Harbour. Mukamuka Point near Wellington was suddenly uplifted 9ft, while the uplift in the town itself reached only 2ft and on the opposite side of Cook Strait, at the mouth of the Wairau River, submergence took place. In the Awatere Valley (Marlborough), the ground suffered powerful rents and fissures which could be followed for a distance of 40 miles and still gaped locally several feet wide in the year 1859. Near Cape Campbell, landslides occurred, laying bare the white rocks so that coasting vessels reported it to be freshly fallen snow and in Cook Strait Captain Kennedy, two days after the earthquake, saw the surface of the sea covered with dead fish. All observed phenomena point to an epicentre out in Cook Strait, and it is an opinion generally circulated by the colonists that a submarine volcanoes is situated here, having a connection with these outbreaks of earthquakes.

In fact, soundings carried out by English Naval Officers*, show that, in front of the entrance of Wellington Harbour in 41° 25'S Lat. and 174° 37'E Long., a deep crater-like hole is found on the sea bottom, over which the sea restlessly heaves up an down. *[Hochstetter's footnote to above text]Comp. No. 2054, English Admiralty Maps.]

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In the year 1855, at the time of the earthquake in Wellington, an ash eruption is said to have taken place here [identified by Hochstetter as Ketetahi, an active fumerole on the slopes of Tongariro – but it was probably Red Crater]....

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In the Wairau Valley ... near the river bed, numerous systems of earthquake fissures can be observed, which always trend parallel to the course of the river and are intersected at various angles by abrupt bends in the river. [These observations were made by Dr. Julius von Haast in 1859, so the fissuring is most probably the result of the 1855 earthquake].

Source: Hochstetter, F. von. 1867. *New Zealand, its physical geography, geology and natural history, with special reference to the results of government expeditions in the provinces of Auckland and Nelson.* German edition

Location: Wellington, Marlborough, Awatere, Wairarapa

Keywords: secondary, uplift/subsidence, ground damage, biological effects

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The second and last earth-quake on the 23 January 1855, attended with the most extraordinary phenomena, was felt throughout New Zealand. A powerful surge rolled from Cook Strait into Wellington Harbour. Manuka [Muka Muka] point near Wellington was suddenly raised nine feet, whereas the elevation in the town itself was only two feet, and on the opposite side of Cook Strait, at the mouth of the Wairau River, depressions took place. In the Awatere Valley, the soil received large fissures and crevices. One such fissure was traced full forty miles, and as late as 1859 my friend Dr. Haast found some of these fissures three feet wide and several feet deep. Near Cape Campbell parts of the mountain fell exposing white rocks, so that the sailors spread the report of having seen fresh fallen snow, and two days after the earth-quake the surface of the sea was covered with dead fishes. All the phenomena hitherto observed point to a central point in Cook Strait, and it is a generally prevailing opinion that a submarine volcano lies there, with the eruptions of which the earth-quakes are intimately connected. And, in fact, it has been proven by soundings made by English Naval Officers*, that in front of the entrance to the harbour of Wellington, 41° 25' South lat. and 174° 37' long. East of Greenwich, there is a crater-shaped hole at the bottom of the sea, over which the sea has never been seen quite calm.
*[Hochstetter's footnote to above text] Comp. No. 2054 English Admiralty Maps.

HOLLARD, Elizabeth.

Source: Hollard, E. ca. 1930? Reminiscences [1842-1930]. QMS-0989-0990, Alexander Turnbull Library, NLNZ.

Location: Hutt Valley

Keywords: primary/reminiscence, mainshock, aftershocks, building damage, ground damage, uplift/subsidence, response/recovery

Although I remember the earthquakes of 1848 I was too young to understand the awful portent; and I thought it much more interesting to be taken each evening to Mr Hughey's big barn instead of being undressed and put to sleep in a common place bed! Because for some reason the barn was considered safer than a house, and also for the comfort of companionship, some friends would meet, and with no more equipment than blanket and pillow, pass the night on the floor of the barn - rocked by the frequently recurring earth tremors. Seven years later, history was repeated. For in that interval the Hughey family and also our own removed to the Hutt, and there the farmer built another large barn; and when again the earth was shaken with violent quakes, we fled to its shelter as to a refuge; and again, in company with those friends we passed the fearsome nights in Mr Hughey's barn. On Jan 23rd 1855 occurred the first shock of the earthquakes of that year. Although the time was midsummer the night was cold and wet. My father, my brother and a friend were sitting round the fire while my father read aloud an article ... When the shock came he leaped from his chair and in that same breath the seat he had occupied was buried under a heap of bricks which an instant before had been the chimney. But not one of the three was hurt. My mother had retired earlier but not to sleep for I had crept in beside her, and together we were looking at a picture ... when without a moment's warning all creation appeared to be shattering. But my Mother's face was the face of a Saint! While the earth reeled she clasped her hands and lifted her head, and softly repeated the concluding words of the Psalm just read...

When morning dawned, evidences of the violence of those awful convulsions was seen in the lines of blue sand which had been thrown up in some way from a deep strata in the earth. A deep creek which turned the wheel of a flour mill had dried up and never more did the mill-wheel turn. It is well known that the flowing tide never again reached the old high-water mark.

There was great destruction of household treasures, but the continuance of shocks were so nerve wrecking in effect that many people believing that the end of all things was near, were quite indifferent to the ruin of their goods. A woman saw her clock shifting to the edge of the stand but did not put out her hand to stay its crash to the floor. In another house a newly opened bag of sugar was thrown down and when a dog wandered in and began to lap up the sugar, care was not taken so much as to shoo the dog away...

But the good old earth ceased to quake at last - at least for longer intervals and with less severity. That no life was lost at that time was due to the fact that all buildings were of wood - and chimneys were built with mortar that was little more than clay, so instead of falling bodily when put to the test they crumbled.

Elizabeth Hollard's parents, Mr and Mrs Robert Robinson, arrived from England in 1841 Elizabeth was born in August the following year, making her 13 in January 1855. Her girlhood was spent at Karori, Taita in the Hutt Valley, Waikanae and finally, Otaki. Her father was in charge of the Maori mission at Otaki under the late Bishop Williams, and it was during that period that the famous Maori Church was erected there. Elizabeth was living in Karori at the time of the 1848 earthquake. After marrying John Hollard (see Anon 2) in 1863, she went to live in the Wairarapa.

HORT, A

Source: Hort, A. 1855. Diary extracts. *In:* Levine, Stephen (ed.) 1995. *A standard for the people (the 150th anniversary of the Wellington Hebrew Congregation 1843-1993.* Wellington Hebrew Congregation and Hazard Press Ltd, Christchurch, New Zealand.

Location: Wellington, Porirua

Keywords: primary, mainshock, aftershocks, building damage, casualty, tsunami/seiche, response/recovery

Levine's interpretation of Hort's diary is given here. However, words inserted in [ ] by Levine seem unnecessary in some cases. It is suggested that the reader omit them, hence reading the diary as it was originally written. The italics indicate diary extracts.

> *The almighty will'd it otherwise for on the Night of the 2nd January [sic] shortly after 9, without the Slightest previous notice, a most terrific Earthquake burst forth, far more violent than those of 1848 and more instantaneously destructive in its consequences. I had not long before seen my little Grandson home, a distance somewhat above 2 miles, and was discussing Politics with Mr. Levin, Mr. Bell and another Gentleman who had not long returned from the races, when it occurred and, being absent from my Dear Wife and [daughter] Caroline, gave it an additional horror. When we got out of the House, it being a Wooden One not the danger of those built of Brick, the resemble of the motion I can only compass to the velocity of the form of a Mill propel'd by the wind. This [shook], as rather said to be two but so [close] upon one other that no [second] interval could be distinguished. [This] lasted close to 3 minutes, and 3 minutes of intense suspense and anguish they were. The moment this [shock] had subsided [it] was succeeded almost incessantly by others of a much lighter character. I started for home, and the Gentleman and Mr Levin was kind enough to accompany me. We enquired of the terrified people we met what the State of the Beach road was and [did not receive] so many consoling or encouraging accounts, but were cautioned to look about us at every step. Luckily we arrived home safely, and altho' I found my dear Wife and Caroline greatly agitated, it was a great revival to them to see me return.*
>
> The '*destruction*' he had seen on the way '*was quite appalling, many chimney.... had fallen*', including '*all the old brick injured by the last Earthquakes*' which were now '*crushed to pieces*'.
>
> *A beautiful Hotel recently built at a great expense by a German Baron (Alzdorf) [was] much crushed and he himself only recovering from a severe attack of Paralysis. Not able to escape sufficiently quickly was a man so injured by the fall of the chimneys inward that on being released he died in 20 minutes, happily and miraculously the only life which has fallen a Sacrifice. You can scarcely imagine the dread crush which*

accompanied the Shock [of] all these destructions.' Among the buildings threatened was *'the New Bank, a Massive building only recently put up and just then completed at the expense of £6000'* but *'now a mass of ruins'*.

When *'united with the whizzing of the Earthly convulsion'* the destruction '*rendered [was] truly horrifying and imparted a terror I hope you or none for whom I entertain a regard will ever encounter*'. Nor had it yet come to an end.

Since then we have more or less experienced Shocks almost every day and Night, some days sharper, other days less frequent and slighter - this morning we had a pretty heavy one, so that they [have] now continued with more or less force for nearly 5 weeks.

Happily none [have been] of the terrific character of the 1st, accompanying which [was] a tidal Wave which washed into Several of the Stores on the Beach, fortunately the Mouth of our Harbour being too Small to admit its full force, or it most probably would have Swept all on the Beach as a deluge, but from this impediment it divided itself, the greatest force entering the Next or Porirua Harbour, and on the shores of the Wairarapa 20 feet high, washing away the Boatman's Cottage and all in it, he scarcely having time with his Family on Seeing it approaching to escape to the hills, which he fortunately did, as it clear'd away a Ton of Iron, several Bales of wool and other things lying there on the Beach for Shipment to Wellington.

As for Hort's own residence there was a lot of renovation and reconstruction to be done. *'All my Chimneys are again Down, all the outer of my House greatly Shaken and Crack'd, and Several interior damaged but no fatally or as extensive as I first Apprehended they were, but then it is a brick house which, altho' lined with wood, creates a fear and hesitation to inhabit it now.*'

As a result he was now less hopeful about prospects than he had been years earlier: *'For I fear this is a confirmed Earthquake Country, of which the large Cost of it [is] almost Worthless - my Greenhouse has blown up, bodily, as altho' shot with a Cannon and Shatter'd to pieces.' Lost with it were abundant fruits, including a 'Crop of Grapes' which had been 'ripening off the Parent', with 'thick and heavy stems'.* He regretted, too, the loss of *'many many beautiful Plants which my Dear Caroline has nurtured with the greatest Care, being presents from all quarters of the Globe*'.

At the same time there were positive qualities emerging form this calamity. *'Amidst all these Disasters there exists universally a generous Sympathy here [which] I have never anywhere else witnessed.'* The crisis atmosphere of a colonial community, post-earthquake, was of some comfort: *'[It] is a Source of great relief to the perturbation of the Mind.*' Hort then made an observation which would be heard among New Zealanders for more than a century*: 'Such a degree of Honesty exists here, without closing a Door or Window you can have your House wholly untenanted, without the slightest apprehension or even imagination of any one interfering therewith, much less abstracting anything however it my be known that Valuables are Contained therein.'*

After the earthquake the Hort family left their home *'for a Fortnight'*, taking with them their servant, lodging with *'a new neighbour who, with his Family, insisted theirs being a Wooden Cottage we should share it with them, and partake of their hospitality until all the dangers were passed'.*

Again, in passing, Hort offers a comment which almost sets the tone for future references by New Zealanders to their much larger neighbour across the Tasman Sea: *'What a different result in Australia wants there under like Calamity.'*

HUTTON, Frederick Woollaston

Source: Hutton, Frederick Woolaston 1886-1889. Field book. Canterbury Museum, Christchurch, New Zealand.

Location: Christchurch, Lyttelton, Canterbury

Keywords: secondary, mainshock

Extract 1 Shock of 1855 felt severely in Lyttelton and Christchurch, more severe than any other – meeting in White Hart, Christchurch, under Sir J. Hall at this time – lamps swung out violently.

Extract 2 Earthquakes of 1855 severely felt at Lyttelton and Christchurch – a meeting was being held at the White Hall Hotel under presidency of Sir J. Hall – Lamps swung out at large angle.

IORNS, B.

Source: Iorns, B. 1932. Old Wairarapa - an early earthquake - an interesting review. *In: The Wairarapa Times-Age*, September 24 1932.

Location: Wairarapa

Keywords: secondary, uplift/subsidence, faulting, ground damage

During the recent floods in the Wairarapa Lake district references were made in the papers to a great earthquake in the early days of this district, writes Mr B. Iorns, of Bunny Street, Masterton. Probably there are old residents who may have a much wider knowledge of the subject than myself; if so I hope they will supply any additions or corrections to this account. The date of the earthquake seems fairly definitely established as in 1832, just prior to the advent of white settlement in this district, Maoris who experienced the disaster, for such it was to many of them, gave to some of our old settlers particulars which agree fairly accurately. Two of such natives, Hemi te Miha and Tame wi Parata, were at the time living in pas near the Turanganui River. These pas seemed to have suffered severely, as the latter native was the sole survivor of seven in his particular whare and even he had a leg broken. In later years he became coachman for the late John Russell of Whangaimoana Station. These natives were definite that the shake occurred in May, 1832, and stated that much alteration occurred in the landscape around Palliser Bay, including the raising of the land at the Western Lake and consequent shifting of the outlet channel to the Eastern side of the Lake; also many cracks appeared in the ground and landslides along the coast east of the Lake.

Perhaps the most noticeable result of the shake was a fault or crack running along the whole of the western side of the Wairarapa Valley. I believe that it runs from Palliser Bay to East Cape, north of Gisborne, but cannot vouch for that. Personally I have followed the line from Dalefield to Dryer's Rock, north of Mauriceville. This section runs in a perfectly straight line, 20 degrees east of magnetic north. Assuming that the line does continue, and that it is straight northward, it would pass close to Makuri, Waipukurau and Opapa, between Hastings and Napier, through the centre of Wairoa, close to Gisborne, through Waipiro Bay and east of East Cape. Southward it would pass through the Wairarapa Lake and the western side of the Lower Lake. This is partly surmise, but it is, rather suggestive that it should link up a long line of the most wobbly localities of New Zealand. At some future date I hope to verify this.

Bruce's Lake, north of Masterton, was a result of the same shake. Across the river from the lake the Maoris occupied the Ruataniwha Pa. According to one Maori, Paul Hamua, then living there, they quickly abandoned the pa when the big slip blocked the Ruamahanga River. He stated that when the river finally broke through the Maoris living in pas lower down had to climb trees to save their lives. He also placed the date at about 1832, and was quite sure that the long fault was caused at the same time.

Climatic conditions, slips and live stock, are steadily eradicating much of this crack, also roading and farming operations. As an instance of the latter, whilst discussing it with Mr E. Eagle, of Belvedere, I expressed surprise that it was not more plainly visible. Mr Eagle remarked with a smile that he would be disappointed if it was considering that he had put over 70 loads of earth into that particular part to level up the paddock. Probably the average width would be from 10 to 12 feet, but in places there are sections up to 100 feet in width, 30 feet deep and several hundred yards long, some containing raupo swamps and others quite useful dams with permanent water. Some of the larger sections are strongly reminiscent of the formation works of some of our abandoned political railways.

In the early days of farming in this district this fissure was a source of annoyance to owners of cattle which were often bogged in their endeavours to cross. It also formed a hiding ground for wild pigs until the bush was burned. At one spot I believe it passed under a large tree, splitting it up to the branches with half of the tree rooted and still growing on each side of the crack. In some places other cracks exist, running parallel to and at short distances from the main one. As for a more precise line, running south, the line crosses Dreyer's Rock Road right at the junction with Mauriceville-Mangamahoe Road, passing under an old woodshed. From there it runs east of Mauriceville, crossing the road between the overhead railway bridge and river bridge, follows the river valley, running up over hills on to Palmer's farm and crossing Jackson's Road about a third of a mile north of L. Jackson's homestead, along flats and edge of foothills, passing about three quarters of a mile east of Bruce's Lake over the Ruamahanga River, crossing the Main Highway just below the terrace east of the Miki Miki Road junction; across the plain, and the Waipoua River and up hills towards Matahiwi, passing just behind the concrete of the old Matahiwi Dairy Factory and crossing the Matahiwi Road between the gate-posts of Amundson's entrance. It then passes over the Matahiwi Station, just behind Harcombe's cowshed, running down the side of the hill below the road and

crossing the Kaituna Road at the edge of the swamp on to Mr R. McKenzie's property. After crossing the Waingawa River it crosses Mt. Holdsworth Road just west of Mr Searancke's house, running up hill just below the old sledge track on to Mr Parker's farm; running down and crossing the road at a small birch bush, continuing on across the Mungatarere River and Carrington Road on to Mr Larder's farm, passing alongside the cowshed and up the hill from there on it passes down, leaving Mr McCauley's farm and crossing Belvedere-Carrington Rd between the bridge and junction of the roads. Passing the cowshed it continues over the hills again, crossing the Belvedere Road on to Mr Eagle's farm, there running along the foothills until it finally leaves the hills on to Mr Sayer's farm. This is as far south as I have traced it. I did not have time to verify the ownership of all the properties mentioned, so there is probably errors in some cases.

For the information obtained from the Turanganui Maoris I am indebted to Mr Jas, White, an old resident of the Whangaimoana district and now resident of Landsdowne, and for much pertaining to this end of the Valley, to Mr Chas. Bannister, the well-known guide.

A somewhat different version of Paul Hamua's recollections is found in Bannister (q. v.). It is possible that another earthquake was severe in the Wairarapa before widespread European settlement. An earthquake in May 1840 is a possible candidate, (see Iveson, Bannister & Eiby (1968)), but much of Iorns description fits what it known to have occurred in 1855. It is intriguing that Lyell (1856c, 1856d) also refers to an earthquake in 1832.

Eiby, G. A. 1968. Descriptive catalogue of New Zealand earthquakes. Part 1 - shocks felt before the end of 1845. *New Zealand journal of geology and geophysics 11:* 16-40.

Source: Iorns, B. 1904. The earthquake of '55. *In: The New Zealand Mail*, November 20 1904
Location: Wellington, Wairarapa, Palliser Bay, Hutt Valley
Keywords: secondary, primary/reminiscence, tsunami/seiche, uplift/subsidence

Te Kopi to the Waiwetu River (Wellington) was raised. In the vicinity, and beyond Te Kopi the coast line for some considerable distance was lowered. The Waiwetu River had a large mud bank on each side of it, next morning after the earthquake. One settler informed me that in the early days fair sized craft used to sail up to Waiwetu River and one small schooner which was at anchor in the river at the time of the earthquake was found high and dry on a mud bank next morning the water having receded through the land being thrown up. For the bulk of the information in this article I am indebted to Mr Alfred Matthews, of Waiorongomai, Featherston, a pioneer colonist, and breeder of the famous Waiorongomai Romney Marsh Sheep.

This article is very similar to Iorns' 1913 article (q.v.) and to that written by Alfred Matthews (q.v.).

Source: Iorns, B. 1913. Article. *In: Wairarapa Daily Times*, April 14 1913.
Location: Wairarapa, Wellington, Palliser Bay.
Keywords: primary/reminiscence, secondary, mainshock, aftershocks, casualty, uplift/subsidence, ground damage, tsunami/seiche, building damage

1855 January
WAIRARAPA
The earthquake of '55 was felt in its greatest severity in the north-west angle of Palliser Bay and for some distance along the Rimutaka range. The features of the country were changed. Parts of the mountain range were torn to pieces, and big slips came down the sides of the mountain. The traces are as apparent today as at the time of the visitation. Some of the slips were hundreds of feet long and many chains across. The writer has often scaled the mountain where the slips came down, and the country is just as devoid of vegetation at these spots as it was after the slips occurred. Great rents, caused by the earthquake, are still visible in the mountain side. Prior to the earthquake settlers were put to great inconvenience getting around the Muka Muka rocks. If the sea was rough it was impossible to take stock round these rocks or even to ride past them. The whole of the stock from Hawke's Bay (then generally known as the Ahuriri) and the East Coast had to be taken to Wellington round these rocks and they were a source of trouble to drovers and settlers. But when the earthquake came the whole scene was changed in a few seconds. Millions of tons of earth came down from the mountainside and completely buried the rocks - five in number, and the land was raised to such an extent and the sea forced so completely back that nowadays one can travel over this route at any time without one's journey being delayed. At high tide the sea does not come within two chains of where the Muka Muka rocks were....

The eastern side of Palliser Bay was not affected to any great extent in the way of the features of the country being changed. The upheaval on the north-west side, however, was terrible in nature. So severe and so extensive was it that there is actually a lagoon now where the sea used to be, and several chains of sand between the high-water mark of the sea and the lagoon.... The tidal wave on the night of the earthquake swept the wharves [at Te Kopi, Palliser Bay] completely away, and carried a number of bales of wool out to sea. A big canoe on Kirawai [Kiriwai] Backwater ... where settlers used to keep stores, wool, etc. was buried by a slip, and the Kirawai [Kiriwai] Backwater, which was very deep, and up which boats loaded with wool, etc. used to come, was turned into a lagoon by the earthquake. On the Whatarangi side of the Bay there was no upheaval; if anything a slight sinking ... the coast line from the Wellington side of Te Kopi and the Waiwhetu river (Wellington) [Hutt Valley] was raised. In the vicinity, and beyond Te Kopi, the coast line for some considerable distance was lowered. The Waiwhetu river had a large mud bank on each side of it next morning after the earthquake ... in the early days fair-sized craft used to sail up the Waiwhetu river, and one small schooner, which was at anchor in the river at the time of the great earthquake, was found high and dry on a mud bank next morning, the water in the river having receded through the land being thrown up.

IVESON, Ben

Source: Iveson, B. 1954. Severe earthquakes in early days brought scenes of terror for settlers in new land. *In: Wairarapa Times-Age*, March 11 1954.

Location: Hutt Valley, Wairarapa, Palliser Bay, Wellington

Keywords: primary/reminiscence, secondary, building damage, ground damage, faulting, tsunami/seiche, uplift/subsidence

There were three very pronounced earthquakes felt in Wellington and in Wairarapa before Masterton was really a town, these being sharply recorded in the memory of those men and women who later became prominent settlers in Wairarapa. Mr H. H. Jackson known afterwards as "Stonestead" Jackson, who arrived in Wellington in 1840 and was one of Greytown's founders, and who with Messrs. Masters and Tocker came to Wairarapa and selected places for the townships of Masterton and Greytown and established his "Stonestead" farm in the latter district [the property was situated west of Greytown and straddled the fault], in a series of articles written in 1890, stated that his first experience of an earthquake was in Wellington in May 1840.

"I was sleeping in the big survey whare at Pipitea," he wrote. "The natives had been having a large Korero on account of the chief Wharapouri going to Hawke's Bay to bring back his sister who had been taken as a slave there. Sleeping in a cot in the corner of the whare to keep clear of the fleas, I was, at daybreak, bumped against the side of the whare. The building which was 30 feet by 20 feet, rocked violently and I expected to be killed outright. I rushed to the door and saw Bennett, the storekeeper, running round his tent which was pitched close by. He was in his shirt and had a double barrel gun in his hand, threatening to shoot the fellow who was trying to break into his tent".

Reports, which reached Wellington later stated that the earthquake had been severely felt further north as far as Te Ore Ore.

But the most severe earthquake in the memory of the Maoris and early Wellington and Wairarapa settlers was in 1848" continued Mr Jackson. "Considerable damage of every description was done and the early colonists thought the crack of doom was upon them. Houses were demolished, chimneys were thrown over in the settlement, the water in the Wellington harbour rose several feet and fissures appeared in the earth and land slips were to be seen on every hand. From this time till 1855 we got along without any more such frights."

Mr Jackson referring to the disastrous earthquake in 1855 and the tidal wave in Wellington stated that it occurred on Anniversary Day, January 22 [sic], shortly after 9 o'clock in the evening. "I was at Stonestead," he wrote "and my family was at the Hutt. Next morning I started off to learn how they fared. When I got to Featherston I found all the crockery smashed at Burling's hotel and the chimneys down. When I got to the ascent of the hill behind the hotel I found the road over the Rimutaka hill broken in two and one part raised six feet above the other. The road was damaged more or less until I got to Drake's Elbow. Beyond that the road had clean slipped away for chains [1 chain

is about 21 m] together, and I had to climb over the broken edges as best I could, and the stones kept rolling down. I was five hours getting to the Saddle (top)."

On the other side of the hill Mr Jackson met a Mr Matthew Shirley coming to the Wairarapa on foot and further on a Mr Bidwill who had left his horse at Pakaratahi [Pakuratahi]] because the road was so smashed up that it was dangerous to ride over and utterly impossible to do so in places and most difficult for those on foot.

Mr Jackson found that he could not get through the Gorge in the darkness as the task was too risky and he had to wait till next morning. When he got to the Hutt bridge about noon, one end of the bridge had slipped off the abutment down into the river. He saw the home of Mr Ludlam at the Hutt (on the site of which long years after the well known McNab's gardens were established) completely wrecked. All around there was evidence of earthquake damage. When Mr Jackson got to his home at the Hutt he found all safe except the crockery which was all smashed, "and I was saved the trouble of packing it for the Wydrop." The latter was the name by which the settlers called Wairarapa.

Mr T. Kempton, who landed in Wellington in 1840 with his parents and later settled on a farm at Greytown, in some memoirs left by him, had the following to say about the 1855 earthquake: "The big earthquake which took place on January 22 [sic], 1855, broke the Rimutaka road away altogether in places and in other places the hills came down and completely blocked the road which was difficult to find. It was blocked for weeks before you could get a pack animal over it."

About this time there was a cart road from Wellington to the Rimutaka summit, but from there to Featherston (known in the very early days as Patumoki) there was a bridle track only. Later gangs of men from Greytown opened the road on the Featherston side of the Rimutaka hill.

The writer [i.e. Iveson] often talked over the 1855 earthquake with the late Mr Alfred Matthews of Waiorongomai, Western Lake, and founder of the famous Waiorongomai stud flock of Romney Marsh sheep, and the late Mr Henry Eglington, owner of Wharekauhau Station, Palliser Bay, who was closely associated with the early days of settlement in the Hutt Valley. The earthquake caused the land to rise from about Whatarangi, on the north [east] side of Palliser Bay, right round the coast to Waiwhetu (Hutt Valley). A big cave facing the beach at Wharepapa, (at one time known as Kiriwai and owned by Mr John Cameron before Mr C. Matthews purchased it) which was used to store wool in ready to be taken in boats to a steamer standing off in the bay, disappeared altogether. This cave was at the end of the unformed road from what was known as the Kiriwai gate round the edge of the lake to the beach.

At the southern bend of the bay at a place called the Muka Muka it was impossible to get past one particular spot at high tide, a detour having to be made along the side of the hill on foot or on horseback, of course, there being no proper road. After the earthquake this particular place was left high and dry with the sea's high water mark some distance away.

> Before January 22 [sic], 1855, fair sized craft used to sail up the Waiwhetu River from Wellington harbour, and it was common talk among the settlers that considerable smuggling took place in the vicinity. After the earthquake the smuggling days came to an end and the Waiwhetu River became a comparatively shallow stream, on the banks of which the writer saw some 56 years [1898] ago the remains of a trading boat which he was told became stranded there during the earthquake.
>
> The scenes of terror, both as far as Europeans and Maoris were concerned, caused by those early earthquakes, with chimneys crashing, the ground opening up, houses collapsing, huge slips rolling down the hillsides, bridges being twisted over into rivers with the waters of the Wellington harbour becoming tidal waves many feet high and with the water in many small streams disappearing altogether, produced memories which the settlers of those far away days never forgot. Masterton has had many earthquakes since 1855, the worst having been that of 1942 when Queen Street was practically wrecked and hardly a house in Masterton or in the surrounding districts escaped damage in one or other of the most severe shocks.

The Cyclopaedia of New Zealand (1897) records that Jackson was then continuing to write a diary, as he had done for the previous fifty years. Contact with a local historian in Greytown and consequently a descendent of Henry Jackson revealed that these diaries had been destroyed by Jackson's last surviving daughter. The 1890 article referred to by Iveson has not been found in the *Wairarapa Times* and copies of the *Wairarapa Standard* for this period have not survived. Jackson's [q.v.] reminiscences in the *Wairarapa Standard* 1883 do not contain the same material..

Bagnall (1976 , reference given below) remarks that Jackson seemed to be a reliable and accurate recorder of historical facts and information while others (such as Masters) often gave distorted views.

Bagnall, A.G. 1976. *Wairarapa - an historical excursion.* Hedley's Bookshop Ltd., Masterton, New Zealand.

JACKSON, Henry H.
Source: Jackson, H. H. 1883. Reminiscences of the early Wairarapa Settlers, No. V. *In: Wairarapa Standard* September 10 1883.
Location: Hutt Valley
Keywords: primary/reminiscence, building damage, uplift/subsidence

> Before the big earthquake of 1855, the tide used to reach up the Hutt River as far as the bridge; also up the second and third river high enough to carry boats, punts, and timber rafts down to the pa....
>
> The next bridge was a suspension built by Percy and Son, Millwrights. It was built of heart of totara in one solid span of cross braces, set on abutments, and was both a durable and fine looking bridge. The earthquake of 1855 lifted it clean up, causing the right end to slide back on the abutments for ten feet, and the left end to drop into the river without breaking anything. Having no engineering skill, however, it could not be lifted, so had to be broken up.

Further reminiscences from Jackson can be found under Iveson (q.v.). Jackson was often referred to as "Stonestead" Jackson, *Stonestead* being the name of his Wairarapa property, which included a section of the Wairarapa Fault between the Waiohine and Tauherenikau Rivers.

JOBLIN, D.
Source: Joblin, D. 1975. *The Colonial One. Lorna Monckton of Newstead.* Whitcombe & Tomb, Wellington, New Zealand.
Location: Wairarapa
Keywords: secondary, ground damage, faulting

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> Behind Newstead the bush came right down almost to the sheepyards ... Behind the bush the foothills rose steeply. In many places they were slashed across by large fissures caused by the 1855 earthquake. In the largest of these - well up the slopes - a lagoon fed by a spring had formed. No one knew how deep it was.

Newstead was north of present-day Featherston and south of the Tauherenikau River.

JOHNSTONE, Harry Bell
Source: Johnstone, Harry Bell. 1855? Record of journey from Auckland to Port Nicholson in 1855. Original held by Mr Owen Johnstone, grandson of the writer. Typescript copy held by Tauranga District Library, Tauranga, New Zealand.
Location: Waikato, Taupo, Thames
Keywords: primary, secondary, mainshock, tsunami/seiche

> January 22nd. [at *Kitotehe*, a mission station near Taupiri River.] This evening we experienced an earthquake at about 8 o'clock. The day had been cloudy with a little breeze, and towards evening very dark and still. We had just finished dinner, and were all sat round the table having a yarn, when the house began to move to and fro. I sang out it is some of those damned cattle or pigs rubbing against it, and had scarcely got the words out of my mouth when the whole earth and place seemed as if about to turn topsy turvy, and the natives outside cried out "he ru he ru" meaning a shaking of the earth. We all rushed outside rather alarmed that the house was coming down. It lasted about 3 or 4 minutes and then was still again. I should think that no brick building could possibly have stood where we were. I tried to explain to them that it was from natural causes, and the subject filled the evening.... The effect this earthquake had in Wellington and elsewhere nearer its source was appalling....
>
> January 25th. ... Captain Johnstone and a Mr Hay from the Thames district breakfasted with us this morning ... They had felt the earthquake.... Stopped for the evening at a place called Whakapaeu at the house of a trader called Simpson.... The junction of the two rivers, Waikato and Waipa [Ngaruawahia], will become soon no doubt a place of considerable importance. The earthquake caused the water in the Waipa to rise and rush from side to side....
>
> January 28th Sunday. Started to walk to Rangiawhia [Rangiowhia] [from Messrs. Dixon & Corvell's place at Te Rore, near Whatawhata?] ... Arrived at Mr Vicars house ... The evening I spent with the Vicars ... They had felt the earthquake and heard several loud reports as of distant cannon after the shock.

February 13th [approx.] They [Mr & Mrs Spencer*] had felt the shock of the earthquake here [at Tarawera or Lake Taupo] very severely. They told me one of the natives said that Tongariro was in volcanic motion again, and had burst out, lava flowing down its sides. The loud reports which were heard on the Waikato came from Tongariro, but this was wrong.

*Reverend Seymour and Mrs Spencer felt the earthquake at their mission at Kariri, Lake Tarawera. Afterwards they travelled to their mission station at Rangatira Point, Lake Taupo, where they met Johnstone.

JOLLIFFE, John

Source: Jolliffe, J. 1855. The diary of John Jolliffe, R. N., written during the voyage to New Zealand 1851-56 [as Staff Surgeon on board H.M.S. *Pandora*]. New Zealand Journals 1851-1856. Micro-MS-130. Reel 1, Alexander Turnbull Library, NLNZ.

Location: Wellington, Nelson, Marlborough

Keywords: primary, secondary, mainshock, aftershocks, building damage, ground damage, casualty, tsunami/seiche, uplift/subsidence, response/recovery, biological effects, atmospheric effects

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[1855 January] Sunday 21st. We arrived at Wellington this morning glad enough to be back again to a decent anchorage after so much tossing and tumbling about....

Monday 22nd. The anniversary of the Wellington settlement and consequently a general holiday - there were some sports going on in the afternoon....

23rd Tuesday. The day will long be remembered in Wellington as the most alarming and distressing in its history from the dreadful shock of earthquake which commenced in the evening at nine o'clock and destroyed houses and property to an immense extent but fortunately few accidents have as yet occurred and only one life has been lost, that of Baron Alsdorf the proprietor of the largest and best hotel in the town.

We were to have gone to sea in the morning but it came on to blow hard from the N.W. (which would have been hard against us through Cook's Straits). I landed with Captain Drury and Simmons, the latter went to the races and I after paying a visit to Captain D'Arcy, to the barracks and then back to Captain D'Arcy's again where I remained all day as it came on to rain hard and the wind continued to blow as hard and in the squalls even harder than before. There was nothing all day to indicate the approach of an earthquake. Generally speaking when they have occurred before it was in calm sultry weather and there has been some warning in the shape of rumbling sounds or slight shocks to alarm the population and allow them time to make some preparations but nothing of the kind occurred on this occasion which made it still more alarming. The last great earthquake was in 1848 and was very severe indeed but for eight months there has been no shocks at all and consequently the people were lulled into a state of security.

I was sitting at the table playing dominoes with Mrs D'Arcy. Captain D'Arcy was sleeping on the sofa, the children had gone to bed, Nelly and her little sister were sleeping at Captain Paul's house about a hundred yards distant. Captain D'Arcy's house is a small wooden one of four rooms and a kitchen on the ground floor and a

small garret above, and situated on the Te Aro flat, a large space of perfectly level ground covered with grass and scattered houses like ? It was about ¼ to nine and I distinctly heard a slight rumble like a carriage passing over wood pavement and being a sound very unusual in this part of the world at once exclaimed "what is that", before Mrs D'Arcy could answer "it is an earthquake", we had most convincing proof of it - the whole earth trembled, we jumped up but could hardly keep on our feet, the ground seemed to move like the waves of the sea and the house appeared to sway to and fro; the chimney fell down, some of the bricks coming into the parlour, and covering everything with dust, the pictures on the walls were shaken out of their places, ornaments from the ? shelf were thrown into the centre of the room; chairs, tables and other movables were tumbled down and tossed into other places; the decanter and tumbler on the sideboard came down and bottles of wine in the cupboards were smashed and their contents running over the ? in the midst of this confusion tossing about and smashing.

My first impulse was to open the front door and get the children out of the house for fear it should come down. I could hardly open the door from the shaking of the earth and the violence of the wind. At the moment I opened the door Capt. Maybin [?] rushed into the house like a madman with his hands thrown up crying out for Mrs. D'Arcy and all to "come out of the house, for God's sake!" I ventured to remark that there was no occasion for so much alarm and that it would be better to be more quiet and to avoid frightening the woman and children more than was necessary. All these things occurred within the space of three minutes which was the length of the first great shock; but it was intermittent, the first shock and greatest lasted about half a minute, followed instantaneously for three minutes by others a little less severe. Having got out the children on to the grass we carried out beds and blankets and made them as snug as possible and warm too for they had only their nightdresses on and required much covering up - besides the D'Arcys, Mrs Paul and her daughters came round for comfort and security and all were seated on the beds and wrapped in blankets. Nelly D'Arcy and the little girl came running round in their night-dresses - some of the ladies were in hysterics and others nearly fainting and all pale and frightened.

When I first opened the street door during the first shock I saw lights in every house round about and heard people shouting and then a ? of some house close at hand that had ? ? and then reports soon came of people being killed and then of a baby being smashed in a house close at hand. I went to see if I could do any good but found the child only bruised by a clock falling upon it - then I started off to see a young lady in fits but they were only hysterical and as she was under the care of her admirer, a gallant young officer, I thought I could not do better than leave her under his charge and I was right for she soon recovered and joined the party on the beds.

Presently several officers and some parties of soldiers came to see if their services were required but as they fortunately were not, they went on elsewhere to render assistance. The wind lulled very quickly after the second shock and continued to do so until it became comparatively calm, the rain left and the stars came which wonderfully cheered up the dismal scene - as we were seated on the beds lots of people came in all kinds of grotesque costumes that notwithstanding the seriousness of the occasion one could not help laughing at times - one man without any trousers on and with a blanket came along calling on the Lord for mercy - then came a lot of women like ghosts wrapped in sheets and blankets and carrying children screaming

and crying and frightened - then a party of officers and gentlemen came advising the ladies to go into the houses, others telling them that they would be crushed if they did. The voice of the latter prevailed for nothing would induce the ladies and children to venture into their houses - so finding this to be the case Major Murray went away to the barracks for a tent and it soon arrived with the adjutant and a party of soldiers and was very quickly pitched - we made the interior comfortable and put all the ladies and children into it. Lt. Blewitt came along with a bottle of sherry and a wineglass ? with this and his jolly manners did far more to revive the ladies' spirits and ? than ? of the ?. Of all things in any danger there is nothing like presence of mind and, above all, calmness - frantic actions and wild exclamations frighten the women more than anything and men should never give way to them come what may for they are no good nor ? ? ? ? feelings.

At twelve o'clock I left the D'Arcys all right and snug in their tent and then accompanied Mr Paul to his son-in-law's, the Hunter house being a rendezvous for his family and having left him safely I went to Dr. Prendergast's where I had intended to have slept - I found my bed covered with books and plaster and all kinds of rubbish and the floor covered with bricks and mortar from the fallen chimney - the sitting room presented a still more confused scene the floor being covered with broken glass, books etc. etc., the kitchen was in the same condition. I sat down and tried to sleep but the frequent shocks shook the house so violently that I did not like to remain inside so went out and walked up and down. The shocks came every few minutes by a rumbling sound like carriages at a distance and then came the heaving of the earth as if it moved in waves and was violently shaking from side to side at the same time the shocks varied in intensity and were generally followed by a rush of wind but to me then appeared an evident tremulous motion all night without any intermission but it could only be felt by leaning against a door post or the walls of a house - when walking about the light shocks were hardly felt at all.

About one o'clock Prendergast came home and I went with him on a tour of visits all through the town to see if we could be of any assistance anywhere. First to Major Murray's - his chimneys were all down and smashes indoors tremendous. In the lower barracks the destruction was tremendous all the chimneys down ? ? smashed. The upper barracks on top of Cook's? hill escaped tolerably free from injury. In the hospital were a whole host of women and children all huddled together in the passages ? and frightened - the sick wards were filled with bricks and mortar - from the chimneys having fallen in; fortunately no-one was hurt - coming round by Te Aro flat we looked into the D'Arcy's tent they were all right, the children asleep - from there we passed along the street to opposite the Bank and Commissariat offices both in a very dilapidated state - the whole of the ornamental portico in front of the bank is down and in the road in front is a large crack in the earth thirty yards long and from the upper end of it was issuing a quantity of thin grey or bluish mud there is none like it anywhere in the vicinity. It must have come up from some considerable depth below. Some say it came up from about 30 feet. We continued our journey along the higher part of the town called the terrace - at every house they have the same story "chimneys down -inside in perfect confusion - glass and china all smashed - but happy to say no-one hurt" - coming to Dr. [no name given] house Prendergast went in, (he was examining some objects with the Dr's microscope when the first shock took place he snatched up the microscope and went out of doors with it but was then thrown over from the violence of the shaking). The Dr. said "I have been sent for to several patients - but tis impossible to go with my house in such

confusion and family in danger and alarm". On arriving at the Civil Hospital we went to examine a woman who had her leg broken by a chimney falling upon her when she was in bed, - the hospital was in frightful confusion and the chimneys had fallen into the wards and covered the beds. Fortunately the sick all escaped in time - a large tank of water on the top of the building was split open and the water poured through and deluged the whole place - several of the medicine bottles were broken.

From the Hospital we passed Mr. Hoggard (the Postmaster's) house [on the Terrace?] - he was walking up and down outside - his house being filled with refugees, chiefly women and children - and the interior in other respects being in great confusion from the smash of furniture, crockery ware etc. - at Colonel Gold's the children then in number ten all bundled into one room and in great alarm. At Mr. St. Hill's and Colonel McCleverty's the smashes were equally great - chimneys and heaps? broken at Mr. Clifford's (the speaker) and ? ? he has (or had) a nice house but the dining room is in perfect ruins the walls having fallen in. At Government House there was great destruction, all the chimneys down and some of the walls had fallen in and the rooms filled with bricks and mortar. At the Guard House the bricks of the chimney had fallen nearly crushing some of the men.

We returned by the beach the offices of Govt. and Council chambers built of wood were down - the Royal Hotel much shattered so that the doors could not be closed - all along the street every house showed more or less the effects of the shock, the Baron's Hotel the largest building in the town was much shaken and part has fallen down. Baron Alsdorf, the owner, was killed by the falling in of a chimney as he sat by the fire. In some houses the panes of glass were all broken - in others the window frames had fallen out - one house had the upper storey of wood standing on the upright supporters? whilst all the underpart had fallen away -In the druggist shops and public houses the shocks amongst the bottles had been most destructive smashing most of them.

During the first or grand shock the tide rose several feet and flooded the floors of the shops facing the sea - the water then receded to many yards lower tide than had ever been known before even during extraordinary Spring Tides - indeed during the whole night the tides kept ebbing and flowing every 25 or 30 minutes. This tidal phenomenon never occurred before during the previous shocks not even during the severe ones of 1848.

I returned to Prendergast's during the morning - vainly tried to sleep in an armchair - but from the repeated shocks and the excitement of the night could not snatch a wink even. At eight o'clock walked down to Capt. D'Arcy's and found them all at breakfast and looking much better than I expected from the excitement of the night. At nine I came on board the ship.

Notes

The wind at the commencement of the great shock was blowing hard from the N.W. with frequent squalls and showers of rain. After the shock it died away and ultimately was almost calm with no rain and the stars shining brightly.

The tide at the first shock was high and immediately rose several feet and flooded the street up to the houses facing the sea - it then went down and receded lower than

it ever was before known to do and afterwards until the following morning kept ebbing and flowing every half hour.

The great shock came with only a half second's warning in the form of a low rumbling noise, the first convulsion lasted about half a minute followed instantaneously by other shocks in quick succession but less in degree for 2½[?] minutes or more, so that the first shock lasted altogether little less than three minutes.

During the whole night there was a tremulous motion and at irregular intervals shocks of greater or less intensity but none nearly so severe as the first one - before each shock came a rumbling noise (more or less loud as the succeeding shock would be more or less severe) resembling the rumbling of carriages over hard pavements. When the shock came to the earth seemed to move vertically like the waves of the sea from West to East (or N.W. to the E) having at the same time lateral horizontal movement - the vertical movement seemed the most destructive to houses and such like long objects whilst the shaking (or lateral) horizontal movement (like a man shaking a sieve) seemed the most destructive to small things such as glasses, chimney ornaments, bottles etc. After each shock had passed, when quite calm and after an interval of a few seconds followed a rush of wind that lasted only a few seconds and then passed off.

All houses that had an upper storey seemed to have suffered more than the others; those that suffered least were those that had but the ground floor and were built of wood; - brickwork and plaster everywhere suffered greatly. The dogs barked loudly every time the rumbling noise came that preceded the shock - horses in stables were much frightened and even canaries in cages were frightened in the same way ? evidently knowing that something unusual and alarming was taking place and this they knew not what?....

Some few persons went on board the ships in the harbour but the majority stopped by their own houses remaining on the threshold or wrapped up and squatting down in groups close by their houses ready to run in or further away as occasion may require - others went into the ? bush and encamped there for greater safety.

24th Wednesday. We had intended to have sailed this morning but it blew so hard from the N.W. that it was out of the question - the shocks in a mild degree continued at intervals all day long. In the afternoon a tent was sent on shore and pitched opposite? Captain Gold's house for them to retreat into in case of further severe shocks. At ½ past 11 at night there was a sharp shock and at ¼ to 1 a.m. a very severe one but short in duration. We felt them all on board the ship very much - the sensation on board seemed like that of a ship just grounding on a coral bank and then being violently shaken - there was also a curious sound, communicated by the cable as it if was rubbed or ? ? considerably on the ? ? As the ? in the ship bells on board were set ringing and the men jumped up from their hammocks fancying the ship had gone ashore.

Thursday 25th. After the sharp shock in the middle of last night the wind shifted to the south and a fine morning broke - we sailed about 6 a.m. passing or rather beating down the Harbour of Port Nicholson - several shocks were felt, some of them rather

severe ones and in the middle of the day in Cooks Straits one was felt - it had been a beautiful day with....

Friday 26th. Arrived in Nelson this afternoon and anchored outside of the Boulder bank about two miles from the shore. The pilot came on board and told us that they had felt the earthquake very severely on shore and that a good deal of injury had been done to the houses in the town; chiefly those about the Waikaki Hotel suffered most - at the Port and other places the shocks were comparatively light - the people were much alarmed and some persons who came from Melbourne to settle went away again immediately not willing to risk their lives and property in an earth-quaking country.

Sunday 28th. Went on shore with Jones and Simmonds and took tea at Major Richmond's and consumed a large amount of fruit in his garden which abounds in plums, greengages, apricots, cherries ... The shocks of the earthquake could not have been as severe here as at Wellington two or three brick houses are much shaken and must be taken down - the ? chapel, a brick building is much shaken and there are several chimneys down - all three houses are close together, those at in other parts of the town are scarcely at all injured - called on Capt. ?...

30th Sunday. The Nelson steamer arrived this afternoon....

There are reports arrived that the earthquake was most severely felt in Wairau plains, that most of the houses are down and that a tidal wave had washed over the banks from Cloudy Bay and done great damage. The earthquake of 1848 was severely felt throughout the Wairau Plains and the ground was then torn up and displaced in a direct line for 85 eighty-five miles in some parts as wide as a canal in other places only a fissure in the earth of various depths.

We met Mr. Ward on Sunday just about to proceed to the Wairau and in great anxiety as to the safety of his wife and family....

31st Wednesday. Left Nelson this morning with Mrs Drury and Miss Richmond in hand and anchored at Croixilles in the ? opposite the watering place....

Saturday 3rd ... Last night I felt the shock of an earthquake, it was only slight in degree but of long duration - some shocks were also felt during the day of yesterday - and ? ? shock this morning Sunday....

[Nothing relevant in the next few day's entries]

Saturday 10th. Arrived at Wellington at nine o'clock this morning.

Sunday 11th. To Church in the morning and to dinner at Captain D'Arcy's and a walk in the evening with Mrs. D'Arcy and Nelly. The earthquake shocks ? continue at the rate of two or three during this 24 hours - they are however only slight in degree and seldom longer than 20-40 seconds duration. The people are busy clearing away the fallen houses etc. from the first great shock but very few have commenced rebuilding their walls or chimneys. The land in the harbour and all round the coast has been thrown up some feet, in the harbour it is estimated that the rise has been at least three feet, so that piers and jettys that boats could reach at the lowest spring tide

cannot now be approached within a distance of many yards - if there should be ? ? rise of the land of three feet [1 m] would be of benefit to the town of Wellington by giving them considerable additional frontage for building wharves etc. Mr. Swainson, the naturalist estimates the good that the recent earthquake has done at one hundred thousand pounds value!! I should say that it has done the settlement injurys to more than twice that amount.

All around the harbour is a belt of mussel shells in some places a foot or more deep that were thrown up after the first grand shock - fish - crayfish and other creatures of the sea were thrown up along the coast in numbers and close to Wellington beds of oysters were exposed by being left by the low tide when previously they were well covered with water. At Lyall Bay the tidal wave flowed over the low ground for a considerable distance and left lots of fish dead on the racecourse. [Brief entries for 12th-20th are of no interest]

Wednesday 21st. George D'Arcy, Messers McLean, Mantell and Cooper came on board and at twelve we sailed for Hawkes Bay - with a ? that carried us quickly out of the harbour ? about 50 miles[80 km] up the coast when it fell calm.

The *Pandora* then proceeded to Auckland, to Taranaki and on March 30th it arrived back in Wellington. While waiting for the tide at the harbour entry they experienced " a short but sharp shock". After visiting Wellington the ship went back to Taranaki and on to the Bay of Islands.

During the "Blitz" period of 1941, some books were recovered from a damaged residence in a London suburb. Amongst these were found four volumes of manuscript that proved to be the "Diary of John Jolliffe", written during his voyage to New Zealand in the survey ship *H.M.S. Pandora* which sailed from England in 1851. Jolliffe was Staff Surgeon on this little vessel, which was only some 319 tons. Lieutenant Morton Jones [q.v.] served on the same ship. The voyage occupied about five years, most of which were spent surveying the harbours and rivers of New Zealand. Australia was also visited. It was during this period that the journal was completed.

Transcription of this part of Jolliffe's journal is primarily the result of work by Margaret Hurst, with some additions by the authors. Jolliffe's long hand is difficult to read and question marks have been used here to replace indecipherable words or phrases and indicate where others are uncertain.

JONES, Theodore Morton
Source: Jones, T.M. 1855. Journal, 2 June 1851-5 April 1856. Vol. 1.Original is in the Mitchell Library, Sydney, Australia. A copy is held in Wellington, Micro-MS-0220, Alexander Turnbull Library, NLNZ.
Location: Wellington, Hutt Valley, Nelson, Wairarapa, Kapiti Coast, Wanganui
Keywords: primary, secondary, mainshock, aftershocks, uplift/subsidence, building damage, casualty, ground damage, tsunami/seiche

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... the following morning [23rd] was ushered in with a nor'wester with the disagreeable accompaniment of rain. In this case the gale proved unusually violent and a little after 9 o'clock, I happened to be upon deck when I felt a sudden and very severe vibration in the ship as if it was grating heavily and rapidly over a sandbank or perhaps resembling more closely the motion of a railway carriage.... This

continued for nearly a minute increasing in intensity and violence setting the bells ringing and causing great commotion.... This was an earthquake; the sensation was most extraordinary and it was blowing violently from the NW at the time my first impression was that the ship had struck the ground but knowing from her position that to be impossible with the present wind I speedily discerned the real cause. During the lull that followed the shock we distinctly heard shouts and the crash of falling chimneys and houses, the rapid passing to and fro of lights in the town and other signs of commotion led us to suspect that the shock had been felt severely on shore. Shortly afterwards I landed with Capt Drury and found a sad scene of destruction before us. Houses had been shaken down, nearly all had lost their chimneys and wherever brick-work had been used in their construction total demolition had ensued. The only casualties that occurred ... were the death of Baron Alsdorf (a German ... who kept a large hotel on the beach), who dangerously ill in bed, was struck by a portion of falling chimney - the fracture of the skull of one woman and the arm of another. Had the shock occurred one hour or two later after the inhabitants had retired to their beds there is no telling any limit to the probable number of serious casualties.

On landing we passed the Council Chambers - an old rickety two-storied building - fallen to the ground, the adjoining Government Offices, also in a very dilapidated state - the interior of Government House was a perfect wreck, every room being filled with the rubbish of falling brick chimneys, which in their descent had destroyed portions of the furniture, chandeliers & such and had the house been inhabited at the time must have destroyed the principal part of its inmates. The Military Guard had also a narrow escape, a large chimney having in its fall filled their little guard room. They, however, by rushing out at the instant of the shock succeeded in keeping clear of the falling rubbish....

... of the principal houses and the neighbourhoods, all had the same story to tell - chimneys invariably down and in some cases portions of the houses with their glass and valuable furniture destroyed and of course all were more or less in a state of alarm. Groups of people walking outside their houses, where they proposed spending the remainder of the night obviously anticipating a repetition of the shock and eagerly enquiring for news from distant parts of the town met us everywhere. The shocks still continued much less severe than the first, but still alarming and causing great vibration to the slight wooden houses - one family accepted our offer to go on board the *Pandora* but some little time after when they had recovered from their first alarm they thought it as well to remain where they were.

On walking along Lambton Quay we found matters in the same plight, - several old wooden houses were level with the ground. The poor Baron's hotel an imposing-looking two-storied building (of lathe and plaster) had suffered very much, one side being bulged out very considerably and a portion of it having fallen to the ground. The houses built of brick had also suffered much being rent and many portions displaced; many of the shop windows had fallen into the middle of the street and the shops exposed to the mercy of the passer-by. At Mr Laing's the celebrated confectioners the contents of the shelves had been thrown down and the debris of sweetmeats, preserved fruits, etc. strewed on the floor to the depth of several inches; on passing by the public houses and druggists shops, the smell of spirits, peppermint and chemicals was quite overpowering.

The Bank, a new and handsome building with slate roof, stone coping had suffered very much, the front part with the portico had fallen into the road, and the wreck inside from the falling chimneys was equally great. The Manager with his family had taken refuge in an iron store in the back which had withstood the shock and strange to say the contents of the shelves had not even been displaced.

At Te Aro they appear to have suffered equally; those who happened to have been in their houses describe the scene as fearful in the extreme. Feeling the ground in motion and rolling from under their feet - unable to stand- furniture and valuables falling in all directions, the swaying about of the house itself with all the accompaniments of a gale of wind on board a ship coupled with shouts and screams from the outside proved a peculiarly awful and distressing scene - once witnessed, never to be forgotten.

The tidal level appears to have risen some seven or eight feet and consequently overflowed Lambton Quay. A portion of the brick sea wall now in course of erection was destroyed. It receded almost immediately and continued to ebb and flow at short intervals (from 20 min to ?) during the remainder of the night ebbing far beyond Low Water Springs mark but I believe not again flowing after the first severe shock beyond the High Water mark.

The shocks continued all night preceded by a loud rumbling noise but towards morning at greater intervals and much less intent and all began to hope the worst was over. From WNW to ESE appears to have been the direction of the shock but as to on this point delivered from no accurate data I would speak with diffidence. Buildings on high ground appear to have suffered much less than those in lower situations. In the Military barracks for instance the lower buildings were much injured while those above escaped unscathed but with the loss of chimneys. This was also the case, I am told, in 1848 which shock by all accounts was not nearly as severe as the present one.

An earthquake must be felt to be ?, there is no describable or known disaster to which it bears resemblance and to the last day of my life I shall never forget the extraordinary thrill which ran through me on first experiencing it. It was not one of fear but accompanied by a sickening sensation and an idea of general instability and the insecurity of everything which we had ever before regarded as ? and immovable....

Daylight of the following morning revealed the actual state of affairs, all had suffered more or less, consequently no-one was better off than his neighbours and universal sympathy and good feeling was the result.... Those who had tents pitched ...- involuntary picnics were to be seen in all directions - and extensive demand following for iron ? and pots for cooking purposes - Mr Lacy's pies were also in great demand? and his men were kept in constant requisition during the day.

In the Hutt district much damage had been sustained from the rising of the water and the action of he earthquake together, the bridge over the river Hutt was thrown down and communications for some time consequently interrupted. Mr. Ludlam's house suffered considerably and he himself narrowly escaped with his life, the rubbish from the falling chimney filling the room in which he was sitting. The fissures in the ground were also of considerable extent.

In the Wairarapa Valley the earthquake was felt as severely as at Wellington. One house was thrown down and four Maoris who were within were unfortunately killed by the falling ??. The road from Wellington to the Hutt and up the Valley was a good deal injured, as also the coast road near Wainui by a heavy landslip.

The natives were considerably alarmed and in the Wairarapa anxiously enquired of Mr McLean if this was the Last Day.... Such a severe shock had evidently not been frequently experienced by them.

At Te Kopi, a small boat harbour at the Wairarapa, a very heavy wave swept the beach washing away the sheds, buildings?, the bales of wool that were lying there to be taken to Wellington and all that was on the beach. The Muka Muka rocks which caused the worst part of the road to Wairarapa have now become the best by the alteration caused by the earthquake, the beach now extending a considerable distance beyond them above the level of high water.

In the dividing range of hills between Wairarapa and Wellington on the east side of the Harbour several heavy landslips from the summits are visible from Wellington, the earthquake appearing to have exerted great force on this range.

At Wanganui the shock was severely felt throwing down nearly all the chimneys. The bed of the river at ?? had the appearance of an ill-ploughed field: the fissures being very numerous and of considerable depth. no casualties fortunately occurred although it was much feared that from the substantial nature of the Barracks buildings, some accidents might have happened to the Military detachment stationed there.

[The next section of Jones's journal is not included here as it is a paraphrase of material in the *Spectator*]

On the morning of the 25th we left Wellington for Nelson experiencing in the passage through the Straits two smart shocks, one in 26 fathoms water, off Sinclair Head, the other in 80 fathoms off Queen Charlotte Sound: the ?? precisely similar but to a less degree than to those felt by us when at anchor.

The following morning we anchored outside the Nelson Bar where we await the arrival of the mail from Auckland. I have already described the account of damage caused here by the earthquake. People were of course very much alarmed many gave a most exaggerated account of what had happened, their fears lending them to believe that they had actually seen what they described. Mine host at the Waikatu [?] [Hotel], a worthy old ? assured as they watched a man going up the street while the undulatory motion of the ground was going on the waves were so high that at one moment he appeared to be elevated two feet above the ground and the next the upper part of his body was alone visible. The ? authority told us that the hills on the other side of the Matai Valley [north end of present day Nelson] bowed most gracefully to each other during the most violent part of the shock!!

Jones's journal was located and transcribed by Margaret Hurst. Morton Jones was a lieutenant (later a Rear Admiral) on board the H.M.S. *Pandora* anchored in Wellington Harbour at the time of the earthquake.

Source: Jones, M. 1855. Private Journal. Original in the Mitchell Library, Sydney, Australia. A copy is held in Wellington, QMS-1076, Alexander Turnbull Library, NLNZ.
Location: Wellington, Hutt Valley, Nelson, Wairau Valley, Motueka
Keywords: primary, mainshock, aftershocks, building damage, casualty, ground damage, uplift/subsidence, tsunami/seiche

> [January 23 1855] ... Blowing very strong - 9.20 p.m., Had just gone on deck... There were a great number of lights moving to and fro on the shore, some shouts and the sound of falling buildings....
>
> ... a little time after with Capt. Drury; found a sad scene of destruction; many houses had tumbled down; nearly all had lost their chimneys and wherever brickwork had been used in their construction a total demolition had ensued - the only casualties ... were the death of the Baron (Alsdorf) ... a woman had her skull fractured; a soldier some ribs broken; another woman an arm and this was about all. The Royal Hotel opposite the landing pier: his whole ? the contents of the shelves, bottles, etc. had been thrown down and smashed and the smell of spirits, peppermint was perceived at some distance from it. The Government Offices, almost adjoining, were a sad plight; some falling? this way and some another; chimneys all down and all glass broken. government house: a complete ruin inside; every room filled with the debris of the brickwork; in the little guard room the chimney, or rather the bricks composing it, filled it up; Near this a fissure in the earth had been made, about three inches in width and extending across the road. When it first opened an eye witness declared the aperture was sufficiently great to have admitted his body; it almost immediately closed again.... Then to the Gold's: Mrs G and the children were much alarmed - chimneys down and all the beds in one room; twelve or thirteen little heads peeping out and all imploring Papa to take them on board. Papa very prudently declined going. And then to St Hill's - ?, glassware etc all smashed, the bookcases fallen, chimneys down etc.... Then to McCleverty's; chimney down; [Mrs McCleverty] a little alarmed of course but not absurdly so. At Clifford's his dining room and chimney down; wine, china, etc. smashed. A brick house also? Passing by the Postmaster's (Mr ??) [Mr Hoggard] house; he told us that all his furniture was destroyed; piano, china, wine etc. a similar tale met us everywhere. On walking along Lambton Quay, found things in a bad state - nearly all the old wooden houses were down - the chimneys universally - the brick houses and those of lathe and plaster were also much rent and shaken. Nearly all the shop fronts had fallen out - glass smashed. at Mr Laing's, the confectioner, the contents of the shelves had fallen on the floor which was strewn with ... The Bank had suffered very much. A very substantial building with stone portico, slate roof etc: the front part of the building with the portico had fallen into the street and all the chimneys were down. Mr Raymond, the manager, with his family had taken refuge in an iron store behind, which appears to have stood well, nothing having been ?, even from the shelves. A Te Aro Flat they appear to have felt it very much; all the houses were more or less injured; more particularly the lower part of the Barracks; the detached? house on the Upper Flat were much less injured; the chimneys not having been thrown down.... Outside the enclosure of the Bank was a fissure through which a large quantity of thick grey mud had been thrown up from a depth of thirty feet where a ? of this description of mud exists. The Doctor [Jolliffe] describes the scene at Mrs D'Arcy's as being fearful in the extreme. They were sitting quietly in a room playing some games when in a moment they felt the ground roll from under them, the furniture falling in all directions, decanters, glasses, etc. rolling from the table. The sudden

rush outside the house accompanied with shouts, screams and the noise of falling chimneys rendered it peculiarly awful and distressing. The tidal wave appears to have risen seven or eight feet and overflowed Lambton Quay, destroying some part of the brick sea wall now in course of erection; it receded almost immediately but continued to ebb and flow suddenly the remainder of the night; the Barquantine grounded four times; it recede by many yards beyond the low water springs mark. On returning we found everybody still much alarmed, few venturing inside their houses. The Pauls were better and thought better of coming on board. The shocks still continued but much less intent and at greater intervals and people began to hope the worst was over. Got on board at 2 a.m. ? feeling a slight shock and almost constant vibration.

Wednesday 24th. Still blowing hard from the same quarter; the people are having a daylight inspection of the losses and mishaps. The destruction of property has been very great and the injury this earthquake has done the Settlement is inestimable; - all hopes of its now becoming the Seat of Government are at ? - Auckland ? This earthquake exceeds in intensity very much by all accounts that of 1848 which at the time of its occurrence was regarded as extremely awful. The damage at the Hutt has been also very great, Ludlam's nice house almost a ruin. Capt ?? Guard? but little better; the Hutt bridge doubled up etc.; many other casualties; people are beginning to fear the consequences at Wanganui, where the Barracks are of lathe and plaster and some buildings of brick and tile. The Wellington Jail?, a substantial building of brick and stone and supposed to be earthquake proof, has been rent in several places; the roof has also suffered. The prisoners were ? ?. Some people have had hair breadth escapes with their lives and prefer remaining out of doors to ? any further ? Tents are being pitched and many people will spend the night in the Tea Tree? bush in preference to sleeping in their houses. The pastry cooks ? pies in great request today, few having fire places to cook their food. Another shock similar to last nights will create immense destruction. a vessel arrived from Melbourne having anchored last night at the Heads. She felt the shock also very heavily; prepared for sea but it coming on to blow very heavily from the N.W. ? to let go second anchor. slight shocks still continuing and almost constant vibration. In 1848 another severe shock occurred thirty six hours after the first. People are ? anxiously looking for it.

To bed at 10pm. several slight shocks during the first watch and a little before one o'clock a very severe one which made me jump out of bed quicker than I can well describe.... Another shock as I write this....

Thursday 25th ... Several smartish shocks ? at 9 am and 1150 am on our way to Nelson.
Friday 26th. [At Nelson] ... The earthquake has been felt here apparently very severely; also a few chimneys are down but I imagine not so much mischief done as at Wellington.

Sunday 28th ... Everybody, of course, is much alarmed at the earthquake; we experienced two slight shocks this afternoon; by all accounts it was not as severe as that felt at Wellington, the damage done is limited to a very small space; the Wakatu has suffered much, several chimneys having been thrown down; also the Wesleyan School had a few minor damages. It has been felt at the Wairau and Motueka.

JUDD, George
Source: Judd, G. 1934 Article *In: Evening Post*, May 24, 1934.
Location: Wellington, Hutt Valley
Keywords: primary/reminiscence, mainshock, aftershocks, building damage, ground damage, uplift/subsidence

> At first, said Mr Judd, the settlers could only get to the Hutt by travelling along the beach, or by taking a boat from Wellington. It was possible at high tide for a boat to go up the river as far as the bridge. In its earliest stages the present Hutt Road was a route over which one could lead pack horses, and later it was improved sufficiently to be a cart track. During the great earthquake [1855] a tremendous slip came down on the road.
>
> He had been in many earthquakes, said Mr Judd, but the one at Wellington in 1855 was the worst of the lot. However, there were some severe earthquakes in Wellington in 1848. A number of brick buildings which "had been rattled up of bad material" were rattled down again. This gave the residents of Wellington a fright, and wooden houses became more popular. Well-constructed wooden houses stood up to the great earthquake of 1855 well. Only one chimney was left standing in Wellington, and only one bakehouse could operate. The earthquake occurred at nine o'clock at night, and the trees shook all the next day. The bed of the harbour rose 3 feet 9 inches all round.

Mr Judd was 99 when he gave this interview to the *Evening Post*.

KEMPTON, Thomas
Source: Kempton, T. 1901. Letter written on April 25 1901. *In: Wairarapa Times Age*, March 8 1940.
Location: Wairarapa
Keywords: primary, mainshock, ground damage

> At March 1854, there was an earth road to the Summit of Rimutakas, thence to Featherston only a bridle track, very narrow in places with high rocks above and below and thousands of dead trees hanging over the road, which were very dangerous in windy weather which was of frequent occurrence. On January 22 [sic], 1855, a big earthquake broke the road away altogether in places and in other places the hill came down and blocked the road altogether, so that it was difficult to find the road at all. It was blocked for some weeks before one could get a pack horse over again.

See also Iveson.

KENNINGTON, A.L.
Source: Kennington, A.L. 1978. *The Awatere – a district and its people.* Published by the Marlborough County Council. Printed by the Express Printing Works. Blenheim, New Zealand.
Location: Marlborough
Keywords: secondary, background, uplift/subsidence

p113 At that time (1848-1856) all transport was by bullock dray, and the track used, to get from the Boulder bank to the Awatere, was along the beach and around the White Bluffs. Only at low tide was this route possible, and even then it was an exciting and

> dangerous experience. Large stones frequently came bounding down the cliffs, frightening the teams, and bigger than usual waves would sometimes threaten to engulf the dray and its contents....
>
> When the town of Blenheim came into being in 1857, (known first as Beavertown) wool began to be taken direct from there, down the Opawa River ... The Awatere run holders now needed a more direct route to this new centre to replace the trace around the White Bluffs....

This extract is included in this database as an indication of tectonic uplift or subsidence of this part of Marlborough. Any changes in level of the land, particularly subsidence, along this frequently beach route from the Wairau to the Awatere would surely have been noticeable and recorded historically, particularly as people were well aware of the effects of uplift in the North Island.

KEYS, Ben
Source: Keys, B. 1919. Extracts from his scrapbook 1914+. *In: Rotorua Chronicle*, March 1919.
Location: Wellington
Keywords: primary, mainshock, tsunami/seiche, biological effects

> It was on the second day of the races that the big 'quake occurred. It was a shake such as we have never since experienced. Its most alarming effect was to create a great wave, which swept across the sands as far as Burnham Water and rushed up into the gullies of the hills beyond. In town the waters of the harbour were thrown across Lambton Quay, and flooded all the shops along the waterfront, causing everyone to seek safety on the higher levels. One most curious effect was the masses of fish thrown up on the beach between town and Terawhiti. They were carried up by the great wave, and left stranded there above the high water mark, and the late Mr. John McMenamin of Terawhiti station used to tell us of his ride along this bank of fish, his horse floundering and slipping among them as he galloped homeward after the 'quake.'

KILMISTER, John
Source: Kilmister, A. 1932. Some early history of the Kilmister family and early Wellington as they remembered it. MS-1117, Alexander Turnbull Library, NLNZ.
Location: Wellington
Keywords: primary/reminiscence, mainshock, aftershocks, building damage, tsunami/seiche, uplift/subsidence, biological effects

> Another report of the 1855 earthquake comes from Mr Kilmister senior, who bought a farm on Tinakori Hill near the wireless station. He recalls that...
>
> "While living here [Tinakori Hill] the big earthquake of 1855 occurred about nine o'clock at night, it shook on and off for ten days. At its worst it was almost impossible to stand without holding on to something. For days the dead tops kept coming off the big puketea trees, which grew along the valley at the top end of Tinakori Road. It did quite a lot of damage to brick buildings; it also did some good, it lifted the land from the sea, giving them a better road along the beach to the Hutt. There was a coach being driven along this road when the earthquake came. The driver did not know what had gone wrong with his horses; he kept whipping them

up, and they kept floundering about; the next thing he knew they were splashing in water, the sea was coming over the road. Next day there was [sic] fish all the way along near the road, left high and dry."

LEAN, Alexander
Source: Lean, A. 1881? Reminiscences 1851-81. MS-1143, Alexander Turnbull Library, NLNZ.
Location: Christchurch
Keywords: primary, mainshock, aftershocks

[At Haswell]
January 23. It was during this meal towards the end of daylight when a creaking noise attracted our attention ... A sensation akin to that being on shipboard - a palpable moving of the floor and building - It was an earthquake! and a tolerably severe shaking too....
During the night occasional tremors kept up the sensation of something wrong below ground - but nothing to seriously alarm us.

January 24. Several earth tremors occurred during the evening and throughout the night and between one visitation and the other attacks on our feelings [reference to active mosquitoes and flea] - the night was one of the most eventful I have passed in my experiences.

LUDLAM, Alfred
Source: Ludlam, A. 1855. Letter, dated March 8 1855. *In: Upper Hutt Leader*, November 20 1990.
Location: Hutt Valley, Wellington
Keywords: primary, mainshock, aftershocks, building damage, uplift/subsidence, response/recovery, ground damage

An extract from a letter written 'home' to Britain on March 8, 1855, from 'Newry', River Hutt, in which Alfred Ludlam describes his home as 'destroyed'. [The text of Ludlam's leetter is italicised for clarity]

We have indeed had an awful visitation and now it is all over we can look calmly on its effects. To some they have done no damage, to others very great. Unfortunately I have to place myself among the latter, for it completely destroyed my house and a great deal that was in it.

But upon going round Wellington, and comparing the damage of 1848 with the present damage, I should say the amount is very much less than in 1848. This may be easily accounted for by the fact that there were not nearly so many brick houses and those that were are all strongly bonded with wood and iron. A great many that suffered with the previous shake, this time are uninjured.

If the town had been built of brick the consequences of such shocks would have been dreadful.

Although in the town they felt the shocks very severely, I think the effects were much more felt on this (Hutt) side of the harbour; and judging from what we hear from Hawke's Bay, Wairarapa and Manawatu, the shocks seem to have been much more

fatal in their effects on any land that joins the spurs of the Tararua Range.

For instance, on the hills on the eastern side of the harbour there is a high range, one of the spurs of the Tararua. There are immense slips from the top of these and they appear dreadfully unstable.

I believe that we suffered so much in the Hutt from the fact that the shocks took along that range. The effects over here are 10 times worse than in 1848.

You will remember that then my house was nearly finished, all the chimneys and brick work being up except the ornamental tops. The only damage done to it then was a slight crack on the top of the unfinished chimney.

The destruction of my house was momentary. The first shock, a vertical one, threw it in the air and shook it. The movement was very perceptible. The second, in a moment, shook all the chimneys off their foundations and brought them in to the rooms. I was sitting close to the fire, my wife opposite.

Messrs Hutton and Bidwill [q.v.] who were near the door got away, and tried to carry off my wife, but she broke away from them and came to me.

I was jammed by a table, in the act of pushing myself back in an easy chair. I dared not go forward, for fear of being buried and there we were in the dark. I thought nothing could save us from being buried in the ruins when I saw a chimney 15 feet high come down in a mass. A picture which had been hung on the chimney not more than a week jumped about at first, and the shock threw it over my knees, resting on the arms of the chair.

My last view of the whole affair just as the flicker of the lamp light on the floor went out, was the chimney in a mass falling in on us and while in the act of falling a shock seemed to double it up.

My legs received the fall of the hearth but owing to their being covered up by the picture, although very severely bruised, they were not further injured. Had it not been for the frame they must have been smashed.

We were both very much bruised by falling bricks. Nothing can describe our feelings while we remained quiet for an opportunity to get out. It was perfectly dark, the house rolling and rocking heavily, and the nose of glass breaking was the most appalling thing I ever heard.

The feeling of being covered up to my waist in the ruins, and not daring to move until it was all over was most painful. I wriggled myself out of the brickwork and escaped with my wife into the hall, where we found Hutton and Bidwill holding open the door for us to escape.

As soon as we got outside we went to see about the servants who had first climbed out of the windows. They too had had a narrow escape.

There were four distinct shocks. We remained in front of the house for an hour. The earth was heaving up the whole time, and when a fresh shock came the house

appeared almost to bend to the ground.

We left it and went to Bells. We found Mrs Bell had had a very narrow escape. The road all along was riven by strips and sunk in some places a foot. The bridge which you will remember is destroyed. The first shock it bounded high in the air and fell into the river.

The shocks were incessant until daylight. They continued heavy and numerous for three days, but did no damage.

The first did all the damage, and it is now ascertained beyond doubt that the land is upheaved on this side of the Straits. We used to have a tide of nearly three feet, but it has left us, nor do I expect it will return. I wish it would.

But I (hear) you ask what the Wellingtonians will do, whether they will move.

If you were to arrive (except for the ruin of some houses) you would not perceive any difference. They seem as busy as ever and do not appear to think much about it, and those who have suffered are putting their places to rights again.

The Bank got dreadfully shaken, also the Barons new hotel. Poor fellow he little-thought he was building his death trap. He used to say 'Look at my house, that is the way to build against earthquakes, no shock will destroy that'. I am quite of opinion after what I have seen that the stronger and heavier a building is the worse is its destruction.

The houses most injured were the strong ones. Only two in the whole place were levelled to the ground. The Council Chamber and the old billiard and ball room, the other Brandon's office.

Buildings near the ground, built entirely of wood are the only ones which will answer for this country.

We have now heard from all parts and find it has been felt more or less everywhere. At Auckland they say very slightly, but it appears to have been pretty strong at the barracks for the soldiers ran out of the scoria buildings and at Epsom it was very sharp, so letters to this place say.

Our papers, particularly the Independent, mentioned it in a few lines just as if we had had a shock which had knocked a chimney or two down.

I am quite undecided as to my future movements. I should greatly regret leaving NZ because it is a beautiful climate, but I must own I have no confidence in its future. A country subject to such visitations will never become populated.

However, I do not intend to come to any decision at present and it would not do to force property into the market just now. Although Petre sold his place of 46 acres, bush and cleared land, with house, for 2300 pounds only two days ago.

We have had a most beautiful summer though rather dry. My garden was looking very well. As for fruit I never say anything like it, the trees actually breaking down.

My greenhouse suffered with the rest and is nearly a ruin....

We have been shipping apples to Port Philip, Australia. I sold a ton for which I got at the rate of 1¾ a bushel.

This extract is a fuller version of Ludlam's letter than that quoted by Ward (1928) (q.v.).

LYELL, Sir Charles
Source: Lyell, C. 1856a. Correspondence from Sir Charles Lyell to his sister, Sophia Lyell, and to Walter Mantell, April-May 1856. Originals held at Kinnordy House, Scotland.
Location: Wellington, Wairarapa, Marlborough, Palliser Bay
Keywords: secondary, uplift/subsidence, tsunami/seiche, mainshock

Notes on the contents of correspondence from Sir Charles Lyell to Walter Mantell have been abstracted at Kinnordy House, that is, the originals were not sighted by the authors. Quoted material is given in italics.

Item 1 [Lyell to Mantell]

3 April 1856, 53 Harley Street, London
Is to send an abstract of his lecture at the Royal Institution to be published in their Proceedings, and wishes to add to it a note, a copy of which he encloses. "*I want you to read my new proposed note & to criticise it & suggest any alterations or additions.*"

He thanks Mantell for a map of New Zealand.

Item 2 [Lyell to Mantell]

4 April 1856, 53 Harley Street, London
Wishes to add a sentence about the Barrett Reef at the entrance to Port Nicholson.

I see that in Taylor's N. Zeald[*]. *Mr. Roberts says that the greater elevation (5ft.) was on the eastern side of the harbour of pt. Nicholson and the lesser 4 ft. on the western. This I presume is correct?*

Lyell is referring to Rev. Richard Taylor's 1855 book, entitled *Te Ika a Maui or New Zealand and its inhabitants* which is quoted elsewhere (see Taylor, R)

Item 3 [Lyell to Mantell]

5 April/56
My dear Sir
It was unlucky that I missed you by a few minutes. Mr Roberts whom I saw yesterday was very clear that during the three months immediately following the shock of Jany 23, 1855 when he was working in the harbour of Pt. Nicholson there was no settlement or striking down of the upraised rocks. He said that you remained there some 4 months after him and therefore the subsidence alluded to by you of several inches may have commenced after he left.

Under these circumstances I refrained from alluding to the depression mentioned by you, in the note to the lecture wishing to talk over it with you as to the precise modification in the statement of the fact which it may be desirable to publish.

I am going on collecting facts and as soon at I have a copy of the lecture to send him I shall write to Mr Weld for news about the Middle Isld and the volcanic eruption near the Wairaw [Wairau] R. which he wrote a letter about according to Mr. Roberts.

Did you hear of this? Mr. Roberts has promised to draw up notes on what he can remember and if you will do the same I will put them all together with a few comments on the geological bearing and importance of the facts.

The dead fish were not seen or heard of by Mr. Roberts except where the wave came into the lake [Burnham Water] near Wellington.

To what height did you ever trace the newer tertiary blue clay of Onekakara Geol. Quart. Journ. Vol. 2 p 330. Does not the clay contain recent species of shells? I want to ascertain the amount of upheaval in N. Zealand since the existing species of marine shells inhabited the N. Zeald. Seas?

I hope to hear Owen's paper on Tuesdy.
Ever most truly yrs
Cha Lyell
W. Mantell Esq.
Can you give me any facts about the waste or undermining of sea cliffs in N. Zeald.?

Item 4 [Lyell to his sister Sophia Lyell]

5 April 1856

...I have a Royal Engineer Mr Roberts, & a geologist Mr Walter Mantell now in London both of whom were at the antipodes & in the very middle of the convulsed region last year.

Item 5 [Lyell to Mantell]

19 May 1856, 53 Harley Street, London
My dear Sir,
I have seen Mr. Weld and have obtained a good deal of information about the earthquakes of 1848 and 1855 as they affected the Middle Island - He had before the arrival of the Newspaper you sent me given up the volcanic eruption as probably spurious.

He mentioned the great disturbance of the tides for some weeks after Jany 23/55 and this all along the shores of Cook's Straits so that when they at length settled into a state of equilibrium adjusted to the new levels it would render the estimate of the rising or sinking of the land very vague except in favoured spots.

On this account I should be careful in regard to the sinking after the upheaval as inferred from tides - I find Mr. Roberts notes some of them made 3 months after the shock very positive against a sinking and he seems to say that nothing but very exact measurement at such points as Muka Muka, and others in the Harbour of Pt. Nicholson will suffice because every month emerged rocks above water acquire the same colour as the rest and the newly raised portions appear less novel and dissimilar from the old. He seems from his employments to have been well qualified

to judge, but so you will say were your informants - How much did they estimate the sinking to be?

Was it not a french vessel called "Le Ballet" from which the rock was name or must it be anglicized? Balley
every tr[ul]y yrs
Cha Lyell

I am much obliged to you for the old river channels.

When I draw up all the evidence I shall of course insert any observations bearing on differences of opinion as to subsidence after upheaval which may seem desirable – Roberts merely testifies to
3 months after Jany 23d -

Item 6 [Lyell to Mantell]

53 Harley St, May 20 1856
My dear Sir
I think it was Mr. Weld that told me that Capt. Drury R.N. of the surveying ship Pandora in Wellington in 1855 published in the Spectator an account of variations in the tides after the great shock. Could you procure me the Spectator? Or when could I get the evidence. I shall give the statements of the partial subsidence which tally with accounts given of similar collapses after upheavals in Chile.

Could we not get the Muka Muka Pt. At Pencarrow re-measured? Or would the "white zone of corals alias nullipores" be effaced by this time? Or before you return
Every tr[ul]y yrs
Cha Lyell

Item 7 [Lyell to Mantell]

Saty. 24 May/56
My dear Sir
I return you the map which you were so good as to lend me & thank you for your explanations. I am in hopes of getting Mr. Roberts to re-measure the Balley rock as a difference between spring & neap tides could make some inches, if not feet in the amount of emergence of the Balley rock – I shall call some day soon.
Ever try yrs
Cha Lyell

Source: Lyell, C. 1856b. Notebooks of Sir Charles Lyell. Notebook 213. Originals held at Kinnordy House, Scotland.
Location: Wellington, Wairarapa, Marlborough, Palliser Bay
Keywords: secondary, faulting, uplift/subsidence, building damage, ground damage, tsunami/seiche, mainshock, biological effects

[Notes of interview with Mr. Edward Roberts, Friday, 4 April 1856]

[p. 13] E. Roberts 11 James St., Westminster
The old post [of] a native village of Porirua according to Mantell indicates a subsidence under the low water - Mr Roberts has been there, knows the place well and saw nothing to indicate it.

Mr Roberts was carrying on engineering works in the harbour of Pt. Nicholson which it was necessary before the quakes to carry on a low water but after the event it was possible to work at all times of the tide. (The tide is not more than 4 feet).

Mr Roberts was in Wellington 3 months after the earthq[ua]k[e] & did not observe any sinking of the land - Mr Mantell remained longer, 6 or 7 months after the shocks & thought there was a sinking of several inches -

Ballet rock is in Pt. N. so called [p. 14] from a french schooner having run aground on it after wh. it was buoyed.

12 years ago after Mantell - had over 3 ft. of water over it & it is now 2 ft. above low water mark a month after the earthquake - just opposite R's house 1 m & 3/4 -

Another rock, a part of Barrett's reef (outside of it) was quite white whereas other rocks of the same reef had only a zone of white rising above the water - several feet above their base –

About 3 years ago an English vessel broke from her moorings in Wellington Harbour & was driven on shore at S.E. end of the harbour where she remained when Mr. Roberts came away 3 months after the earthq[uake] of 1855 - Before the earthq[uake] at low water there was generally 3 ft. water round her & after the shocks she [p. 15] was high & dry at low water - One cd. walk round her - This vessel was the Sophia brig -

A settler who lives about 60 miles inland said that the fault was 9 ft. high at his place & cd. be traced as far as the Tararua range of wh. the Rimutaka is a spine -

In the northern island about 140m. N. of Wellington the Waitotara river flows thro' a forest of dead trees – a tree which never rots – a cedar? These trees must have been long [dead?] at the time. The river flows thro' them – The deserted channel of the river is seen about 1 ½ miles to the S. of the present channel – this is supposed to have happened before the natives came to the island or above 500 yrs ago –

[p.16] Mr. Roberts has seen two changes of the course of rivers in the tertiary country - a dead tree will change the whole course of a river for miles.

The Wairau river flows thro' a very flat country so that a slight sinking wd. cause a great difference in the tides.

A. F. Weld, Chiccock House
Bridport, Dorsetshire
Volcano near the Wairau river sd by Weld to have broken out.

A land slip of abt 3 acres slid into the harbour of pt. Nicholson burying a part of the road leading to the Hutt valley - -

A house built of "cob" clay & straw shaken down in the Wairapa [sic] plain wh. tho' not elevated or much shaken.

[p. 17] Qy. dead fish
Tidal wave flowed inland near to Wellington & left fish wh. died near Wellington - it came in over the race-source [sic], the races being held in afternn. of day before the earthquake...

Earthquake N. Zealand
Taylor. Trees growing in a ship

[p. 54] Mem.

1. Tax return to be made
2. Call on Roberts N. Zealand

The shocks of Jany. 23d. were in the night half past 9 p.m.
In 1848 first shock at 2 A.M. or in the night & the 2d 3 P.M. The 3d about 5 A.M. 2 nights after

Were the pictures turned round during the 1848 earthquake?

[p. 55] Mr Roberts made a report on the Light House [at Pencarrow Head] - & they ascertained that there was no sinking of a few inches after the rise -

The Active was wrecked some 30 m. S. of Nelson

36 hour intervals between shocks of 1848
The great fault sd to

[diagram of fault]

[p. 83] Earthq. of Oct. 18th 1848 occurred at 3 o'ck. P.M. the wave of Weld must have been this

Burnham water a small lake in the centre of the course - not all the fish were washed -wave in the night

[diagram, meaning unclear]

low water at neap tides does not show so great an elevn. as low water at spring tides - there
is a difference of 18 inches - ordinary tides about 4 ft. 6

Even now it is not long out of the water 2 1/2 months after the time of earthq.

Roberts fd. the same difference at Pencarrow Isld [Point].

[p. 84] A general belief that the sea cd. come back again - this tends to make it thought that it did also

Transcription of Lyell's notebook has been supplied by Kinnordy House and Leonard G. Wilson. Although greater detail, of the diagrams in particular, has been requested, we have received no reply to our requests.

Source: Lyell, C. 1856c. On the successive changes of the Temple of Serapis. *Proceedings of the Royal Institution 2:* 207-214 and given as a lecture at the weekly evening meeting, March 7 1856.
Location: Wellington, Wairarapa, Marlborough, Palliser Bay
Keywords: secondary, mainshock, ground damage, faulting, uplift/subsidence, tsunami/seiche, biological effects

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> ... and lastly, the latest event of the kind, yielding to no other in magnitude of its geological and geographical importance, the earthquake of New Zealand, of January 23rd, 1855. The shocks of this convulsion extended over an area of land and sea three times as large as the British Isles: after it had ceased, it was found that a tract of land, in the immediate vicinity of Wellington, comprising 4600 square miles, or nearly equal to Yorkshire in dimensions, had been upraised from one to nine feet, and a range of hills, consisting of older rocks, uplifted vertically, while the tertiary plains to the east of it remained unmoved: so that a precipice, nine feet in perpendicular height was produced, and is even said to be traceable for 90 miles inland, from north to south bordering the plain of the Wairarapa. In consequence of a rise of five feet of the land on the north side of Cook Strait, near Wellington and Port Nicholson, the tide had been almost excluded from the river Hutt, while on the south side of the same straits on the Middle Island, where the ground had sunk about five feet, the tide now flows several miles further up the Wairau than before the earthquake. *
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> *[Lyell's footnote to above text] Some memoranda respecting the changes in physical geography, effected during the earthquake of January 23rd, 1855, will be found in the Appendix of a new work by the Rev. Richard Taylor, entitled "New Zealand and its inhabitants," London, 1855. These were furnished by Mr. Edward Roberts, of the Royal Engineer Department, who has since (March 1856), on his return to London, communicated other particulars to Sir C. Lyell. Mr. Walter Mantell, also now in London, and who was in Wellington (New Zealand) during the shocks of last year, besides confirming the statements of Mr. Roberts, has supplied valuable information respecting the geological structure of the country upraised or depressed during the catastrophe.
>
> The upheaval around Wellington was only from a half to four feet, but went on increasing gradually to Muka Muka Point, 12 miles distant, in a direct line to the south-east, where it reached its maximum, amounting to nine feet, and beyond, or eastwards of which, there was no movement. Mr. Roberts was enabled to make these measurements with accuracy as a white zone of rock, covered with nullipores just below the low tide, was upraised.
>
> The perpendicular cliff, at the point above mentioned, formed part of the seaward termination of the Rimutaka chain of hills, which consist of argillite (not slaty), of ancient geological date. Their eastern escarpment faces a low country, consisting of very modern tertiary strata, which also terminate when they reach the sea in a cliff, 80 feet high, and considerably lower than that formed by the older rocks. This tertiary cliff remained absolutely unmoved, the junction of the older and newer rocks constituting a line of fault, running north and south, for a great distance (according to a resident, 90 miles) inland along the base of the hills, where rising abruptly they bound the low tertiary plains. A fissure open in part of its course, and in which some cattle were engulphed in 1855, marks the line of fault in many places.

Among other proofs of subsidence experienced on the opposite side of Cook's Straits, or in the northern part of the Middle Island, contemporaneously with the upheaval above mentioned, Mr. Roberts states, that settlers have now to go three miles further up the river Wairau to obtain supplies of fresh water, than they did before the earthquake of January 1855. There was no volcanic eruption in the northern island at the time of these events; but the natives allege that the temperature of the Taupo hot-springs was sensibly elevated just before the catastrophe.

During a previous earthquake in 1832, other alterations in the relative level of land and sea occurred: and many of the colonists fear a repetition of such movements every seven years, for in 1841 and in 1848, there were violent convulsions. The larger part, however, of New Zealand has not suffered any injury during the same period from earthquakes.

Source: Lyell, C. 1856d. Sur les Tremblement de Terre du 23 Janvier, 1855, à la Nouvelle Zélande. *Bulletin de la Société Géologique de France, 2e série 13*: 661-667.
Location: Wellington, Wairarapa, Marlborough, Palliser Bay, Wairau Valley, Kaikoura
Keywords: secondary, mainshock, aftershocks, ground damage, faulting, uplift/subsidence, tsunami/seiche

M. de Verneuil communique la note suivante de M. Lyell, traduite par M. Laugel.

Dan le courant des trois derniers mois, j'ai eu souvent l'occasion de causer à Londres avec plusieurs personnes qui peuvent passer, à juste titre, pour de bons ovservateurs, et qui se sont trouvées l'an passé (1855) à la Nouvelle-Zélande au moment du grand tremblement de terre. Ce sont M d. Edward Roberts, des ingénieurs royaux. Walter Mantell, fils de feu mon ami le célèbre géologue, et lui-même un explorateur scientifique de la Nouvelle-Zélande, et Frédéric A. Weld, propriétaire deterres dans l'île du Milieu (Middle-Island).

J'espère pouvoir vous aporter plus tard un compte plus détaillé des modifications géologiques et géographiques qui sont le résultat de cette grande convulsion, ou de persuader à un des témoins de faire lui-même la description de ce qu'il a vu. En attendant, je vous envoie l'exposé de quelques-uns des fait principaux qui présentent un intéret géologique, surtout de ceux qui se rapportent à la formation d'une grande faille et à un soulévement qui dépasse en hauteur verticale et en étendue horizontale toutes les dislocations de cette espèce, dout la date soit historique et qui soient jamais venues à ma connaissance.

Le tremblement de terre eut lieu dans la nuit du 23 janvier 1855, à neuf heures et demie du soir : il fut le plus violent dans la partie laplus étroite du détroit de Cook a quelques milles au S.-O. de Port Nicholson; mais des vaisseaux en iner en ressentirent le choc à 150 milles de la côté, et la surface entière ébranlée sur terre et sur mer est estimée a 360,000 milles carrés, surface trois fois plus grande que celle des îles Britanniques.

Dans le voisinage de Wellington, dans l'lle septentrionale, M. Roberts croit qu'une étendue de pays qui comprend 4,600 milles carrés (et par conséquent peu inférieure en dimension au Yorkshire), a été soulevée d'une manière permanente de l'a 9 pieds. Il n'y avait point de soulèvement perceptible sur la côte à 16 milles N. de Wellington; mais, de ce point à Pencarrow-Head, le promontoirè occidental de Port-

Nicholson, la hauteur du soulèvement allait graduellement en augmentant depuis l jusqu'à 7 pieds, et continuait a croitre jusqu'au flanc oriental d'une rangée de collines nommées Rimutaka, qui forment un chainon des montagnes Tararua, et òu cette hauteur atteignait 9 pieds. La le mouvement fut arrêté brusquement, et n'affecta en rien la contrée basse qui s'étend plus loin vers l'E., et que l'on nomme la plaine Wairarapa. Les points d'élévation, maximum et minimum, que nous venons de mentioner, sont à peu près à 23 milles l'un de l'autre, dans la direction du N.-O.

M. Roberts a été occupé, avant et après le 23 janvier, a exécuter pour le gouvernement divers travaus dans la rade de Port-Nicholson et sur la côté, et il a eu l'occasion d'observer avec précision les changements de niveau du sol qui ont affecté plusieurs points, et entre autres les falaises de la pointe de Muko-Muka, à 12 milles S.-E. de Wellington, où le côté oriental des collines Rimutaka, dent nous avons parlé plas haut, vient atteindre le détroit de Cook. Il y a observé une ligne de faille très distincte; d'un autre côté de cette ligne, la roche a été élevée verticalement à une hauteur de 9 pieds; de l'autre côté de la fissure, il n'y a eu de mouvement d'aucune sorte.

La masse soulevée consiste, d'après M. Walter Mantell, en argillite ancienne, non stratifée, avant la composition ordinaire du schiste argileux, mais sans présenter de schistosité. Cette roche forme, du côté de la mer, une falaise de plasieurs centaines de pieds de hauteur, tandis que les couches marines tertiaires, qui sont à jour à l'est, le long de la côté, forment une outre falaise, relativement basse, qui ne dépasse pas 80 pieds en hauteur. Ces couches tertiaires n'ont été nullement soulevées. M. Roberts a pu mesurer avec exactitude la hauteur du soulèvement dans la roche ancienne de la pointe de Muko-Muka, grave?? a une hande blanche où la surface de la roche avait été couverte de Millépores juste au-dessous du niveau de la marée basse. Le matin du jour qui suivit le tremblement de terre. Il trouva cette zone blanche a 9 pieds plus haut qu'elle n'était avant le choc. Il n'y avait auparavant pas moyen, excepté pendant tres peu de temps, à la marée basse, de passer entre la mer et le pied de cette falaise perpendiculaire. Les bergers étaient obligés d'attendre la marée basse pour faire dépasser le promontoire à leurs troupeaux. Depuis le mouvement de soulèvement. une plage doucement inclinée de plus de 100 pieds de largeur a été mise à sec, et les colons ont pu y faire passer la route qui suit la côté.

La ligne de jonction des roches anciennes et plus modernes que nous avons décrites plus haut est marquée, dans l'in? la contrée, pa un escarpement continu qui suit la direction N.-S. tout le long des collines Rimutaka, dont le flanc est escarpé du côté oriental et domine la plaine de Wairarapa, formée de dépôts tertiaires. La direction de la faille produite par le soulèvement a été rendue visible par la formation d'un mur presque vertical qui porte la trace d'une récentre rupture a 9 pieds de hauteur, et peutêtre suivi dans l'intérieur des terres sur l'ètonnante longueur de 90 milles, suivant le témoignage de M. Borlase, colon qui habite la vallée Wairarapa, à peu près à 60 milles au N. du détroit de Cook. La faille est, néanmoins, marquée en beaucoup d'endroits par une fissure ouverte dans laquelle les bestiaux sont venus tomber, sans qu'on ait pu, dans certains cas, les en retirer : quelquelois ces fissures, de 6 à 9 pieds de largeur, sont remplies çà et là de boue et de terre meuble.

Le jour du tremblement de terre (23 janvier), la rade de Port-Nicholson, ainsi que la vallée de la Hutte, ont été élevées de 4 à 5 pieds : l'élévation minimum s'est produite sur le côté occidental, l'élévation maximum sur le côté oriental de la rade. Un rocher

nommé le roc Balley, à une petit distancede la baie d'Evan, etait autrefois à 2 pieds au-dessous du niveau des plus basses marées, est? comme un vaisseau y avait touché, on avait placé une bouée pour marquer sa position. Ce rocher dépasse actuellement de 3 pieds le niveau de la mer à la marée basse. Depuis le tremblement de terre, la marée remonte à peine la rivière de la Hutte. Au moment du choc, de grandes vagues sont venues de? jeter sur la côte, *et* pendant plusieurs semaines les marées ont été très irrégulières. Des poissons morts ont été rejetés par les flots sur le champ de course de Wellington lors du tremblément de terre, et M. Mantell raconte que différents vaisseaux ont vu aussi, dans le détroit de Cook, des poissons morts flottant sur la mer en nombre prodigieux, quelques-uns appartenant à des espèces que les pècheurs n'avaient jamais vues auparavant.

Je viens d'apprendre par M. Weld, qui résidait au S. du détroit, dans l'île du Milieu, que le premier choc a été senti autour du cap Campbell, en mème, temps qu'à Wellington à neuf heures et demie du 23 janvier), mais que, en outre, on y ressentit pendant la nuit plusieurs mouvements de tremblement très forts; que le lendermain matin, à trois heures, on sentit un choc que l'on suppose étre local, et qui était égal en violence au premier. Pendant plusieurs jours, il y eut encore d'autres mouvements; les vagues roulèrent sar la côte à une distance de 50 milles dans les terres. Le deuxième jour après le premier tremblement de terre du 23 janvier, à un endroit que l'on nomme les Drapeaux, entre le cap Campbell et Waipepo, quelques hommes, occupés à charger du bois sur un vaisseau, virent distinctement le tremblement de terre venir à eux depuis le point que l'on nomine les Rochers Blancs, placés à 3 milles plus au N.

Il vint à eux dans direction de N.-O. à S.-E., et était rendu visible par les pierres qui roulaient du haut des falaises, par des éboulements, des nuages de poussière et les vagues de la mer. En somme, il semble que la surface mise en mouvement dans l'île du Milieu ne fut pas aussi considérable que celle qui le fut autour de Wellington. En outre, il semble qu'au S. du détroit le mouvement a été renversé, c'est à -dire qu'il a été presque partout un mouvement d'abaissement. La vallée du Wairau, avec des parties de la côte voisine, se sont abaissées de 5 pieds environ, de façon qu'aujourd'hui la marée s'étend à quelques milles plus loin qu'auparavant dans la rivière Wairau, et que les colons sont obligés de remontger à 3 milles plus haut qu'ils ne faisaient avant le tremblement de terre pour avoir de l'eau douce.

Il n'y eut aucune éruption volcanique pendant que tout ceci avait lieu, ni dans l'île du Nord, ni dans celle du Milieu: mais les natifs prétendent que la température des sources chaudes de Taupo s'eleva sensiblement, juste avant la catastrophe. Il avait été rapporté dans les journaux de la Nouvelle-Zélande que, dans I'île du Milieu, il y avait eu une éruption volcanique sur une montagne nominée Kairuru, près de Waipepo, mais cette assertion est aujourd'hui démentie, et l'on suppose que la colonne de fumée aperçue par quelques bergers? venait de quelque incendie allumé par des naturels, qui ont, en effet l'habitude? de brûler les buissons.

Je terminerai cette esquisse des ?? qui ont été produits par le tremblement de terre en 1855, en faisant observer que l'on a agité la question de savoir si la contrée, soulevée de plusieurs pieds en janvier autour de Port-Nicholson, ne s'est pas affaissée de nouveau dans le courant de sept ou huit mois, jusqu'au mois de septembre. Les témoignages sur ce point sont, jusqu'a un certain point, contradictoires, mais ne sont pourtant pas entièrement inconciliables. M. Mantell croit qu'il y eut un àffaissement

partiel avant qu'il quittàt la Nouvelle-Zélande en septembre, opinion partagée par le capitaine Sharp, le commandant du port et M. Robert Park, ingénieur civil et géomètre da gouvernement. Leurs conclusions s'appuient principalement sur les marées hautes, qui leur parurent monter plus haut, au lieu que les marées basses étaient plus basses immédiatement après le choc du mois de janvier.

M. Roberts quitta la Nouvelle-Zélande trois mois après le tremblement de terre, et ne pouvait donc donner aucun témoignage sur l'état des choses en septembre; mais il revint avec la persuasion qu'à son départ aucun affaissement n'avait encore en lieu, et, comme il érait constamment employé à des travaux pour le gouvernement, il croit que le moindre changement de niveau aurait difficilement pu lui échapper. Nous avons déjà dit que les marées avaient été très irrégulieres pendant plusieurs semaines après le choc, de sorte qu'il est nécessaire de prendre des mesures exactes pour établir le fait affaissement, en tenant compte,à la fin, d'un soulèvement et d'un effondrement subséquent. Ceci est d'autant plus nécessaire que, dans le port Nicholson, il y a toujours 18 pounces de différence entre les marées des syzygies et des quadratures, de façon que l'émergence des roches à la marée basse dépend en partie de l'époque ou l'on fait l'observation.

D'un autre côté, il ne faut pas oublier qu'au Chili et sur d'autres parties de la côté de l'Amérique du Sud, plusieurs observateurs ont constaté qu'après des mouvements de soulèvement considérables la côte s'était ensuite légèrement affaissée.

Le nombre des tremblements de terre violents ressentis dans la Nouvelle-Zélande depuis le commencement de ce siècle est si grand, qu'il alarme avec raison les colons, et peut démontrer au géologue quels changements géographiques importants peuvent avoir lieu, non-seulement pendant la durée d'une espèce, mais encore pendant la vie d'un individu surtout si l'on choisit pour individu un de ces arbres qui couvrent quelques-unes des montagnes de la Nouvelle-Zélande. M. Weld, qui a été dans l'île du Milieu pendant le tremblement de terre précédent de 1848, m'informe qu'à cette époque il se produisit une grande fissure dans la haute chaine de montagues, de 1000 à 4000 pieds de haut, qui s'étend au S. depuis la falaise Blanche dans la baie des Nuages, et qu'ou peut regarder comme la prolongation, de l'autre côté du détroit, de la chaine Rimutaka ou Tavarua dont il a été question plus haut. La fissure de 1848 n'avait pas, en moyenne, plus de 18 pouces de largeur, mais elle était remarquable par sa longueur, car elle a été tracée par M. Weld ou ses amis, et des personnes dignes de confiance, sur une étendue de 60 milles, dans la direction N.-S. sur une ligne parallèle à l'axe de la chaine. Qu'il n'y ait eu aucun soulèvement lié à la formation de cette fissure, c'est ce que l'on n'a pu établir.

Il semble qu'ou puisse conclue, des divers renseignements que l'on possède – que le point ou les mouvements sonterains se manifestent avec le plus de force s'est déplacé pendant les tremblements de terre successifs de la Nouvelle-Zélande; ceux de 1843, 1841, 1832 et 1826, ont déterminé des modifications permanentes dans les caractères géographiques de régions diverses. En 1832, sept ans avant la colonisation de ces îles par les Anglais, les convulsions étaient si sensibles, que les baleiniers se réfugierent dans leurs bateaux pendant quatre mois.

Suivant M. Taylor, qui a récemment publié un ouvrage intitulé *La Nouvelle-Zélande et ses habitants* (Londres, 1855), il-s'est produit des changements, dans le dernier demi-siècle, en divers points de l'île du Milieu, dont quelques-uns sont situés jusqu'a

5 ou 6 dégrés de latitude du détroit de Cook.Parmmi? d'autres faits, il rapporte qu'en 1847 on découvrit la carène d'un vaisseau qu'on crut être *l'Aciive*, naufragé en 1814. 200 yards dans les terres sur la côte occidentale (à peu près à 30 milles au S.-O. de Nelson) avec un petit arbre qui crossait à travers la membrane. Ceci nous aprend que, dans une période de trente ans. L'Océan s'était retiré assez loin pour laisser ?? débris d'un unufrage à 200 yards dans les terres. beaucoup plus loin an S., environ à 80 milles au N. de la baie Dusky, était une petite crique, autrefois nominée la Queue, souvent en 1823, par les pècheurs de phoques, dont les vaisseaux y trauvaient un excellent abri, derrière de hautes falaise, et des eaux si profondes près de la côtée, qu'ils pouvaient directement passer de leurs bateaux sur les rochers. Après une succession de tremblements de terre, en 1826 et 1827, la transformation de la ?? ?? si complète, que ces traits anciens devinrent ?? ?? ??: : la crique est aujourd'hui à sec, et ?? ?? ?? l'eau des arbres, qui out sans doute été entrainés dans le mer, par des éboulements, du haut des montagues-escarpées qui entourent la côte.

[The following translation of the portion of the above referring to the 1855 earthquake has been provided by Dr. Geoffroy Lamarche.]

During the last three months I had the occasion to talk with several people in London who could be considered good observers. They were in New Zealand last year (1855) during the great earthquake. They are; Mr. Edward Roberts of the Royal Engineers. Walter Mantell, a scientific explorer of New Zealand, (who is also the son of my friend the late and famous geologist), and Mr. Frederic Weld, a Middle Island landowner.

Later I hope I will be able to either provide a more detailed report on the geological and geographical modifications which are the result of this great convulsion, or I will persuade a witness to give a description of what was seen. While waiting I send you a statement of some important facts which are of geological interest. In particular those referring to the formation of a great fault and of an upheaval which is greater in vertical height and horizontal extent than all dislocations of this kind that I am aware of to date.

The earthquake occurred on the night of the 23rd January, 1855 at 9:30 p.m. It was most violent in the narrowest part of Cook Strait, a few miles SE of Port Nicholson. Some sea vessels felt the shock 150 miles from the coast and the whole area affected was estimated at 360,000 square miles, an area three times the size of the British Isles.

In the vicinity of Wellington (in the North Island) Mr. Roberts believes 4,600 square miles (an area just smaller than Yorkshire) was raised permanently from 1 to 9 feet. There was no noticeable rise of the coast 16 miles N. of Wellington. From this point to Pencarrow Head, the eastern headland of Port Nicholson, the extent of the upheaval varied gradually from 1 to 7 feet. This continued to the eastern side of a range of hills called the Rimutakas, which form an arm of the Tararua ranges. Here the amount of upheaval reached 9 feet. At this point the motion suddenly stopped, not affecting the lower land extending further east, called the Wairarapa Plain. The points of minimum and the maximum elevation just mentioned, are almost 23 miles apart, in a NW direction.

Around the time of the 23rd January, Mr Roberts was working on various projects

for the government, in Port Nicholson harbour and on the coast. Thus he had the opportunity to precisely observe changes in the level of the land which affected several points including the cliffs of Muka-Muka. This is 12 miles SE of Wellington, where the eastern side of the Rimutaka Range reaches Cook Strait. Here, he observed a very distinct fault line; on one side of the line, the rocks had been raised vertically to a height of 9 feet; on the other side there had been no movement of any sort.

According to Mr. Mantell the risen mass consists of old stratified argillites, with the normal composition of argillaceous schists, but without schistosity. This mass forms a several hundred foot high cliff towards the sea, whereas the tertiary marine strata, which are exposed to the east, next to the shore, form another relatively low cliff which would not be higher than eighty feet. These tertiary strata did not rise. Mr Roberts was able to accurately measure the amount of the uplift of the old rocks at Muka-Muka Point due to the altered position of a white band of millipores [the 1868 account calls these nullipores] which covered the surface of the rocks to just below low tide level. On the morning following the earthquake, he found this white zone 9 feet higher than it was before the shock. Previously, it was not possible to pass between the sea and the bottom of this perpendicular cliff except during a short time at low water. Shepherds were forced to wait for low tide in order for stock to pass the promontory. Since the upheaval, a gently sloping beach in excess of 100 feet wide has been laid dry so that settlers have been able to form a track which follows the shore.

The former described ancient rocks - and tertiary rocks junction line is marked inland by a continuous north-south escarpment along the Rimutaka Mountains. The eastern side is escarped and looks down on the Wairarapa Plain formed of tertiary deposits. According to a witness, Mr Borlasse who lives in the Wairarapa Valley about 60 miles [actually 45 miles] north of Cook Strait, the course of the fault direction produced by the upheaval was rendered visible by the formation of an almost vertical wall. This contains the mark of the recent rupture of 9 feet and can be followed for the amazing distance of 90 miles. Moreover, the fault is marked in many places by an open fissure into which cattle fell, and sometimes from which no-one could pull them out. At other places there are fissures, from six to nine feet wide, that are filled with mud and top soil.

On the day after the earthquake (23rd January) Port Nicholson Harbour and the Hutt Valley were found to be uplifted by 4 to 5 feet. Minimum elevation was on the western side and maximum elevation on the eastern side of the harbour. Balley Rock, not far from Evans Bay, was formerly 2 feet under water at lowest tides, and because a vessel had touched it, a buoy had been placed to show its position. This rock is now 3 feet above low tide level. Since the earthquake the tide hardly goes up the Hutt River. At the time of the shock, great sea waves rolled in upon the coast and for several weeks the tides were irregular. Dead fish were dumped by the waves on the race course at Wellington during the earthquake, and Mr Mantell relates that various vessels in Cook Strait reported numerous dead fish floating on the sea, some of them species never before seen.

I have just learnt from Mr Weld, who was living south of the strait in the Middle Island, that the first shock was felt around Cape Campbell at the same time as it was felt in Wellington at 9:30 p.m. on the 23rd. However, he also felt very strong tremors

during the night. On the following morning at 3:00 he felt a shock, supposed to be local, which had the same strength as the first one. For several days there were other movements and waves rolled along the coast for a distance of 50 miles. In a place called "The Flags", between Cape Campbell and Waipepo [Waipapa] on the second day after the first earthquake of the 23rd January, several men employed to load logs on a ship distinctively saw an earthquake approaching them from a point called White Rocks, located 3 miles northward. It approached them in a NW - SE direction, and was made visible by stones rolling from the top of the cliffs, by landslides, clouds of dust and a sea wave. In short, it appears that the area involved was not as important as that which was upheaved around Wellington. Moreover it seems that south of the strait, the direction of movement was reversed. That is, almost everywhere there was a downward movement. The Wairau Valley and part of the adjoining coast, subsided about 5 feet in such a way that now the tide flows several miles further up the Wairau River than it did before. Now the settlers are forced to walk three miles further up the river to get fresh water than they did before the earthquake.

There were no volcanic eruptions during this time, either in the North Island or in the Middle Island. Natives claim that the temperature of Taupo hot springs increased noticeably just before the catastrophe. It has been reported in the New Zealand newspapers, that there was a volcanic eruption on a mountain called Karuru, near Waipepo [Waipapa] in the Middle Island. However, this assertion is now denied and it can be assumed that the column of smoke seen by a shepherd was probably a bush fire.

I will conclude this account of changes produced by the 1855 earthquake by pointing out that some have asked whether the land having risen several feet around Port Nicholson in January would not have sank again during the following 6 to 8 months, or before September. On this point witnesses are somewhat contradictory but not irreconcilable. Mr. Mantell believes that there was a partial sinking before he left New Zealand in September, an opinion shared by two other reliable witnesses, Captain Sharp, head of the port and Mr. R. Park, a government civil engineer and land surveyor. Their conclusions were mainly based on the fact that high-tide levels seemed higher in September and low-tide levels lower than just after the January shock.

Mr. Roberts left New Zealand three months after the earthquake and hence was unable to give evidence on the September conditions. He returned [to England] certain that there had been no sinking before his departure. He feels that he could not have missed any slight change of level because he was still being employed in the same work by the government. We have already said that the tides were very irregular for several weeks following the earthquake. Thus it is necessary to make accurate measurements to establish any likely collapse, by taking into account any upheaval and subsequent collapse. This is especially important in Port Nicholson Harbour because of the 18in inch difference between spring tides and summer tides. Those rocks exposed at low tide depend on when observations were made.

Source: Sir C. Lyell, 1868. *Principles of Geology* Vol.2, 10th ed. John Murray, London.
Location: Wellington, Wairarapa, Marlborough, Palliser Bay, Wairau Valley, Kaikoura
Keywords: secondary, mainshock, aftershocks,ground damage, faulting, uplift/subsidence,

tsunami/seiche, biological effects

P 82-89 In the course of the year 1856, I had an opportunity of conversing in London with three gentlemen, all well qualified as scientific observers, who were eye-witnesses of the tremendous earthquake experienced in January of the proceeding year in New Zealand. These were, Mr. Edward Roberts, of the Royal Engineers department; Mr. Walter Mantell, son of the celebrated geologist; and Mr Frederick A. Weld, a proprietor in the South Island. (Note: This account was published by me in the Bulletin de la Soc. Geol. De France, 1856, p 661) The earthquake occurred in the night January 23, 1855, and was most violent in the narrowest part of Cook Strait, a few miles to the SE of Port Nicholson (see Map, fig 101); but the shocks were felt by ships at sea 150 miles from the coast, and the whole area shaken of land and water is estimated at 360,000 square miles, an area three times as large as the British Isles. In the vicinity of Wellington, in the North Island, a tract of land comprising of 4,600 square miles (not much inferior to Yorkshire in dimensions), is supposed by Mr. Roberts to have been permanently upraised from 1 to 9 feet. There was no perceptible elevation on the coast 16 miles N of Wellington, but from that point to Pencarrow Head, on the east side, at the entrance of Port Nicholson, (see Map, fig. 101), the amount of upheaval went on increasing somewhat gradually, till it reached a vertical height of 9 feet along the eastern flank of the Remutaka Mountains. This range terminates in Cook Strait, between Port Nicholson and Palliser Bay, in a lofty coast rising rapidly to heights about 4,000 feet above the sea. Here the vertical movement ceased abruptly along the base of these hills not affecting the low country to the eastward, b, fig. 102, called the Plain of Wairarapa. The points of minimum and maximum elevation, from NW to SE in the district above alluded to, are about 23 miles apart, which therefore expresses the breadth of the upraised area. Mr. Roberts was employed professionally, before and after January 23, in executing several government works in the harbour of Port Nicholson and on the coast, and had occasion to observe minutely the changes in the level of the land, which took place at various points, and especially in the sea-cliff, called Muka-Muka, 12 miles SE of Wellington, where the eastern flank of the Remutaka range, before described, terminates southwards in Cook Strait. Here a distinct line of fault, c, d, fig. 102, was observed, the rocks on one side A, being raised vertically 9 feet, while the strata B, on the other side of the fissure, c, d, experienced no movement. The uplifted mass A consists, according to Mr. Walter Mantell, of argillite, having the ordinary composition of clay state, but not laminated. It presents a cliff, several hundred feet high towards the straits, whereas the horizontally stratified tertiary strata exposed to the eastward form a comparatively low cliff, not exceeding 80 feet in height. These tertiary strata, participate in the upward movement. Mr Roberts was able to measure accurately the amount of permanent upheaval in the older formation, by observing the altered position of a white bank of nullipores, with which the surface of the rocks had been coated. This white zone, a few hours after the earthquake, was found to be 9 feet above its former level. Previously to the shock, there had been no room to pass between the sea and the base of the perpendicular cliff and as the herdsmen were obliged to wait for low tide in order to drive their cattle past the cliff, Mr. Roberts was engaged in constructing a road there. But immediately after the upheaval, a gently sloping raised beach, more than 100 feet wide, was laid dry, affording ample space at all states of the tide for the passage of man and beast.

The junction of the older and new rocks along the line of fault above described is marked in the interior of the country by a continuous escarpment running north and

south along the base of the Remutaka [Rimutaka] Mountains, where they present a steep slope towards the great plain of the Wairarapa formed of the modern tertiary deposit before mentioned. The course of the fault along the base of the escarpment was rendered visible by nearly perpendicular cliff of fresh aspect 9 feet in height and traceable in an inland direction to the extraordinary distance of about 90 miles, according to information given by Mr. Borlase, a settler who lived in the Wairarapa valley about 60 miles north of Cook Strait. [Actually Borlase lived only 45 miles from the Wairarapa coast to the south.] It was marked, moreover, in many places by an open fissure into which cattle fell and could not in some cases be recovered, or by fissures from 6 to 9 feet broad filled here and there with soft mud and loose earth. At the same time that this vertical movement took place on January 23, the harbour of Port Nicholson, about 12 miles to the westward of Muka-Muka cliff, together with the valley of the Hutt, was raised from 4-5 feet, the great elevation being on the eastern, and the lesser on the western side of the harbour. A rock called the Balley Rock, a short distance from Evans Bay, was formally 2 feet under water at the lowest tides, and a vessel having touched upon it, a buoy had been placed over it, to mark its position. This rock projected after the shock nearly 3 feet above the surface of the water at low tide. The rise of the convulsion great waves of the sea rolled in upon the coast, and for several weeks the tides were irregular. Dead fish were left by a wave on the racecourse at Wellington, and Mr. Mantell states that others were also met with by several vessels in Cook Strait floating on the sea in surprising numbers, some of them of species never seen before by the fishermen.

Mr. Weld, who resided south of the straits in the South Island, informed me that, besides experiencing there the shock of the 23rd, he felt another next morning of equal violence, and waves of the sea rolled in along the coast for a distance of 50 miles. At a place called the Flags between Cape Campbell and Waipapa (see map), some men were loading a vessel with wood, when they saw distinctly an earthquake approaching them from a point called 'the White Rocks,' 3 miles to the northward. Its approach was rendered visible by the rolling of stones from the top of the cliffs, also by landslips and clouds of dust, and by the accompanying sea wave. Upon the whole it appears that the area convulsed in the South Island was not so extensive as that upheaved around Wellington, also that to the south of the Straits the direction of the movement was reversed, being for the most part a downward one. The valley of the Wairau, with parts of adjoining coast, subsided about 5 feet, so that the tide flowed several miles farther up into the Wairau River that it formerly did, and shops taking in fresh water were obliged to go three miles farther up the river to obtain a supply than they did before the earthquake.

There was no volcanic eruption, whether in the Northern or Southern Island at the time of these events; but the natives allege that the temperature of the Taupo hot springs (see small Map, fig 101) was sensibly elevated, just before the catastrophe.

I will now conclude this sketch of the changes produced in 1855 by observing that a question arose as to whether in the region about Port Nicholson the land, after it was upheaved several feet in January, sank against to some slight extent or a few inches in the course of 7 or 8 months or before September 1855. When Mr Roberts left New Zealand, three months after the earthquake, there had been no sinking of the upraised land, and he felt persuaded that he could not have failed to notice even a slight change of level had any occurred. He ascertained ten weeks after the shock that there had certainly been no subsidence whatever on the coast at Pencarrow Head, and the

tides were so irregular long after the earthquake, in the harbour of Port Nicholson and elsewhere, that the supposed partial sinking of the coast which some believed to have taken place might perhaps be deceptive. It is surprising how soon the signs of a recent change of level on a coast are effaced to all eyes but those of the scientific observer, especially where there is a rise and fall of the tides. Rocks newly exposed soon began to weather and vegetation spreads over the emerged land, and a new beach, with all the characters of the old one, is formed in a few months along the sea-margin.

The geologist has rarely enjoyed so good an opportunity as that afforded him by this convulsion in New Zealand, of observing one of the steps by which those great displacements of the rocks called 'faults' may in the course of ages be brought about. The manner also in which the upward movement increased from north-west to south-east explains the manner in which beds may be made to dip more and more in a given direction by each successive shock.

An independent witness of the earthquake of January 1855, a civil engineer, says in a letter to Mr. Robert Mallet that 'first and greatest shock of January 23 lasted about a minute and a half. All the brick buildings in Wellington were overthrown, as well as the bridge over the Hutt. The hillsides opposite Wellington, those of the Remutaka [Rimutaka] range, were much shaken, as evidenced by the many bare patches with which they were chequered, fully to the extent of one-third of their surface, whence trees had been shaken off.' The ground in this range, he says, was more violently shaken than in Wellington, and the direction of the shock was NE and SW agreeing with that of the chain of hills. After the shock the tide did not come at high water within 3 or 5 feet of its former height. [See] Reports of Brit. Assoc. 1858, p. 105.

Mr Weld was in the South Island during the previous earthquake of 1848, and he informed me that a great rent was then caused in a chain of mountains varying in height from 1,000 to 4,000 feet, which run southwards from the White Bluff in Cloudy Bay and may be considered a prolongation of the Remutaka [Rimutaka] or Tararua chain above alluded to (see Map). This fissure of 1848 was not more than 18 inches in average width, but was remarkable for its length, for it was partly traced by Mr Weld and partly by observers on whom he could rely, for 60 miles, striking north-north-east and south-south-west in a line parallel to the axis of the chain.

Fig. 101.

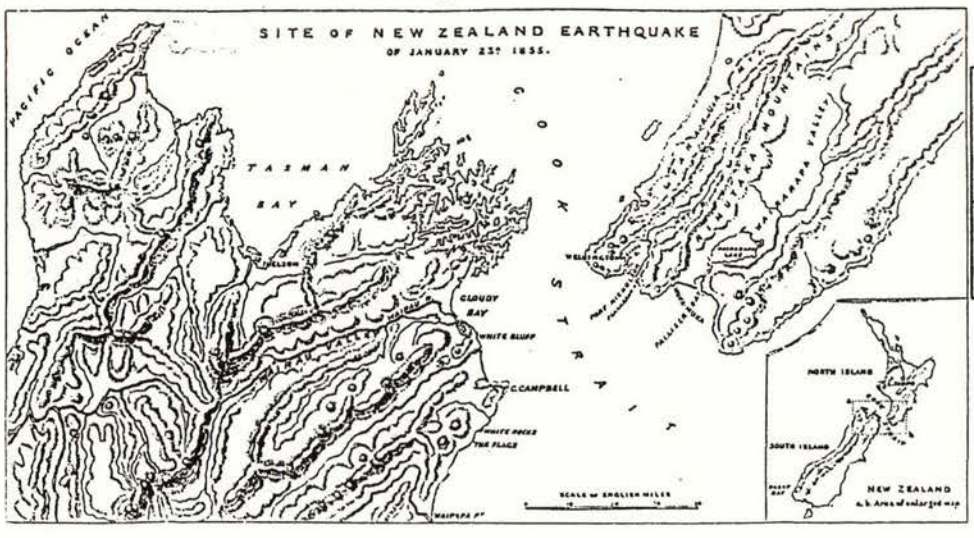
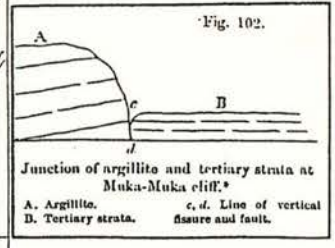


Fig. 102.



Junction of argillite and tertiary strata at Muka-Muka cliff.*

A. Argillite. B. Tertiary strata. c, d. Line of vertical fissure and fault.

McDOWELL, James

Source: McDowell, J. ca.1910-11. Letter to the Editor *In: Evening Post?* Family scrapbook of Alistair Stuart of Gladstone, Wairarapa Archives, Masterton, New Zealand.

Location: Wellington

Keywords: secondary, mainshock, ground damage

To The Editor

Sir, - Dr. Bell's lecture concerning Wellington Harbour and earthquake risks to our brick buildings has stirred up great interest in their want of stability demonstrated so clearly by the doctor. It has done more, as it has stirred up my recollections of New Zealand's greatest earthquakes for the past forty five years, and the appalling tidal wave of 1868 that caused such consternation at Westport. It has also brought up to mind the recollections of a living witness of the destruction caused by the great earthquakes of 1848 and 1855 - matters practically unknown to our present citizens. These conversations of long ago concerning those upheavals with those who related the facts when the distance to those events was closer and memory clearer than they could be 61 years after, render a description of them at the present time of interest to your many readers. I therefore send to you the description given by Mr John Valentine, of Oriental Bay, to me on many occasions in days long past. Mr Valentine is one of our citizens of a ripe old age approaching nearer to ninety than falls to the lot of many, having lived in the reign of George the Fourth, William the Fourth, Queen Victoria, and Edward the Seventh, and with his regiment helped to suppress the French rebellion in Canada in 1835, and enjoyed whatever joy is to be found in earthquakes in Bermuda also riots about Dan O'Connell in Ireland, and other pastimes before sailing to the Pacific and the then very young colony of New Zealand. But few remain who were aged enough at that time to intelligently record their experiences, observations, and sensations of those long continued vibrations, resulting in the upward thrusts, lifting such a wide area five feet beyond former level of the earth's surface. Scientists may tell us the enormous thrusting or pushing power required by nature for this task.

Mr Valentine said it was a beautiful sunny day and the 65th Regiment was on full dress parade, where Fitzherbert Terrace now stands. The regiment was in line for inspection of arms. The band, of which he was one, was stationed opposite the regiment playing, when without warning he noticed that the steady line of soldiers started to go up and down as if they were in heights and hollows, and the bandsmen fell sprawling in all directions. On rising they again fell, and all the regiment became very seasick. That ended the parade. The earthquakes continued - none so heavy or disastrous as the first one, and they finally ceased in three to four months. The results of the great shock were too many to occupy your space within a letter, but three of them so impressed the settlers that frightened ones left Wellington for more solid places. The items causing their departure were: - Two fissures or long deep openings in the earth's surface. One extended from behind the Oriental Bank now the Albert Hotel across Willis Street and through where the Duke of Edinburgh Hotel now stands, and on into the harbour as far as the eye could trace it. It was wide, and long planks had to be placed across the wide fissure. The other fissure was beyond Pipitea Point, and went up Tinakori road and on into the harbour. As time wore on those fissures either closed or naturally silted up. Across the harbour the great damage was done. Up to that time the harbour was wooded all around, but the earthquake changed the appearance as, all the hills were split open by the upward thrust and the front parts fell into the harbour. The high mountains behind

Wainuiomata were split, the fronts falling, all the trees and bush being covered up, leaving an almost perpendicular face in places and very ugly scarred and rugged faces. The writer remembers how ugly and desolate they looked 44 years ago. Since then time has partially covered their nakedness with growths but some of the scars still remain.

The late Mr John Plimmer wrote what he saw off a ladder on a building on which he was working when the earthquake occurred, the whole Te Aro Flat undulating and waving like a field of oats in a wind. The earthquake extended north and south; a large crack or fissure opened in the river at the town of Petrie, now called Wanganui, and the late Mr Isaac Plimmer told me that he was working at a sawmill for his father on Mount Victoria, and at night he saw a great flare of fire in the sky in the south, and that there must have been an eruption in the direction of the Cheviot Hills. It was found out later that the hills from Port Robinson to Cheviot had been split and one side subsided in places for five or six miles.

The earliest record we have of earthquakes in New Zealand in Cook Straits is from Captain Cook's Journals. He states that a very severe earthquake occurred whilst he was repairing his ship in Cook's Cove, Queen Charlotte Sound, on his first voyage. There is also record of an earthquake occurring on his third voyage. It will be remembered by most of your readers that only a few years ago we had earthquakes at the Cheviot that lasted for from four to five weeks, and the several shocks during that period accounted for the brick chimneys and bakers' ovens in the new township. The features of the San Francisco, the Messina, the Chilian, and the Mexican earthquakes proved that even tall buildings, if constructed of reinforced concrete and of steel, have stood the test, and all brick structures collapsed. Wooden structures stood well. All derangements to them were caused by their unstable brick chimneys. The tall Spreckels building is a monument to steel and concrete. Why not construct reinforced concrete chimneys in all wooden houses. After the severe earthquakes in 1868 in Nelson and New Plymouth all chimneys were constructed outside and attached to the structure with iron hooping. Over forty years ago I sailed in the steamer Phoebe from Nelson to New Plymouth. We were "cabled" ashore dressed in huge cork jackets, and found that they had suffered from an earthquake that knocked down the chimneys; they were cooking in the open air. We felt no shock on the steamer. - I am, etc.,
James McDowell
9th August.

Parts of paragraphs 2 and 3 of this extract clearly confuse effects of the 1855 Wairarapa earthquake with those of the 1848 Marlborough earthquake.

MCINTOSH, A. D.

Source: McIntosh, A. D. 1940. *Marlborough - A provincial history. Provincial History Committee, Blenheim, New Zealand*

Location: Marlborough

Keywords: secondary, uplift/subsidence, building damage

p168-9 The earthquake which had provided such a dramatic beginning to the year began on the evening of January 21st [sic] with a series of terrific shocks throughout the whole district, and continued more or less continuously for nearly three weeks. Nearly every

mud whare in the Wairau came down. 'In Flaxbourne', records Frederick Trolove [q.v.], 'sixteen houses, all having been built this summer, are either flat to the ground or so shaken that they are beyond repair. The houses built under the large hills have suffered the least; and those on flat ground are levelled with it. Apart from the immediate destruction of houses and cottages and terrifying the pioneers, the most important result was the subsidence of the Wairau Plain. As to the extent of this subsidence opinions differ. Sir David [sic] Lyell, the most eminent geologist of the day, records five feet in the lower Wairau, but William Budge, who was living at Budge's Island near the mouth of the Wairau, in a letter to the Superintendent of Nelson *, records 'the subsidence of the whole district at the time of the last severe earthquake to the extent of at least eighteen inches'. The land had become so sodden that Budge was forced to leave, but of greater consequence than the depression of the land was the corresponding deepening of the Opawa River. It was soon discovered that small schooners could navigate the bar and sail almost up to the tidal limits, which were just beyond the present railway bridge over the Omaka. Although it was some little time before schooners and steamboats superseded the whaleboats as the general vessel of trade transport, the significance of this change was soon recognised. The Wairau possessed navigable qualities superior to those of the narrow and crooked Opawa up which sailing vessels had to be towed by bullocks, but on account of swamps the Wairau could not be reached by drays.

*[McIntosh' footnote to above text] Budge to Superintendent, Oct 29, 1855. Nelson papers: 34

The letter by William Budge to the Superintendent referred to in this extract has not been found in any Nelson district papers held at the National Archives.

McKAIN, Douglas Mary
Source: *A short account of early days in Wellington, Westshore and Eskdale*. MS-Papers-1353, Alexander Turnbull Library, NLNZ.
Location: Wellington
Keywords: primary, building damage

Grandma McKain, on her arrival, leased a section of land, the lease costing £4 at a rental of £12 a year, for seven years. Her sons John and James erected a cottage on it. She later acquired several other cottages, and during the severe earthquakes in Wellington the damage done to them cost her over £70 to repair.

Source: McKain, R. 1855. Diary. MS-41 Alexander Turnbull Library, NLNZ.
Location: Wellington
Keywords: primary, building damage

1855
Jany the 23. Sad earthquakes at Wellington

Clearing the ruins from the Building	[£]
Paid to the men	4- 2- 0
Paid to Huxley for timber	23- 5- 9
Carpenters Bill	20-17-?
Three chimneys Building	5-12-0
Bricks lime sand and one chimney pipe	3-10-0
Lock to back cottage	0- 5-6
Fencing from Loxleys	0- 8-0
Mudgways bill for labour & nails	17-0
Calico for ceiling the little room	10-0
Paid Noder? For labour	5-0
Tacks	1-0
Paperhanging	10-0
Paid ? for ceiling Bedroom	3-10-0
Nailing down back cottage floor	9-0
	£64-3- 0

The pence column is obscured in several places.

MACKAY, Alexander
Source: Mackay, A. 1891. Claims of Natives of Wairarapa Lakes and adjacent Lands. *Appendix to the Journal of the New Zealand House of Representatives G4: 1-71.*
Location: Wairarapa
Keywords: primary, secondary, uplift/subsidence

The following are extracts of evidence given by various witnesses called to the Hearings of the Maori claims. Note this Alexander Mackay, land commissioner, should not be confused with Alexander McKay (q.v.), geologist.

p4

> "In 1855 heavy earthquakes raised the land, and the lakes were lowered, leaving large strips of land between their borders and the previous high-water mark, which can be easily defined to this day by logs and other land-marks. The boundaries of the sales can also be proved by living witnesses." The evidence given at the inquiry relative to this allegation was very conflicting. Some of the witnesses testified that all the low-lying land between the margin of the lake and the flood-line had been raised, while others stated that it had only been raised in parts, and that the lake, when closed for any length of time, flooded the same extent of country as heretofore. The allegation is not clearly expressed, as it creates an idea that large strips of land on the margin of the lake have been reclaimed through the action of the earthquake, which is not the case, although it is generally admitted that some places were raised by its action; but the area upheaved in this manner is insignificant when compared with the extent of low-lying land in the vicinity of the lakes.

p 16

> The evidence of J.P. Russell, esq., J.P.
> The second claim which is asserted by the Native owners of the Wairarapa Lake is that the Government of New Zealand have wrongfully seized a large area of land on the eastern side of the lakes which the Native owners never ceded to the Crown. The evidence which is relied upon to support this claim is that- (1). The land ceded to

the Government in 1853 was bounded by the high-water mark of the lake; this is supported by the evidence of Mr. Russell and others. (2). That the Government have admitted this position at one point by subsequently purchasing from certain Natives land which, according to the boundaries now insisted on, should have been the property of the Government. These parcels of land have been already referred to. (3). That the boundaries of the lake were altered in 1855, subsequent to the cessions, by the earthquake, which raised large tracts of land theretofore covered with water.

A sketch survey has been made, and the map has been put in evidence, showing the high-water mark of the waters of the lake. To this map we crave leave to refer. The boundary as laid off on this map is clearly distinguishable on the ground. This boundary is not insisted on as determining the boundary throughout its extent, but merely in places where the land has been proved by evidence to have been raised by the earthquake.

A.S Menteath,
C.A. Pownall

p 17

Piripi te Maari (sworn):
After the sale an earthquake happened, and raised the land on the margin, leaving a strip of dry land along it. The other sales, three in number, were all bounded by high-water mark. The Turakirae and Turanganui sales took place before the earthquake. The upheaval of the land along the margin of the lake has left a strip of dry land. The Government have sold this land to the settlers. No title was issued to the Natives to the strip of land alluded to. Do not know that the Natives have sold any of this land. Heard of the sale of the Puata and Te Taheke to the Government; this land is situated on the land raised by the earthquake. The boundary of the flood-line can be seen by the drift left by the water. There is a distinction between the high-water mark of the lake and the flood marks. There is good land between the old and new margin of the lake;

Raniera te Iho's reserve was made in the Turanganui Block. The land, when granted to Raniera, was by the old high-water mark; there is 900 acres probably outside, between the river and the present margin of the lake. I was at the Court in 1882, when the title to the lake was before it; I was a witness on that occasion. Our application was that all the land up to the old high-water mark should be granted to us.

By the Commissioner
Am not aware that part of the land comprised in the Taheke Block was the only land on the margin of the lake that was raised by the earthquake; other parts were raised as well. There are two boundaries to the lake; the margin of it is one and the high-water line is the other. If Manihera stated that the sale of the blocks were bounded by the margin of the lake, he was a deceitful person, because he always maintained to the contrary in the presence of the Natives.

By Mr. Pownall
The high-water mark caused by the flooding of the lake is different from the flood-mark made by the flooding of a river. I do not recognise the right of one or two persons to sell the reserve in the Turakirae Block. The banks of the lake on both

sides were affected by the earthquake; part of the reclaimed land was afterwards sold to the Government. Logs and other drift matter were lodged on the land by the flood-waters of the lake. The earthquake upheaved the land along the lake and reclaimed a large strip on its margin. The Taheke Block was part of the land upheaved by the earthquake in 1853.

Thursday, 23rd April 1891 Commission resumed at 10 a.m.
John Alfred Jury (sworn):
I live in Greytown. Have been acquainted with the Wairarapa Lake since I was a youngster-probably about eight years old. Lived first at Te Kohai, Mangatete, and Te Akamangu. These places were in close proximity to the lake; the most distant of these places would be about three-quarters of a mile off. Pukepukeonetea was another place that I lived at, also Te Tirohanga; lived at the latter place with Rawiri my uncle. Was living at Kaupekahinga and Ngapuke when the Turakirae and Turanganui sales took place. Was at a place called Jury's Island in 1855, when the earthquake took place. When the lake was closed in the summer season we used to live at Te Kohai and other places near the lake for the purpose of fishing before the earthquake, and also afterwards. The earthquake of 1855 was the heaviest one that I have ever experienced or heard of. It was the cause of drying up one of the lakes. The Kohai Stream was a deep one at that time. To the westward of Tainoku and on to Te Akamangu was all covered by water before 1855, but after the earthquake these places became dry land. Pukepukeonetia was a place that was under water before the earthquake. Kahutara was a part that was also covered with water, but a great deal of land has since been reclaimed. Tawhitikahu was the place the water used to reach. From Makakahi to Oporua was another part that fixed the high-water mark. Mapunatea was another place that was covered before 1855. I do not know what the part about Taheke was like before 1885, but have been told that this locality was upheaved by the earthquake. All the other places that I have named I know personally of the changes that took place by the action of the earthquake. Was told by the people that the sales of Turakirae, Turanganui, Kahutara, and Tauherenikau were made before the earthquake. I can point out on the ground the places along the boundary of high-water mark from my own knowledge; others I can point out from description. In some places the distance is considerable between the old and new high-water mark.

p 19

After the earthquake a great many of the old fishing places were dried up and rendered useless. I know the position of the high-water mark in many places.

p 20

(d) Matarua Bush, to the east of Pounui was another. The taupahi at teh Rae o te Hiha extended to the Taumata Kaiwharawhara at C. Pounui, to the east of that stream, was another taupahi. At the part to the east of the high water-mark was a swamp in the early days, but is now dry land, and covered with bush. The Awa Puni used to extend to the Mataura Bush. There is no change taken place between Matarua and Pekehoumia. From Te Koangaumu the land has been dried. No change has taken place from the point beyond Te Koangaumu (F) to Tauwhareratanui (O); from there on to Ohaunui, and to Manuka (H), the Tohu o te Awapuni has changed by the land having dried. There are two causes why these places have become dry ground: the earth-quake was one reason, and through the settlers making drains, The land is flooded now, but not as in former times. The places on the east side of the

lake within the Turanganui Block commence at Okourewa (1). From there to Turanganui (2) there is no alteration in the position of the old high water-mark. Do not know where Rautoka is situated, except that it is near the ferry at Te Upokokirikiri. From Turanganui to Wakahauhau, and thence to Otunuku, used to be all covered with water. (3) Makahauhau is a taupahi; Otunuku is also a taupahi (4). Formerly all that country was flooded by the lake, but now it has become dry, and is only occasionally flooded. This is partly due through the earthquake and partly through being drained. From Otunuku to the west of Okoura the line of the Awapuni at Tauanui is to the west of that place. Beyond Okoura (5) is Otamata (6), a bush. The flood reaches into that bush, and has always done so, Matainoke (7) is the next place where the flood-line reaches. (8) From Matainoke to Ngapiaka was all covered with water formerly, but the inland part has become dry through being filled up by the silt from the Ruamahanga River, and also by drainage. From Te Kumenga to Te Takeke was raised by the earthquake, and is only slightly flooded now. This is the part sold to the Government by Manihera and others. Te Kumenga (9) on to Tuakipuku (10) - there is no place called Tuakipuku elsewhere along the lake to Taheke (11), Ngakiore (12), Waiohai (13). Te Here o te Koreke (14) is on the banks of the Ruamahanga. Te Rere (15), near Kohunui, is beyong the Tohu o te Awapuni. In the Kahutara Block, from Te Kohai near the bridge, up to Hinepare to Okoura, up to Otaupuaroaro, was all flooded formerly. I am familiar with that part because I was in Mr. McMaster's employ. Used to go to fetch in the cattle when the flood was on. When the country was flooded only the peaks of the sand-hills were visible. The land was raised by the earthquake, and only the lowest parts are now covered. The country was flooded through the overflowing of the Mangatete and other streams. When a flood happened in former times all this part of the country was covered with water, but that is not the case now. This is partly caused through the inland streams and lakes being drained. Another cause is that the Wairarapa Lake is filling up. Kaihau and Tawhiti Kahu were places the flood-line reached formerly. The mingi scrub used to get covered. Now the water only just covers it roots. Cannot explain why this locality is not flooded so heavily now as formerly. From Mangatete to Te Kohai is flooded as badly now as formerly. From Te Taurapa to Tauanui is not flooded now. This part has been sold to the Europeans, Otehekenga is a small lake: this is being filled up by the Tauherenikau. The Tohu o te Awapuni, on the Kahutara Block, were the sand-hills known as Kirihau and Tawhitikahu. In the Tauherenikau Block the high-water flood-line used to reach to Pukepukeonetea (16). Part of this locality is now dry. The flood-line is further off; this is through the Tauherenikau filling that place. The Opaka Bush is still flooded by the lake, also Te Rakai on to Koreromairangi. These places have always been flooded. Te Mangaroa has become dry land, probably through being silted over by the mud from the lake. Te Ruakokoputuna has been made dry by drainage. Part of Featherston is in Kaiwaewae Block and the other part in Tauherenikau. Hear of the sale of the Kaiwaewae Block, and that it included the upper end of the lake. The cause of this sale was through a dispute between Rawiri, Piharau, and Mr. Lucena. Rawiri claimed the place as a reserve made in the Turakirae Block. Rawiri wanted the rohe of the Owhanga Block taken round by the margin of the lake to Otauira, but Mr. McLean suggested that the line should go across to Owhanga on the opposite side. Rawiri was averse to this, but Mr. McLean assured him that it would not interfere with the reserve at Owhanga. Owakau is above. In former times along the coast towards Turakirae it was very difficult to travel because of the tide, but after the earthquake it was possible to travel at all times. I merely give this as an illustration.

p 21

I have a faint recollection of the earthquake of 1855, but was very young then. Could not describe the effect it had on the land adjacent to the lake. The earthquake took place in 1855, I fancy, but cannot speak positively, as I was only a youngster. I suppose that it was after the land was raised that parts of it became improved. Have heard that before the earthquake the lake was much deeper. I know that a place called Hikurangi, in the Tipua Block, was raised after the earthquake. Remember riding over the land with my father, and noticing the change. Have not seen the whole of the Tipua Block covered with water of late years, but I know from traces of drift-timber being left on top of the sandhills that the floods were much higher in former years. January was the month the lake used to close, and it frequently remained closed for four months. I think it has closed as early as September in some years, but could not name any year when it took place in that month. I am not acquainted with any other part of the country bordering the lake excepting about the Tipua Block.

By Mr. Pownall:
I do not mean it to be inferred that no negotiations took place before 1883, but that I do not know of any such arrangement. I think that Mr. Mathews and others used to make arrangements with the Natives about opening the lake. I have not been a member of the River Board during the time I allude to. I am not a member now. Have heard from my father and others that land has been raised by the earthquake on the western side. I stated that the settlers gained increased land for grazing purposes after the earthquake. The sediment deposited by the lake and the river has raised the land. Have not been down the western side of the lake, but heard that it was raised by the earthquake. Another part that was raised was at Hikurangi. That was all that I heard of. My father acquired some land on the banks of the lake. It is dry when the lake is low : 400 acres was the quantity that he purchased.

p 22

I know the earthquake that happened after the sale of the Turakirae and Turanganui Blocks. It was a short time afterwards in the same year that the earthquake took place. Am sure it was after these sales. Some part of the land was affected by the earthquake and other parts were not changed. The part that was affected by the earthquake on the west side was from Te Rae o te Hiha to Kakaimakatea; before the earthquake this locality was covered by water. The high-water mark of the lake was not affected by the earthquake. If the lake closes in January and remains closed till April the flood level reaches the old flood-line. The depth of the water over the flooded land is not so great as formerly, and some parts are not covered. Cannot describe the distance below the present and the old high-water mark. These are parts that have become valuable since the earthquake; these lands are occupied by the Europeans. The parts that the Europeans object to being flooded is the land that has been raised by the earthquake - at least that is my opinion. The distance between the present awapuni from the old one is about as far as from this hall to Muhunoa, along the Greytown Road, where the bridge was burnt down.

Saw Mr. McLean after the earthquake, but did not go purposely to see him about the effect it had on the low land adjacent to the lake, but he knew of it from others. We did not speak to Mr. McLean about the Europeans occupying the land raised by the earthquake, because we were not aware of this, and it was only on the Europeans

wanting to open the lake, and their assertion that this land was theirs, that made it known to us.

p 23

After the sale the land about the lake was upheaved by an earthquake. A good deal of land was reclaimed by the action of the earthquake. In some places there is a wide space of dry land, in other places it is not so wide. Mr. McLean said, in reply to the request of the Natives, that they should consent to the boundary being taken along the margin of the lake, but I am unable to say what was finally agreed on; but the Natives have always told me that high-water mark was the boundary they claimed to. In some places the distance between the old and present high-water mark is about four miles. On the west side of the lake the flood-line did not extend to a very great distance, because the land slopes on that side, but on the east side the country is flatter and the flood extends further inland. Could not form an estimate of the land that lays between the present and former high-water mark. Consider that there is possibly 20,000 acres now left dry. This quantity that I describe is only my own estimation.

p 24

Am not acquainted with the lake beyond Turanganui, and am unable to say what effect the earthquake may have had upon it. There is good grazing-ground in places.

p 25

Have seen the water quite as high since the earthquake. Have seen it very close to Mr. Hume's homestead. Am unable to state what effect the earthquake had on the land adjacent to the lake, as I was a new arrival about the time it happened. The Natives described the boundaries of the blocks to Mr. McLean, and he had also Captain Smith's sketch-map of the Lower Valley to assist him. This map was completed stealthily by Captain Smith, as the Natives would not allow him to survey, consequently it was not very reliable, but was of some assistance.

The flood-line is the same as it used to be on the east side of the lake. I do not know about the west.

p 27

Aparo Hare (sworn):
I live at at Te Waitapu, in the Lower Valley. I know part of the country in the locality of the lake. I am familiar with the part about the Lower Lake. Have lived at Te Waitapu for a number of years. Was about four years old when the big earthquake took place. The old Natives pointed out places to me that were raised by the earthquake, Hikurangi, on the Tipua Mapunatea Block, was one part that was raised. The place did not bear that name before, but was called so in consequence of having been raised by the earthquake. The land in that locality has not been sold. Te Puata (Taheke Block) was another part that was raised by the earthquake. This land was subsequently sold to the Government. A place near Tauanui was also raised by the earthquake. Hikurangi belongs to the Natives. Te Puata belongs to the Europeans.

I consider that the value of the land raised by the earthquake near Tauanui is worth about £5, and that all the land below the flood-line would average about £4.

By Commissioner:
I can point out in places the position of the flood-line in olden times. The part that I am not acquainted with is between Rahoruru and Turanganui. At the end towards Ruamahanga the flood-line reached Otamata at Okoura, and from there followed along the margin of the low-lying ground to Tauanui. The flood-line at that place is about half a mile distant. There is no alteration along the flood-line through the Kahutara Block. The flood-line is as far inland as formerly; the only difference since the earthquake is that some parts do not flood to the same depth as before. The Paharakeke River runs into the Rangatea Lagoon, and the flood-line extends up that river as far as Matainoke, about two hundred yards from the bridge. The Kumenga is the block where the reserves are situated. I wish to explain that all my informants are dead who described the position of the flood-line between Otunuku and the mouth of the lake, but I have amongst my papers their written description of the places and the names of the hapus who owned the different localities.

p 28

Hoani Paraone Tuninarangi (sworn):
I live at Hinana. I used when a younger man to live at the mouth of the lake. I do not remember when the settlers first wanted to open the lake. Never heard that the lake was opened at any time without consulting and paying the Natives before the River Board took the matter in hand and ignored the Natives. The earthquake raised a great deal of the land near the lake and improved it for grazing; it is excellent land for that purpose. This land belongs to the Natives. The reason why they claim it is because it was not sold in 1853. The low-lying land adjacent to the Turanganui Block would probably be about five thousand acres. I know the Turakirae Block. There is probably the same extent of low land in that block of equal quality. Could not state actually how much there is in both blocks. The land in question would be worth about £4 per acre. All that I know of the matter is what the old people told me about the tohu o te Awapuni (flood line).

p 30

Enoka Taitea (sworn):
Am not sure when the earthquake took place, but think it was in 1854 or 1855. The earthquake raised some of the land along the lake. Hikurangi was a place that was covered with water before the earthquake, but after it happened it was raised and became dry land, but I am unable to state the extent of land that was improved in that way. There is a considerable acreage of land raised by the earthquake on the Turakirae Block.

p 31

Piripi te Maari (recalled)
The land, when flooded by the lake, is not fertilised by it, but it is by the river flood, which deposits a silt.

p 32

Edward S. Maunsell (sworn):
It was the Lower Valley people who made the statement - namely, Piripi, Hemi, Hiko, Apiata, and others. These people stated that the land was raised by the earthquake, and was not included in the sale of the Tauranganui Block, as this land was submerged at the time of the sale. Hear Mr. Peter Hume speak about the Native claim about twenty years ago. He ridiculed the idea of their claiming it. The pencil-

line on the plan indicates about the approximate position of the flood-line at Tauanui; it reaches within about a quarter of a mile of Mr. Hume's house. The Kahutara Block is about half covered with water. When the lake is flooded some of the settlers get flooded out of their houses.

p 33

The land alluded to in my letter as having been raised by the earthquake is a strip along the margin of the lake in the Kahutara Block.

McKAY, Alexander, geologist
Source: McKay, A. 1879. Hand-written manuscript, "Wellington 30 May 1879". MU000135/10 Box 3 Archives, National Museum of New Zealand, Wellington, New Zealand.
Location: Wellington
Keywords: primary, uplift/subsidence

The deposits next in age are the results of the earthquake in 18...., whereby the southern shore of the harbour was elevated 3 to 5 feet leaving beds of marine shells in several places to mark the amount of elevation. One of these to be met with is the sandy flat between the Tea Gardens beyond Powder Point [Magazine Point, Oriental Bay] and the present shore line.

Elsewhere where only hard rock was laid bare the ?? and amount is still evidenced by the height at which we find burrows of Pholas and other boring molluscs.

Source: McKay, A. 1902. *Report on the Recent Seismic Disturbances within Cheviot County in Northern Canterbury and in the Amuri District of Nelson, New Zealand (November and December, 1901).* Government Printer, Wellington, New Zealand.
Location: Awatere Valley, Marlborough
Keywords: secondary, faulting, uplift/subsidence

p 4-5

In 1855 violent earthquakes took place in both islands of New Zealand, and were notably experienced in and around the City of Wellington. They were also felt with great violence in the north-east district of the South Island from Cape Campbell to the mouth of the Clarence River. In this case the disturbance seems to have been due to or resulting from a reopening of a line of fracture running along the eastern base of the Inland Kaikoura Mountains, which line of fracture continued across Cook Strait, passes through the City of Wellington, and is thence continued through the Wellington District north-east into that of Hawke's Bay. This earthquake elevated the eastern shore of Cook Strait and the Rimutaka Mountains 9ft. in a single night, and the reopening of a line of fracture running along the eastern base of these mountains, the supposed continuation of which line, in the South Island, lies to the east of the Great Clarence Fault.

p 9

The connection between earthquake disturbances ... and continuous and long-extended lines of fracture along valleys bounded by mountain-ranges was manifested in the case of the re-opening of the Awatere line of fracture in 1848, and of a like opening along the eastern base of the Rimutaka Mountains in 1855: but it was not until 1855 that the coincidence and identity of these superficial rendings with great lines of fault was established.

MACKAY, J.A.
Source: Mackay, J.A. 1949. *Historic Poverty Bay and the East Coast. North Island, New Zealand.* Published on behalf of the Poverty Bay-East Coast Centennial Council. Coulls-Somerville Wilkie, Dunedin, New Zealand. Gisborne, New Zealand.
Location: Poverty Bay
Keywords: secondary, mainshock

p 366

> Its [the 1848 Marlborough earthquake] successor, on 23 January, 1855, was marked in Poverty Bay by heavy jolts, accompanied by rumbling.

McKAY, W. A.
Source: McKay, W.A. 1901. Report on the geology of Cook Strait from Pencarrow Head to the Ruamahanga River, and of the eastern slopes of the Ruahine mountains between the Tamaki and Makaretu rivers. *Appendix to the Journal of the House of Representatives, New Zealand, C-10:* 28-34.
Location: Wellington, Wairarapa, Palliser Bay
Keywords: secondary, uplift/subsidence

p 29

> Where this spit abuts against the mainland to the west a raised beach can be seen. The length is about half a mile, with a width of 600 yards. The earthquake of 1845 [1855] which was the cause of the raised beaches along this coast, according to the old settlers, did not affect the spit. The height of these raised gravels is considerably lower than the adjoining bar of Onoke Lake, parts of it being barely above the tide....
>
> Continuing along westward a considerable development of blown sands is to be seen piled up against the vertical precipices of the gravel terraces at a height in places of 100ft. or more. At a point about two miles north of the Mukamuka River a small length of raised beach is seen. It continues for about half a mile, and in width it is about 200 yards. It covers the rocks of the main range, the mountain-side rising abruptly from the beach to heights of 2,000ft. or more. The material composing the beach is much coarser than the example near the spit, having a much greater quantity of small boulders. Being in the immediate vicinity of the mineral belt, and by the immense landslips in the vicinity exposing the rocks, a much greater proportion of the red jasperoid slates and green rocks are contained in these gravels. The height above the tide is about 10ft.
>
> A much greater and very fine example of the effects of the 1845 [1855] earthquake is the raised beach stretching without a break from a point three miles and a half eastward of Cape Turakirae to the mouth of the Wainuiomata River, fully four miles to the westward. In width it varies from 200ft. to 300ft. on the eastern and western extremities to three quarters of a mile at Cape Turakirae.
>
> In all three cases of raised beach the effect of the earth-movements has been to throw up a ridge (the old beach) of large boulders and gravel, between which and the hills or high ground is found a lagoon and swamp, which is scarcely above the tideway. In this raised beach at Cape Turakirae the whole surface from end to end is littered with big boulders from 2 ft. to 6ft. or 8 ft., together with the small water-worn gravels of the old beach. Besides this, there are exposures of the water-worn rocks

in situ projecting through the boulder-beach. The old beach-line keeps near to the hillsides, at a distance of about 300 yards to half a mile. Of a necessity the line of the old beach of these raised gravels forms the boundary of the dry ground that was elevated and of the sea-bottom that was raised to its present position. On both sides of the cape the boulders get smaller and smaller as this is left behind, and on the western side of the Orongorongo the character of the beach changes very much, the size of the boulders being much less....

Under the head of "Recent" must be placed the vast landslips which have occurred on both sides of the main range of the Rimutaka east of the Orongorongo. These huge slides are confined to this range, and are much greater on the western slope than on the eastern. The slips have come down from the highest points, and the uppermost part of most of the slips must be at least 2,600ft. above the sea. In all, there must be thousands of acres, for they descend to the river-bottom in most cases at a height of only 500ft above the sea. In their descent they have carried away hundreds of acres of bush in each case, burying and piling it up in utter confusion.

William McKay was Assistant Geologist at the New Zealand Geological Survey, and the son of the celebrated geologist Alexander McKay.

MALLET, Robert

Source: Mallet, R. 1858. On the facts and theory of earthquake phenomena [including a letter by W.C. Bennett, "The New Zealand earthquake – Wellington, 23rd January 1855"]. *British Association for the Advancement of Science Report 1858:* 105-106

Location: Wellington, Wairarapa

Keywords: primary, mainshock, aftershocks, building damage, ground damage, tsunami/seiche, uplift/subsidence, biological effects, faulting

p 105-6

From the interest that belongs to observations of earthquakes in the Southern Hemisphere, hitherto so seldom recorded, I append the following extracts from the letter of an intelligent friend, referring to the New Zealand shock of 1854-55, written very soon after the event. The writer is a civil engineer.

The New Zealand Earthquake Wellington, 23rd January, 1855

Whilst sitting reading and talking at 8.50 p.m., I felt the house (which had been shaking with the occasional NE gusts so usual at Wellington) give a very extraordinary shake, which seemed to continue, and was accompanied by a fearful noise. I at once jumped up, rushed, as well as the violent motion would permit me to, into the front garden, the motion increasing in violence, accompanied by a roaring as if a large number of cannon were being fired near together, and by great dust caused by the falling chimneys. The motion at first was a sharp jerk back and forwards in a NE and SW direction, increasing in extent and rapidity, until I got into the garden - say 25 seconds; it was then succeeded by a shorter and quicker motion at right angles, for nearly the same time, still increasing, but appearing to be perfectly in the plane of the horizon. This was followed by a continuation of both, a sort of vorticose motion, exactly like the motion felt in an ill adjusted railway carriage on a badly laid railway at a very high speed, where one is swayed rapidly from side to side. This was accompanied by a sensible elevatory impulse; it gradually subsided; and the above, constituting the first and greatest shock, lasted I should say, 1'20" or 1

1/2' at Wellington. The earth continued to vibrate all night like the panting of a tired horse, with occasional shocks of some violence, decreasing in frequency and violence towards morning, and nearly all in the NE SW direction, some of them a single jerk back and forwards like that of one railway carriage touching another, but generally they were followed by a vibration gradually decreasing. These lasted with increasing intervals, until I left Wellington on the 11th of April. For the first week after the first shock, the vibration never wholly ceased. All the brick buildings in Wellington were overthrown, or so injured, as to necessitate their removal; the Hutt Bridge was thrown down; the hillsides opposite Wellington were very much shaken, as evidenced by the many bare patches with which they were chequered fully to the extent of one-third of their surface, whence trees had been shaken off: this range, particularly its lower portion, appeared to have been the most shaken. It is called the Rimatuka [Rimutaka] Range, and divides Port Nicholson and the basin of the Hutt from the Wairarapa Valley, where the earthquake was felt with greater violence than at Wellington, the ground having opened in many places 8 or 9 feet, and sunk in one place for 300 yards square to a depth of 8 or 9 feet. The cracks are very frequent, and at first were of considerable depth (deemed unfathomable, because people could not see their depth), perhaps 15 or 20 feet in depth, and extending for many hundred yards. Ploughed ground and mud, dry river- or pond-beds were thrown into all sorts of undulations like a short cross sea, the ridges in some cases 2 feet in height, the prevailing direction of the cracks and ridges being generally at right angles to the apparent line of force, NE SW. The strata about Wellington and the Rimatuka [Rimutaka] are a sort of shale and clay-slate, all broken into pieces not bigger than road-metal, with yellow clay joints; and in places where the overlying clay has been cut through by roads, one can see the cracks caused by former earthquakes filled up by a different-coloured material. I should mention the great sea-wave which came in immediately after the first shock, about 5 feet higher than the highest tide inside the harbour, and 12 feet higher outside; the tide (i.e. water surface) continued ebbing and flowing every 20 minutes during the night, and was most irregular for a week, ebbing further than ever known before. After that time it became more regular; and now the ebb and flow is the same as before the earthquake; but since that, it does not come at high water within 3 or 4 feet of its former height, proving that the whole southern part of the northern island has been raised, the elevated portion commencing at Wangarner [Wanganui?], on the west coast, and going round to Castle Point on the east, where it terminates. The vertical elevation is greatest at the Rimatuka [Rimutaka] Range, outside Port Nicholson, and becomes nil at the above-mentioned points. The shock was felt at Nelson almost as badly as at Wellington, slightly at Canterbury and Ahurii [Ahuriri?]. It was most violent at the sides of hills at those places, and least so at the centre of the alluvial plains.

The great shock continued at one point longer, the further it had diverged from its apparent centre of action opposite Wellington, and became less violent, the motion being slower and not to such an extent. This I think plainly proves (if anything were wanting to prove) Mr. Mallet's wave theory: any person of the slightest perception experiencing the shock and comparing the statement of persons who had felt it in different places could come to no other conclusion. I do not think the thermometer or barometer was affected; I had no opportunity of observing myself; but so I heard; nor was the compass acted on more than was due to the motion.

The captain of the vessel I went in to Ahurii [Ahuriri] was outside Port Nicholson, lying-to in a gale, and thought his vessel had struck, and was dragging over a reef of

rocks; the next morning he passed hundreds of fish all of one sort, a species of ling, whose habit it is to lie on the bottom. The shock was also felt by the 'Josephine Willis,' 150 miles off the coast. I only regret, time and want of means prevented my making more accurate observations, and even giving you those I did make in greater detail. W. C. B.

(The direction of the primary shock mentioned by the writer is in the line of the mountain-chain, reaching from the interior down to Wellington, and also in that pointing to Tonguro [Tongariro] and other volcanic cones. - R. M.).

W.C.B. is William C. Bennett; R. M. is Robert Mallet. Bennett was staying at a place above Oriental Bay, Wellington, at the time of the earthquake (see Bennett).

MANSON, C.
Source: Manson, C. 1981. *Widow [Mrs Dougherty] of Thorndon Quay*. Pigeon Press, Wellington, New Zealand.
Location: Wellington
Keywords: secondary, mainshock, aftershocks, building damage, tsunami/seiche, response/recovery

p 58-60 [at Tarakena Bay]

As she [Mrs Dougherty] reached out for the sewing basket it shot off the table. The table itself hurtled towards the door. The door flew open, off its hinges and out into the night. The chimney came crashing down, by a miracle missing everybody. The clay walls cracked and seemed about to disintegrate....

... The howls of terror [of the three children] added to the din from the advancing surf. So did the clamour from the ducks, geese, and hens ... For two long minutes the violent heaving and rocking went on.

The house collapsing around them, Sally and Dan [Dougherty] herded the children as far from the falling debris as possible. Huge waves began to crash on the beach only a few yards from the front garden, and were coming closer as they watched. The ground rolled and shuddered everywhere underfoot ... Choking dust from the crumbling clay walls ...

Some of the Maori crew from their huts alongside the creek made their way over and joined the family as they struggled up the steep slopes [behind the pilot station].

... The tide rose exceptionally high so it was impossible to go round the beach tracks to the Sutherlands [in Lyall Bay]. Tremors kept shaking the earth, though none of the subsequent shakes was quite as bad as the first log violent jolt.

When at last daylight came, it showed the wreckage of their home; walls, roof, and chimney heaped in ruins on top of the furniture.... The wooden huts of the crew had stood the shake quite well.

As the daylight strengthened Sally saw with growing horror how perilous their situation had been through the night. A tidal wave any bigger would have meant that they would probably all have been drowned before they could get to high ground, trapped as they were between the sea and the steep, and craggy hills.

The task of scrabbling in the wreckage for food and items of clothing was made more difficult by the constant jolting and trembling of the ground....

Soon after the earthquake, a phenomenon occurred which the two families [Sutherland and Dougherty] remembered all their lives. An island rose up in the middle of Lyall Bay ... the adventurous Robina [Dougherty] had rowed herself out to explore it. Just in time, as soon it subsided and vanished without trace....

The story was told also for generations in the two families about another curious occurrence that followed the first shocks of the quakes. The giant high tides which flowed across the isthmus between Lyall Bay and Evans Bay caused thousands of fish to be stranded an the sandhills there. The rushes, Alex Sutherland described in his book, acted like a sieve and retained the fish as the freak tide receded.

Among the visitors from town to Lyall Bay ... were the Allen girls from Thorndon Quay.... Their house and their father's boat building yards were at the foot of the cliff on which Old St Paul's still stands. The house was called Lasswade and was one of a row of brown wooden houses that would stand stoutly over a century fronting the sea that used to wash up to Thorndon Quay. On the night of the quake the chimney came crashing down into the kitchen ...

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Dan [Dougherty] brought reports home of the refugee tent towns that had sprung up on the lower slopes of the farmlands of Kelburn, Karori, Brooklyn, and the rest. There were stories of ruin to new country roads and bridges, most disastrous was the shaking down of the important Hutt River bridge, not long ago repaired after the great 1848 quake.

The family of Celia Manson, descendants of the Dougherty family, was contacted but none had knowledge of family diaries from which this story may have been constructed. It is probable that Manson's years of research into historical papers from many sources, together with some family stories, possibly allowed her to write such a plausible narrative. The Dougherty family lived at the Pilot Station at Tarakena Bay, near the entrance to Wellington Harbour. The family were good friends with the Sutherland family (q.v.), whose family history has also been written.

Source: Manson, D., Manson C. 1966. Pioneer Parade. A.H. & A.W. Reed, Wellington, New Zealand.
Location: Masterton, Wairarapa, Foxton, Manawatu
Keywords: secondary, mainshock, building damage

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Charles Dixon: First official Mastertonian. New Year, 1855, brought the great earthquake, and
this decided Charles to reduce the half-built house from a two-storey to one-storey house. Before long the place was finished, opened and an accommodation house, and name Worksop Farm, after Dixon's birthplace.

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The Rev James Duncan Calvinistic Father of Foxton. It was natural that he should soon being to take a leading role in the new settlement of Foxton. Literally so, when, after the virtual ruin of Paiaka, the chief settlement on the Manawatu, in the earthquake

of 1855, like Moses he led the inhabitants to a new land, taking them down the river to Foxton, where he begged his Maori friends to let them settle.

MANTELL, Walter

Source: Mantell, W. 1873. Proceedings of Wellington Philosophical Society Aug 18, 1873. *Transactions and Proceedings of the New Zealand Institute 6:* 378-379.

Location: Wairarapa

Keywords: primary, mainshock, building damage

> Sir Charles Lyell had collected many interesting facts regarding the effects of earthquakes in this district [Wellington area]. He might mention, as an additional fact, that in 1855 a fence in the Wairarapa lying north and south had all the rails drawn from the mortise holes, while one lying east and west had remained uninjured.

MASKELL, W. M.

Source: Maskell, W. M. 1888. The late earthquake (1st September, 1888) and its bearing on the architecture of Wellington and discussion. Proceedings of the Wellington Philosophical Society 12 September 1888. *Transactions and Proceedings of the New Zealand Institute 21:* 492-497.

Location: Wellington

Keywords: secondary, building damage, uplift/subsidence, background

The Proceedings abstracts Maskell's paper, which was presented orally to the 12 September meeting of the Wellington Philosophical Society, and records the ensuing discussion. At the next meeting (3 October 1888) T. Turnbull (q.v.) replied to Maskell's paper .

> The author, after alluding to the fact that the comparative immunity from destructive earthquake enjoyed by the colony since 1855 had caused a general feeling of security, pointed out that no spot on the face of the earth is absolutely safe from earthquakes. When it was remembered that the most violent of all our New Zealand shakes happened thirty-three years ago, and that a large portion of the Te Aro district in this city could probably not have been built over if that convulsion had not raised it several feet, one was inclined to wonder sometimes at the apathetic coolness of the inhabitants, and especially of the professional and municipal authorities. He was surprised to find that in the building by-laws of the City Council there was not, with one small exception relating to chimneys (which seemed to be a dead letter), a word to indicate that any danger to life or property is to be feared from earthquakes....

[Comments by T. W. Kirk]

> It seemed to him [i.e. Kirk] that a great deal more was made of the elevation of Te Aro flat than was necessary. Old residents had told time that the flat was originally a swamp, impassable except at a few places, and separated from the harbour by a bar; and that one winter there was an unusual accumulation of water in the swamp, with the result that it swept the bar away. From that time the flat ceased to be a swamp of any great extent, and subsequently drainage arrangements were carried out. The earthquake no doubt assisted in the alteration, but he thought it was the accident of the carrying-away of the bar that had most to do with rendering Te Aro available for building purposes....

[Comments by Mr Brandon]

> Mr Kirk had thrown some doubt on the raising of the ground at Te Aro on the

occasion of the earthquake of 1855; but he [i.e. Brandon] believed he was right in saying that on the eastern coast of the province the beach was undoubtedly raised some 12ft., enabling settlers to ride round the coast where they had formerly been obliged to climb over hills, while Te Aro flat was elevated 4ft. or 5ft.. ..

MASON, Thomas

Source: Mason, T. 1855. Letter from Thomas Mason to his uncle, dated Feb 24-Mar 21 1855. MS-Papers-0054-0002. Alexander Turnbull Library, NLNZ.

Location: Hutt Valley, Marlborough, Wairarapa, Wellington

Keywords: primary, mainshock, aftershocks, building damage, ground damage, tsunami/seiche, uplift/subsidence, casualty

Feb. 24 and 21 March 1855.

On the 23 of the last month we had a most terrific earthquake. It commenced a little after 9 PM. with violent upheaving & oscillatory motion the noise was very great - The shocks continued to follow each other at short intervals for three successive days & night, and after that time they became less frequent, but from that time to the present we have never been twenty four hours without a shock. It would be impossible to describe the anxiety and alarm. At the first shock which was the most violent most of the chimnies, & brick buildings, and many wooden buildings also were thrown down. The bridge across the Hutt was broken in two: large fissures appeared mostly along the banks of the rivers and creeks: the roads were rent, and in some places large landslips came down the hill sides - A huge wave rose many feet above the highest known water marks; and quantities of fish were found lying far above it in the morning. The whole of this part of the island is now from 2 to 5 or 6 feet and at Muka Muka, about 20 miles South- 10 feet raised - rocks appearing above high water mark, which formerly were always covered with water: and now a fine sandy beach is left dry where formerly the rocks were almost impassable. The shock was distinctly felt 150 miles at sea, and from one end of New Zealand to the other: But great as had been the convulsion, and awful and appalling - it has been a most merciful one to the settlers - only one life having been lost - many have had almost miraculous escapes, and we may all with grateful hearts give thanks to Him whose providence has been over us, guarding us from injury during this fearful scene. In many instances the Providential preservation was most remarkable, indeed escape or deliverance except by Him whose tender mercies are over all his works was impossible - It has I trust left such an impression of the uncertainty of all sublunary things and the necessity of a preparation for futurity, & desire after heavenly things as can never by effaced - How little work! How utterly insignificant at such times are all the treasures of this world! Oh, that we may ever esteem them as they deserve - as less than nothing & vanity - compared with those of Heaven!

My own loss has been comparative light - one chimney was shaken to the bottom, another was cut off by the first floor and the third was uninjured except a few bricks thrown from the top: while scarcely anything was thrown down in the house. The life lost was that of Baron Alzdorf - who has acted as Joshua Blakey's agent - He was killed by the falling of the chimnies in his house -

21/3/- Further accounts of the effects of the late earthquake have reached us - It appears that 2 natives were swallowed up in a fissure, which closed upon them at Manawatu about 40 miles North and two at Turanganui about 35 miles south east - from this, by the falling of the house in which they were asleep. At Wairau the land

appears to have fallen about 2 feet. On the east coast the land is not upheaved but heavy landslips & large fissures are to be seen. Immediately succeeding the first shock three large waves came up, the last higher than the first two, and at Tekopi about 45 mile [?] [from Wellington] four houses were washed away - but the inmates had retreated in time each succeeding wave being some minutes after the one preceding it. During the continuance of the shocks and up to the present time there had been scarcely any rain. We have scarcely ever been more than 24 hours without one, we had two slight ones last night - and to day is the first wet day we have had for some time - we have had occasional showers.

Letter Unsigned. On reverse side of letter, Thomas Mason, Castlegate,York, England. Mason lived in the Hutt Valley.

MASTERS, Joseph
Source: Masters, J. ca. 1871. The autobiography of Joseph Masters. MS-Copy-Micro-171, Alexander Turnbull Library, NLNZ.
Location: Hutt Valley, Wairarapa
Keywords: primary/reminiscence, mainshock, ground damage, building damage, casualty, response/recovery

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[1855]
I commenced building my oldest son-in-law's house [in the Wairarapa] for both my daughters were now married, when I had nearly finished it, the heaviest earthquake took place, the severest I ever felt. It seemed to shake the foundation of the whole Island. The road over the mountain [Rimutaka Range] was completely blocked up with trees, clay and broken rocks, all in the greatest confusion. This retarded the progress of the settlers as for a time no supplies could be got up. This terrible catastrophe caused a great stagnation, the very foundations of the earth seemed to be shaken, it came without the slightest warning. and when it diminished into slight shocks, there is an indescribable feeling in it, which alarms us as much as the violent displays; the houses now being of wood, there was not so much damage done to buildings, but a large stack of chimneys, was thrown down which killed an old settler, Baron Alsdroff [Alsdorf], a German; this happened on the Anniversary of the Colony January 22nd [sic] 1855. After this, the Government placed men upon the line [Rimutaka road] to clear a good bridle path.

MATTHEWS, Alfred
Source: Matthews, A. 1901. The great earthquake at Wellington in 1855. *In: Wairarapa Daily Times*, November 22, 1901.
Location: Wellington, Palliser Bay, Wairarapa, Hutt Valley
Keywords: primary/reminiscence, mainshock, building damage, casualty, uplift/subsidence, tsunami/seiche, ground damage

On January 22nd 1855, the Wellington was visited by the severest shock of earthquake ever experienced in New Zealand. On the same day the Burnham Water Races were being held near Kilbirnie - probably the first races held in New Zealand. The shock occurred at nine o'clock at night, and came without any warning - there being no rumble at all. It came with such violence that people were thrown off their feet, and it was impossible to stand while the shock lasted. It was a calm day with slight showers, and the evening, previous to the shock, was perfectly calm.

A number of buildings were wrecked, and hardly a chimney was left standing in the town. The only death was that of Baron Alsdorf, who was an invalid, and was lying in bed in his house, which was situated between where the Gear Co. shop is now and Scoular and Chisolm's, on Lambton Quay, when a mirror and some debris fell, killing him. His house was considered the finest in Wellington. The ground was raised to a considerable extent, and the water in the harbour receded very considerably. The low tide the following morning quite astonished the people. There was a great difference in the high water mark before the shock and after it. In connection with it, it is rather remarkable that in some localities houses were shaken to pieces, and others in the immediate vicinity scarcely suffered at all. One noticeable instance was that of the old Waterloo Hotel, just on the Wellington side of the Kaiwarra stream. This building was shaken to pieces, while on the Kaiwarra side not a chimney was damaged. The Wellington side of the Kaiwarra stream in those days used to be known as Kaiwarra and the other side as Kaiwarrawarra.

The oldest natives living at the time had never experienced anything so severe, nor had they traditions of a like occurrence. For six weeks shocks, but not violent ones, were felt, often two and three a day.

A slight tidal wave occurred, but as the harbour was so enclosed no damage was done. During the night tremors, in some cases violent, were incessant People were inclined to leave the Colony on account of the shakes. One thing very noticeable after the shock was that the ground and gravel on the beach was very hard, as if "fused". People jumped to the conclusion that they were going to have periodical shakes every seven years and many were of the opinion (so great was the upheaval of the land) that if they had many more shakes like it the harbour would become dry land and the two islands join again.

In Palliser Bay the shock was felt in its greatest severity in the north west angle of Bay and for some distance along the Rimutaka Range. The whole features of the country were changed. Parts of the mountain range were absolutely torn to pieces, and slips torn off the mountain from summit to base. The traces are as apparent today as at the time of the visitation. There is not a scrap of vegetation to be seen where the slips came down, and for twenty years or more after, great rents, several feet wide, were visible on the Rimutaka Ranges.

Prior to the earthquake, settlers were put to very great inconvenience getting round what were known as the Muka Muka rocks. There were five of these rocks. If the sea was at all rough it was impossible to take stock or even ride round them, it being only possible to get round during a smooth sea. The whole of the stock had to be taken to Wellington from Hawke's Bay (then generally known as Ahuriri), Wairarapa and East Coast round these rocks, and they proved a source of trouble. But when the shock came the whole scene was changed in a few seconds. Immense slips, containing millions of tons of stuff came down. The rocks were completely covered, and the land was raised to such an extent, and the sea forced so completely back, that nowadays one can travel at any time without the surf delaying one's journey. Often for days and days settlers and drovers had to camp their cattle on the beach waiting till the sea allowed them to get past. So it will be seen what a source of trouble these Mukamuka rocks were. The eastern side of Palliser Bay was not affected to any great extent in the way of the features of the country being changed.

The upheaval on the north west side was so extensive that there is actually a lagoon now where the sea used to be, and several chains of sand between the high water mark and the lagoon. The upheaval caused a considerable tidal wave. At that time, the supplies of the settlers in the Wairarapa were brought in by boat from Wellington to Te Kopi. The settlers' wool was also taken to Te Kopi and stored in small whares there, and thence taken by open boat to Wellington, when opportunity offered. The boats, which were only capable of taking six bales at a time, would have to wait for a south-east breeze to sail to Wellington.

The tidal wave on the night of the earthquake swept the whares completely away, and took a lot of bales of wool to sea. Strange to say the return wave brought the wool ashore again, and none was lost. A cave at Kiriwai Backwater, where settlers used to store wool, stores, etc. was completely buried by a slip, and the Kiriwai Backwater, which was very deep, and up which boats loaded with wool, etc. used to come, was turned into a lagoon by the earthquake. On the Whatarangi side of the Bay there was no upheaval, if anything a slight sinking. After the shake, the cliffs caused a lot of trouble, and several tracks along the face had to be cut, on account of the sea encroaching.

Although great damage was done and an anxious time spent by the settlers, yet they really benefited by the shock. A lot of the Lake lands, which previously lay so low, so as to be practically useless, were shaken up and became fairly useful land. On the coast between Wharepapa and Orongorongo, after a heavy rain, for several years after the shock, immense quantities of metal were brought down by the rivers and in some cases it was dangerous to cross over the river until it had subsided on account of the gravel and huge boulders coming down. In some parts a number of quicksands were formed, and those crossing a river had to be very careful lest they got into one. People talk about brick houses standing earthquakes, but if they were to see the testimonial at Palliser Bay of what a severe shake can do, they would soon be convinced to the contrary. Of course Wellington may never again be visited by such an earthquake, which is considered by old settlers to be the severest ever experienced in the Colony. At Cheviot there have been several bad shakes, but only one really bad one was felt in Wellington in 1855, the others accompanying it not being very heavy.

A noticeable thing of late years is that the earthquakes have been in the vicinity of Christchurch. At Rotorua the shocks are purely local....

The previous earthquake of any violence was in 1848, when there were four severe shocks, but nothing in comparison to the one in 1855.

Although this article was written anonymously Bagnall (1976, see reference below) attributes it to Alfred Matthews. It was, however, possibly written by another (possibly B. Iorns (q.v.)), who based it on information given by Matthews. Another article which is very similar to the above and sources the information in it to Matthews and Henry Eglington, and which explicitly identifies the author as "B.I", appears in *The New Zealand Mail* November 20 1904. It is assumed that "B. I." refers to B. Iorns and the article can be found under this name. There is also another version of this article, written by B. Iorns, in the *Wairarapa Daily Times*, April 14 1913.

Bagnall, A G 1976. *Wairarapa - an historical excursion.* Hedley's Bookshop Ltd., Masterton, New Zealand.

Source: Matthews, A. ca. 1925. Memoirs of Alfred Matthews, runholder of Waiorongomai. MS-1622, Alexander Turnbull Library, NLNZ.
Location: Wellington, Wairarapa, Palliser Bay, Hutt Valley
Keywords: primary/reminiscence, mainshock, aftershocks, building damage, ground damage, tsunami/seiche, uplift/subsidence

Two days after we returned to Wellington from Wharepapa we experienced a series of earthquakes of a terrifying description. It was the evening after Anniversary, and I remember having seen the racehorses returning from the races at Burnham Water.

The first shock occurred when I [Alfred was 10 years old in 1855]. was visiting a neighbour with my father [Charles]. Strangely enough my father was conversing about an incident of the earthquake of 1848. Suddenly, without a rumble or a warning of any kind we were thrown from our feet and out from the front of the house and it was some time before we could recover our equilibrium. My father said, "we have never had anything like this before".

He immediately ran to see what had happened to our own house. We found my mother and sister emerging from a crack in the roof. Half of the house came down an the remainder left standing. My younger brother was sleeping peacefully among the ruins and my father at great risk succeeded in extricating him quite unhurt.

The sea was greatly disturbed by the succession of shocks and as its intrusion along the foreshore threatened our house, we scrambled up the back to Mulgrave Street, where the Cathedral now stands and found a number of people already assembled there.

Many tremors occurred from time to time during the night and the effect upon the inhabitants was interesting. They seemed to flock together as if for protection when ever a shock came. During the dark hours there were several strong shocks, but nothing to cause great alarm.

In the morning my father and I went down to our house, and we were astonished to notice that the tide receded a considerable distance so that the foreshore, owing to the raising of the land, was dry for some distance.

People were standing in groups discussing the situation and as I moved amongst them, I was entertained by the various points of view - and opinions firmly held by many people, was that Wellington Harbour would disappear and a strip of land would emerge from Cooks Strait, joining the two islands.

My father spent some days in making his wrecked house habitable and then left for "Wharepapa". He was astonished to see the changes that had taken place. The Muka Muka rocks, where I had known parties of men, large mobs of cattle and sheep, to be held up for several days waiting to get round, were no longer as impediment to travellers - the earthquake having left them high and dry. The house at "Whangapapa" [Wharepapa] had been shaken to the ground. The sea in Palliser Bay had receded at least two chains - in our place there was actually a shallow lagoon between the sea and the shore at high tide. On the western side by the Lake great changes had taken place - the backwater, as we called it - where probably the lake at one time or another had flowed out to sea, was wholly changed. The

connecting channel from the Lake, which was a considerable depth before the shake, was practically dry.

To gauge the depth ...? From the splash they made it was surmised that it was very considerable indeed. I do not think any material change took place on the Eastern side of the Lake.

My father's wool was stored in a building under the cliffs. The building was carried away by a tidal wave and later hurled back on the beach.

There are several different versions and/or interpretations of Alfred Matthews' memoirs. They are included in the database (following, and under Iorns and Iveson) as the differences sometimes concern important features of the earthquake, and because some versions have been incorrectly attributed to other members of the Matthews family. The Alfred Matthews' material provides insight into how easily historical material can be misinterpreted and how carefully it has to be checked.

The above version was transcribed by Dr R. Stout from text supplied by J. R. Matthews (the grandson of Alfred). Although the original was probably written not long before Alfred's death in 1925 (see next extract), the transcription and Alexander Turnbull Library's acquisition of it are dated 1957.

Source: Matthews, A. ca. 1925. Memoirs of Alfred Matthews. *In:* Matthews, R. W. (per HyVE) 1929. Letter, dated Aug 17 1929, to H. J. Ferrar, Acting Director, [New Zealand] Geological Survey, Wellington, New Zealand.
Location: Wellington, Wairarapa, Palliser Bay, Hutt Valley
Keywords: primary/reminiscence, mainshock, aftershocks, building damage, ground damage, tsunami/seiche, uplift/subsidence, casualty

In answer to your letter of 13th inst. with reference to 1855 earthquake and its effects I may say that I have often heard my late father speak of his experiences on that occasion, but I think I cannot do better that give you an extract from a book of his memoirs dictated a short time before his death in 1925. Therein he states:-

Shortly after our return from Wharepapa to Wellington there occurred the severest earthquake ever recorded in New Zealand. It was the evening after Anniversary Day, and I remember seeing horses returning from the races at Burnham Water.

The first shock came when my father and I were visiting a neighbour and strange to say they had been talking about incidents that had happened during the earthquake of 1848. Suddenly, without a rumble or warning we were thrown from the doorway, where we had been standing, out into the street and it was only after the shock ceased that we regained our footing. My father said, "we have never had anything like this before". Not waiting to see the effect on the house we had been ejected from, we ran to see what had happened to our house, and found my mother and sister climbing through a break in the roof. Half of the house came down and the remainder left standing, my younger brother was still asleep in the undamaged portion and my father succeeded in bringing him out unhurt.

The sea was greatly disturbed by the shock and as its intrusion along the foreshore threatened our shattered house, we climbed up the bank into Mulgrave Street, near where the Pro-Cathedral now stands.

Many tremors occurred from time to time and those assembled there huddled together as if for mutual protection. After a time we saw someone coming with a lantern who proved to be the father of a young man in our employ at Wharepapa. He kindly invited us to his house and we spent the rest of the night there, during which there were several fairly severe shocks, but nothing to caused alarm.

In the morning my father and I went down to our house, and we were astonished to find that the tide at low water had farther than we had ever seen it previously, so that the foreshore owing to the raising of the land, was dry for some distance.

People were congregated in groups discussing the situation and it was interesting to hear the different opinions expressed. One was that earthquakes would occur every seven years (as four severe ones had been felt in Wellington exactly seven years before). Another was that Wellington harbour would become too shallow for shipping, and that if the land continued rising the two islands would be joined. This opinion was firmly held by many people.

Although much damage was done by the shake there was only one death traceable to it, namely that of Baron Alzdorf, an old man who was ill at the time. A large mirror in his room fell with a crash and the shock caused his death.

After spending some days making his wrecked house habitable my father left for "Wharepapa" and was astonished to see the changes that had taken place as a result of the earthquake. The Mako Mako [Muka Muka] rocks were no longer an impediment to travellers round the coast, as the sea in receding had left them high and dry, whereas formerly they had been a formidable obstacle, very difficult to get around at certain states of the wind and tide.

Our house at Wharepapa had been shaken down and the men were living in the cowshed.

The next summer I again visited Wharepapa and the changes were very noticeable, but most of all in the vicinity of Palliser Bay. The sea had receeded at least two chains in some places and near Wharepapa there was actually a shallow lagoon between the sea and the old foreshore at high tide. On this side of the Wairarapa Lake a great change had also taken place. A backwater, as we called it, where probably the lake at one time or another had emptied itself into the sea, was quite altered, the connecting channel between it and the Lake, formerly of considerable depth, was practically dry. My father's wool was stored at Te Kopi when the shake occurred, and the building in which it was stored was carried away by a tidal wave and then hurled back on the beach. The wool was sent to Wellington just as it was, and we had no complaint of its being damaged in any way.

R. W. Matthews was the son of Alfred Matthews. The letter is signed, "per HyVE". HyVE was probably Henry Eglington. According to Bagnall (1976, see reference below), Henry Eglington's property included Muka Muka Stream, making him one of Charles and Alfred Matthews neighbours.

Bagnall, A G 1976. *Wairarapa - an historical excursion.* Hedley's Bookshop Ltd., Masterton, New Zealand.

Version 3.
Source: Matthews, J. R. 1942. Letter, dated July 30 1942, to Dr Ongley, Geological Dept [sic], Wellington, New Zealand.
Location: Wellington, Wairarapa, Palliser Bay, Hutt Valley
Keywords: primary/reminiscence, mainshock, aftershocks, building damage, ground damage, tsunami/seiche, uplift/subsidence

The Geological Survey received the followingr correspondence from the Matthews family members in 1942, this time from J. R. Matthews, Alfred's grandson. This account was also supposed to be Alfred Matthews' account of the earthquake.

> The first shock occurred when I was visiting a neighbour with my father. Strangely enough my father was conversing about an incident of the earthquake of 1848. Suddenly, without a rumble or without a warning of any kind we were thrown from our feet and out from the front of the house. My father said, "we have never had anything like this before".
>
> He immediately ran to see what had happened to our own house. We found my mother and sister emerging from a crack in the roof. Half of the house came down an the remainder left standing. My younger brother was sleeping peacefully among the ruins and my father at great risk succeeded in extricating him quite unhurt.
>
> The sea was greatly disturbed by the succession of shocks and as its intrusion along the foreshore threatened our house, we scrambled up the back to Mulgrave Street, where the proCathedral now stands and found a number of people already assembled there.
>
> Heavy tremors occurred from time to time during the night and the effect upon the inhabitants was interesting. They seemed to flock together as if for protection when ever a shock came. During the dark hours there were several strong shocks, but nothing to cause great alarm.
>
> In the morning my father and I went down to our house, and we were astonished to notice that the tide receded a considerable distance so that the foreshore, owing to the raising of the land, was dry for some distance.
>
> People were standing in groups discussing the situation and as I moved amongst them, I was entertained by the various points of view - one opinion firmly held by many people, was that Wellington Harbour would disappear and a strip of land would emerge from Cooks Strait, joining the two islands.
>
> My father spent some days in making his wrecked house habitable and then left for "Wharepapa". He was astonished to see the changes that had taken place. The Mako Mako rocks [Muka Muka], where I had known parties of men, large mobs of cattle and sheep, to be held up for several days waiting to get round, were no longer an impediment to travellers - the earthquake having left them high and dry. The house at Wharepapa had been shaken to the ground. The sea in Palliser Bay had receded at least two chains - in our place there was actually a shallow lagoon

between the sea and the shore at high tide. On the western side of the Lake great changes had taken place - the backwater, as we called it - where probably the lake at one time or another had flowed out to sea, was wholly changed. The connecting channel from the Lake, which was a considerable depth before the shake, was practically dry.

Before the shake our men used to throw stones into this channel for the purpose of trying to gauge the depth. From the splash they made it was surmised that it was very considerable indeed. I do not think any material change took place on the Eastern side of the Lake.

My father's wool was stored in a building under the cliffs. The building was carried away by a tidal wave and later hurled back on the beach.

This version was printed in the *Newsletter of the Geological Society* (August 1986). It was, however, incorrectly attributed to J. R. Matthews despite the accompanying letter clearly indicating that it was J.R.'s grandfather's memoirs, not his.

MEREDITH, Edwin.
Source: Meredith, E. 1898. *Biographical sketch: Reminiscences and Experiences of an Early Colonist*. E. W. Waddington, Masterton, New Zealand.
Location: Wairarapa, Wellington, Palliser Bay, Nelson, New Plymouth
Keywords: primary/reminiscence, mainshock, aftershocks, building damage, ground damage, uplift/subsidence, tsunami/seiche, casualty, biological effects

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Our friends, Mr Valentine Smith and Mr Burton were staying with us. My wife had gone to bed with a bad headache when about 9 p.m. on 18th January [sic], 1855, without any warning the ground under our feet appeared to be struck with tremendous violence and we were thrown forward from the back of the room to the opposite side. I rushed across to my wife's bedroom, where I found walls, roof, rafters, everything heaving and tossing up and down. The cows, of which we had about a dozen in milk, and were browsing on the terrace, came rushing down in a tumultuous mob, and the fowls, which were roosting in trees also on the terrace were shaken off their perches and came flying down, giving loud expression to their alarm. For 24 hours the earth was seldom devoid of vibration for more than a few minutes at a time, and though some of the shocks during the night were unpleasantly suggestive, there was no repetition of the extreme violence of the first shock. At Flat Point the chimney fell, but no one was hurt. At the Lake a house fell, killing several occupants, and in Wellington much damage was done to chimneys and brick houses. The main range running north and south through the 'Orui' run, was rift open by a crevice, or crack, running along the apex of the ridge for several miles, and rent open into deep fissures at a point where the range turns at an abrupt angle. The whole of the country lying between the Wairarapa Lake and Wellington Harbour was upheaved about six feet. The immediate effect of the upheaval being, to set the water of the harbour rolling or flowing from each side alternatively to the other, with the result that first the sea came over Lambton Quay, and into the shops 3 or 4 feet deep, then it would recede, leaving the vessels in port aground at their anchors. Similar effects were produced in Palliser Bay, where a quantity of wool stored in the 'Te Kope' [Te Kopi] stores, was dislodged and carried to sea, but the dreaded 'Muku-Muku' [Muka Muka] rocks literally had to take a back seat, as by the upheaval they were left many chains above

high-water, and a fine sandy beach formed about their base, affording the settlers a fine driving road for their stock, where previously so much delay and loss had prevailed.

Edwin Meredith took up a run, *Orui*, on the south of the Whareama River, Wairarapa, in about 1853-4. The dwelling was constructed of raupo thatched with toi toi and lined with toi toi canes.

MESSENGER, William Snr.
Source: Messenger, W. 1855. Journal 1853-8. MS-030, Taranaki Museum, New Plymouth, New Zealand.
Location: New Plymouth, Taranaki
Keywords: primary, mainshock, aftershocks, building damage

> January 23rd, 1855 ..., at 1/4 past Nine O'clock in the evening a smart shock of an Earthquake it lasted about 3 minutes & appeared to come from East to West accompanied with loud explosions like artillery at a distance, in the direction of Tongariro, several slight shocks during the night perhaps as many as 9 or 10, it did us no harm but threw down some Chimneys in Omata [4 ml. S-W. of New Plymouth] I understand Mr Blakes and Dr Sealys....
> January 24 ... several slight Shocks of Earthquake during the day and in the night also two of them smart ones,
> January 26th ... several slight shocks of Earthquakes.
> January 27th several shocks of earthquakes but only slight.
> January 28th several slight shocks of Earthquake during the day.
> January 29th a few shocks of earthquakes in the day and during the night.
> January 30th several shocks of earthquake but only light ones.
> February 4th slight shocks of earthquakes have been felt daily since the 23rd of last month and frequently in the night.
> February 6th a sharp shock of an earthquake.
> September 22nd at half to 5 O'clock this morning a sharp shock of earthquake that lasted for some seconds but thank god did us no harm, it was preceded by a very heavy shower of rain, the vibration appeared to be in the first instance N & S and then has a circular motion.
> September 24th about half past 10 o'clock PM a slight shock of an earthquake.
> October 21st a slight shock of an Earthquake half past 2 o'clock in the afternoon.

MILLS, Charles, CARTER, Charles R.
Source: Mills, C., Carter, C. R. 1855. Report of the Commission Appointed by His Honour the Superintendent to Inquire into the amount of Damage Sustained by the City of Wellington and Suburbs. From the Earthquake of the 23rd January 1855 and also to Report on the Material and Mode of Building Best Calculated to Resist the Effects of Earthquakes Peculiar to New Zealand. *New Zealand Government Gazette (Province of Wellington) 2(14): 116-126.*
Location: Wellington, Hutt Valley
Keywords: primary, building damage

> Provincial Secretary's Office, Wellington
> October 6th, 1855.
> His Honour the Superintendent directs the publication of the following Report of the Commission appointed to enquire into the amount of damage sustained by the City of Wellington and suburbs from the late earthquake, for general information.

By his Honour's command,
WILLIAM FITZHERBERT
Provincial Secretary

REPORT

Of the Commission, appointed by his Honour the Superintendent to inquire into the amount of damage sustained by the City of Wellington and Suburbs, from the Earthquake which occurred on the evening of the 23rd January, 1855 (and if any individual distress was occasioned thereby) also to report on the material and mode of building, best calculated to resist the effects of the Earthquake peculiar to New Zealand.

The Commissioners, after a careful inspection of the whole of the buildings in Wellington, beg to report, that they estimate the loss sustained from injuries to buildings of every description, (including merchandise and household effects, as near as they can ascertain) at the sum of £15,408. In respect of individual distress the Commissioners have much pleasure in stating, that none whatever has come under their notice, though personal loss, in some cases they regret to say, has been severe.

As regards what may be considered the most important part of their duties, viz.- the materials and mode of building best calculated to resist the effects of the earthquakes peculiar to New Zealand; the Commissioners would premise by saying, that chimneys have sustained the most damage, the greater part of them (about three-fifths of the total number) had their tops thrown down, or so dislocated as to require taking down, about one-fifth were entirely down, and about one-fifth remained uninjured.

Those chimneys which were the most massive, built inside the buildings, and carried through the ridges, stood the best, the lower portion of them being in most cases uninjured. The Commissioners are therefore of opinion that the safest plan is to build chimneys inside, and carry them up through the ridges, at the same time building-in the angle of each jamb, a piece of 4½ x 4 in. red pine, with the chimney bar and two side 4½ x 3 in. cross-pieces secured to it; the angle pieces being also firmly fixed to the joists above and below; the jambs ought to be 14 in. work, and the back 9 in.; the shafts may then be carried up to 18 in., or 24 in. above the ridges of the roofs and ought to be cased up to their junction with them, with scantling and boards; the chimney breasts ought to be built up square.

Double chimneys stand better than single ones, there larger base, weight, and solidity, assist very materially to retain a wooden building in its place. Chimneys built in the angles of rooms are also recommended.

Outside chimneys are least to be relied on if placed against a gable, their narrow base, tapering form, and non-protected state on one side, added to the oscillation on the other, makes their downfall a matter of certainty; if the shafts were built in the centre of their bases, and carried up clear of the woodwork, their chance of retaining their perpendicular would be much enhanced.

Chimneys with circular shafts are recommended from the strength the circular form confers on brickwork, they may be further strengthened by circular iron straps girthing the shaft and attached to the boxing of the chimney.

In reference to buildings in general the Commissioners have not been solely guided by the fact, that they are required to withstand the effects of an Earthquake, but have also taken into consideration that they should be built in such a manner and with such materials, as will lesson the danger from fire, and retard the progress of decay.

Had Earthquakes been their only study, buildings entirely constructed of wood would have been recommended, for sound and well constructed wooden houses receive no damage from earthquakes, but timber being very combustible, and subject to rapid decay, it becomes a matter of urgent importance to a City like Wellington, daily increasing in size, and the buildings once detached now being united in block, or in street line, to be provided with building materials of such a nature as will combine 3 properties, viz.-strength, durability, and incombustibility,- stone or brick naturally present themselves as the most likely to resist decay or fire, but the least calculated to withstand earthquakes, from their want of strength, as the following data show.

Specific cohesion and strength of materials

Iron	9.880
Yellow Deal	0.900
Portland stone	0.083
Com. Free Stone	0.022
Bricks	0.030
Mortar 16 years old	0.005

From the above we learn that Iron is about ten times stronger than Yellow Deal, (a pine of great strength) and yellow deal is ten times stronger than Portland Stone, forty-one times the strength of common Free Stone, and thirty times stronger than brick.
This, and the recent Earthquake, leads us to the conclusion that brick or stone of themselves, for the high walls of a building are unsafe, and therefore ought to be discontinued, unless combined with iron or wood, and simply forming a fire-proof covering to a building.

Buildings with their sides and roofs covered with slate, offer great protection from fire, and are not subject to decay; but from their brittleness they are only serviceable on the side of a building on which there is no traffic.

Galvanised corrugated iron is stronger than slate, affords protection from fire, is very durable and keeps all internal timbers well ventilated, which is the best preservative they can have, - it affords protection from fire, up to a certain degree of heat, that degree attained, it warps, bursts the rivets, and leaves the frame a prey to fire- as in the case of the great fire at San Francisco; but irrespective of this one disadvantage, as a covering to buildings it is far superior to boarding.

The common sheet iron, corrugated only, is not recommended, even with careful painting it corrodes, and as there are points beyond the reach of the paint brush, there it corrodes as rapidly as a red pine board would rot. An instance of this may be seen in Mr. Warburton's iron store, were the ends of the corrugated sheets resting on the ground plate, are eaten into holes by corrosion. Iron houses - such as imported from England - are in nine cases out of ten, so deficient in the strength of the timbers and bracing, as to be unfit for a windy country like New Zealand. In England they are used as sheds and railway stations only. In this country they will be found to be unsuitable. In Australia they have been found not to answer; and have become unsaleable - hence the heavy shipments of them, that have been made to New Zealand.

The shape of these iron houses are the most unpleasing to the eye that can be well imagined.

Were iron houses constructed according to designs supplied from this colony, and all external parts of them galvanised, they would be much superior to wooden buildings, though exceedingly expensive. They ought to have some pretensions to architectural design, and able to withstand the effects of earthquakes - gales of wind - and a saline atmosphere: the absence of these three requisites are very apparent in Mr. Allen's iron store opposite the Post Office.

In the course of their enquiries and inspection two things have invariably presented themselves, in those parts of the town where the most damage occurred, namely dilapidated buildings and defective foundations; buildings erected on loose gravelly, or swampy foundations; buildings with ground plates partially or entirely decayed, or destitute of braces - have suffered severely while both houses, and stores, where the timbers were sound and the foundations good, have escaped without almost any injury, even brick houses, on a good foundation have escaped material injury - for instance, Mr. Hickson's private residence on a foundation of concreted clay; Captain Henton's house; Mr. Eades' store, on rock; Mr. Holdsworth's house in Karori Road, and others.

From Mr. Bowler's Office to Kumutoto Stream, good buildings have really suffered very little, the foundations along here being rock, cropping out, or within three or four feet of the surface. In one place, the chimneys in three two-story houses are uninjured, and these buildings are plastered inside, which is also uninjured. Mr. Laing's two-storey building with plaster front, large brick oven, and chimney, hardly received any damage. From this evidence it will appear that a good foundation assists in no small degree to preserve a house from damage during an earthquake.

Before building, the foundation should be the first consideration. The building sites in Wellington are generally composed of loose gravel, fine and coarse alluvial deposits, in some cases dry; in others, swampy and concreted gravel, hard clay, or laminated rock. The three latter descriptions of ground require but little preparation; the artificial foundations to carry the building, may be piles, brick and piles, or all brick, for, in nine cases out of ten, where the foundations are all brick, and not more than one foot high, they are uninjured; even in a great many cases, where the brick walls are two feet high

and the natural foundation good, they are uninjured; for instance, the New Church in Willis Street, and the Mechanics' Institution.

In foundations all brick, the ground plate should always be kept half an inch above the brickwork, and a strip of lead, iron, or slate, inserted between the two at intervals of four feet; and the bottom weather board ought always to have its under edge one inch lower than the under side of the ground plate, in order to keep all dry.

In bad or indifferent natural foundations, if consisting of loose gravel, the trenches, after having been dug out to a depth of three feet by a width of two feet six inches, should be filled in to a depth of one foot with concrete formed of the shingle thrown out, and Roman cement, or stone lime and then built up to the required height in brickwork. If the ground is new made or swampy, a sill of the heart of Totara 24 in. x 7 in. may be laid level at the bottom of the trench, which has previously been prepared by ramming; a brick wall may then be built on it, or piles tenoned into it, the tenon being dove-tailed and wedged (after being inserted in the sill) the spaces between the piles can then be filled in with brickwork.

Piles, of themselves, fixed in the ordinary way, in ground of a loose or yielding nature, are useless for heavy buildings, intended for warehouses; they do not afford bearing surface enough, and when charged with heavy weights, are liable to sink, oscillate, and, if Totara, to split. They will do, if driven with a piling engine, or placed close together; for ordinary dwellings or light buildings, they answer very well. For some years to come, timber will be the principal material used in building, but the time will arrive when the Colony is richer, when more experience is gained, and when labour and talent are more abundant, when substantial and durable erections of stone and brick will be both numerous and subject to much more violent earthquakes than this. Rome, remarkable for the grandeur and number of stone buildings, has been subject to very violent earthquakes, and their buildings were very high; the Coliseum was 167 feet high by 627 feet in diameter, and held 87,000 spectators. In 439 A.D., a tremendous earthquake damaged this massive stone edifice, and another earthquake in 496 A.D., again damaged it, and shook down the Podium; other earthquakes occurred of a subsequent date, yet this immense building, though about 1,900 years old, has survived earthquakes, fire, and Barbarian spoliation, and at this day, one side of it retains its original height and the grandeur of its ancient proportions.

It is quite easy even at this time to demonstrate that the more massive brick or stone works are, the better they will stand, provided the material and foundations are good. It is obvious that if we can build a block of brickwork in cement, so as to make it a solid body, adhering together in all its parts like stone or wood, and give it the form of a pyramid, it will neither fall to pieces nor turn over. Free stone is only composed of silica and other particles cemented together with a calcareous earth. The pyramidal form is an important one in nature; the high conical hills which surround us partake of it, yet they never overturn - stand there they stand for ages. We see many pinnacle rocks with bases sunk in the earth, and their tapering forms rising high in the air; also poles placed in the ground by man, and the beacon at the heads, though half rotten, and 40 feet high, yet these remain as they were before the earthquake, incontestably proving

that solidity, cohesion, and the pyramidal form offer most resistance, and are the three conditions, which, when combined, are most capable of withstanding the shock of an earthquake.

During the continuance of the late earthquake, the earth was upheaved; a wave-like motion was imparted to it; all bodies on its surface partook of that motion; they oscillated from side to side; all vertical bodies became inclined - at what angle it would be difficult to state, had not a trivial occurrence been noticed, which enables us to form a tolerably accurate idea of the angle to which buildings, &c., were lifted.

In one house, a chest of drawers, standing with its front or narrow part in the direction of the shake, was upset, while in the same house another chest of drawers standing with its end or length in the line of the shake, was left standing.

The depth, that is, from back to front, of the drawers which turned over, was 1ft.7in., and the height 3ft.7in., or rather more than double the depth.

Now with these simple facts before us, aided by a reference to the laws of gravity, which inform us that when the line of the centre of gravity of any body falls without the base, that body falls; we are enabled by finding the centre of gravity of a chest of drawers, and placing it so that its line falls outside the base, to define the angle to which vertical bodies were lifted from their horizontal position during the late earthquake, and that the angle appears to be about 22 degrees, as the diagrams below explain.

This angle may be termed the angle of inclination, and from it we are able to give the proportion the height of a building ought to bear to its base. High buildings with narrow bases are unsafe.

We may lay it down as a general rule, that the height of a building should not exceed the width of the narrowest portion of its base. The bad effects of an inattention to this have been exhibited in the Council Chamber and Mr. McKay's house at the Hutt, which were high buildings standing on a narrow base; at right angles to the axis of the oscillation, while the two long buildings which were respectively joined to them at right angles, and consequently had their long bases parallel to the line of movement, remained, comparatively speaking, uninjured; a proof of the correctness of the views just advanced.

Diagrams [not included]

The figures of solids annexed, show that bodies lifted from their horizontal position to an angle of 22 degrees, if 4 feet high, are thrown 1 ft.9 in. out of perpendicular, if 8 ft. high, 3 ft.6 in., if 12 ft. high, 5 ft.3 in., and if 16 ft. high, 7 ft.

Another illustration of the correctness of this theory, was seen in a brickfield, where rows of bricks were drying in parallel rows, within two feet of each other, when those four feet high were thrown down, while those two feet high remained standing. The rows were at right angles to the line of direction of the shake. Respecting the horizontal

form of a building, a square or parallelogram is suitable; and for the elevation of public buildings, for a high one story building, the pyramidal or Gothic is recommended; and where a two story building is desirable, the same style with a clerc [?] story; but for a low one story building, the Grecian proportions will be found to answer. Where heavy fire proof stores, or a solid brick building is required, the mode in which the gaol is built is recommended; the whole of the brickwork of this building, is with the exception of a trifling crack, uninjured; the massive stone base, the stone quoins, and the window stone dressings, are not injured in the slightest degree; the stone entablature was injured and was taken down; this portion of the stone work was top heavy, some of the stones nearly on the balance, and others of them had no iron rod passing through them at all; whereas, if two iron rods had passed through the two ends of each stone, the result would have been very different.

The first brick buildings erected in Wellington, were in general entirely built of brick; the mortar generally used being of a very inferior description.

Clay being the principal ingredient used, and in the specimens examined by the Commissioners, all traces of a cementing nature had entirely disappeared, and where in constant contact, at the foundations, with wet and damp; this substitute for mortar was found to have changed to a dirty yellow substance of a soft and yielding nature, merely affording a bedding to bricks, whereas if it had been made of proper material, it would gradually have hardened till time had changed it to stone; but this process is exceedingly slow, and if a good hydraulic lime could be found in this country, (and it is said to exist in the north) it would be invaluable, - Roman and other cements are cheaper in London, than stone or shell lime is in Wellington, and nothing but the high price of English cement here, prevents it from entirely superseding the ordinary lime now in use.

The use of clay in the preparation of mortar ought to be entirely discarded, as it eats away all virtue from the lime, and is well known to possess no properties of a cementing nature. The buildings alluded to above were constructed of brick alone, wood not being used to strengthen them. In the earthquake of 1848, many of these erections suffered severe damage, since that heavy two storied stores were constructed, by erecting a wooden frame and casing it with brick, there being in general four inch of brick outside the frame and nine inch built inside the studs; these stores have again suffered and the timbers, red pine and Matai built in the brick work, are found to be decayed, but Totara forming the ground plate, always wet, is perfectly sound: as may be seen in Capt. Rhodes brick bonding Store.

From this it follows that the timbers from decay and original lightness were not strong enough to retain the brickwork, when the side of the building was seven or eight feet out of the perpendicular. An inclined mass of brickwork like the side of Messrs. Bethune and Hunter's store, weighing about 26 tons, exclusive of the heavy goods, shifting to the inclined side, was quite sufficient to partly tear itself away from the angles of the building.

Now if a one storied building were cased with 14 inch brickwork, with here and there holdfasts driven into the studs, and turned down over the brickwork; and if the timbers of the framing were all Totara the studs and braces nine inch by four inch, and the plates nine inch by six inch, there would be little to apprehend from decay or earthquakes. Mr. Stokes' printing-office, though only brick nogged in a Totara frame, exhibits not the slightest symptoms of decay or damage, and it is not weatherboarded. Where a two storied fire proof store is required, it has occurred to the Commissioners, that a building of the following description would be found to answer:-

First. - That a strong frame of red pine, Matai, or black birch should be erected with posts ten inch by ten inch, passing through the centre of the building, having short girders to carry the first floor, tenoned into them, and their ends tenoned to receive a beam, on which the collars of the rafters could be notched. The ground plate should be eleven inch by seven inch, and bands of iron two and a half inch by half inch, fixed four feet apart, and nine inches from the studs, and extending all round the building; thus, for a building seventeen feet high it would take five of these horizontal bands, at the same time vertical bars of two and a half inch by half inch iron, should be fixed having five-eight of an inch bolts, passing through them at their intersections with the horizontal bands. These bolts would also pass through every third stud, and be screwed up with nuts and washers from the inside; a casing of 9in. brickwork might then be built outside the wooden frame, at the same time inserting and nailing pieces of zinc, 5in. wide, on the edge outside each stud, which would prevent contact between the timbers and the brickwork, thereby preserving the former from decay. The outside might be cemented, and consequently the ironwork would be hidden from view.

The top plates may be strengthened by diagonal iron ties, and the first floor by timber ones, let in flush with the upper edge of the joists.

When a new wing or part of a building is to be added to an old erection, it ought to be as strongly connected with it as though it had originally been one building: the want of this precaution may be seen in more than one place. Plastering externally has generally failed, and has received general condemnation. Internal plastering has been found to stand, except where the frame-work has given from deficient bracing or shrinking; if the side or end framing of a house but move half an inch from the position in which it was fixed when plastered, the keys become injured or broken, The same result is produced in external plastering, and also by the plaster being soaked by heavy rains, which causes the laths to swell and break the key, at the same time rotting the laths and timbers. If a building is constructed of strong and seasoned timber, well braced and externally boarded with inch boards, and then battened with Totara battens, lathed with Totara laths, and plastered with good stone lime, in the autumn, winter, or spring, and then in the summer painted four coats in oil, and every summer afterwards two coats in oil - plastering will have been fairly tried, and if it does not stand after this, let it be abandoned.

Mr. Clifford in the wing he built some four years ago to a great extent complied with these conditions, and neither the weather or earthquake has injured the plastering or cornice internally or externally.

To plaster a building externally without painting it, is money thrown away.

The upper surface of all external plaster cornices, should be covered with lead, wood, (totara) or slate, in such a way as to form the upper covering member of the ordinary cornice moulding, (cyma recta) so that in case of shrinking or swelling of the wood, the cornice will not be forced away at its upper part; if slate is the covering, it may be worked in cement with the uppermost member.

The bracing of a building is one of its most important details: braces let into studs the general size, 4 x 1½ ins., are not recommended, solid braces are much superior to these, as can be easily proved, for in 6 in. framing the brace would measure about 6 x 4 in. A section of this represents an area of 24 in, but a let-in-brace of 4 x 1½ ins., gives a sectional area of 6 in. only, it is, therefore four times weaker than a solid brace is. The defect in a solid brace is, that by cutting the studs in two, the building is weakened laterally, to a certain extent this is correct; but the main use of a brace is to hold a building in its place in a direction parallel with the line of itself, if in a shake a building is inclined at an angle of 22 degrees, the braces have then to retain the building in its proper form, but for these braces the building would be dislocated in all its parts, or it would assume the form of a rhombus, as Mr. Watkin's old shop did.

To make a let-in brace as strong as a solid one, and avoid weakening a building laterally, the following is recommended: the studs should be 7 in. wide, and the braces 8 x 1½ ins. let in flush, one on each side of the framing, and opposite each other, these two braces forming a double brace, and measuring each 8 x 1½ ins., together represent a sectional area of 24 inches, being thereby the strength of a solid brace 6 x 4 ins., and leaving 4 ins. in width, in the centre of each stud. In shop fronts it is very injudicious to leave them without braces; for the sake of having a front all window, 2 spaces, at least 2 feet 6 inches wide, should be left for braces; any unsightliness may be easily hidden by a pilaster in the centre of them; the absence of these braces has been felt in the shops of Mr. Watkin and Mr. Pickett. Timber being the principal material used in building here, has induced the Commissioners to consider as part of their duties, the testing of the various sorts of Australian and New Zealand woods, in order to show their comparative strength. The specimens selected for the experiments, were first split from straight grained pieces, and then planed up to bare one inch square, and cut into lengths of 2 ft. 2 in. long, the pieces were perfectly dry, and had been seasoning for six months. The ends of the specimens rested in a notch 1 inch square; there being a clear length or space of 2 feet for testing them; an iron loop was made with the upper end of it square, and just large enough for one of these pieces of wood, and the lower end rounded, in order not to cut the cords which passed through it, for the purpose of supporting the scale which held the weight below, the iron loop was then placed in the centre of one of the specimens, and weights gradually placed in the scale till it broke.

The results will speak for themselves and may be depended on. The first specimen of black birch taking 72 lbs to break it, excited some surprise, and, as the Commissioners felt that it perhaps might be a chance piece, stronger than the ordinary timber of that kind, they procured another specimen which broke with 472½ lbs, thus, not only

establishing its reputation for strength, but its durability; for the last named piece was a portion of a piece which had been in the ground wet and dry for a period of ten years, and is now there perfectly sound and hard as a bone; of course it was the heart of black birch, and, when split, had that sour or acid smell so peculiar to English oak - in fact it always has that sour smell, and, for strength and durability appears to be the oak of New Zealand. Two specimens of English oak were tested some time ago in England one broke with a weight of 455 lbs., the other with 482 lbs. The specimens were 2 feet long and 1 inch square. As to the durability of these woods, blue gum, iron bark, black birch, and Totara, are very durable where exposed to wet and dry alternately. Red and white pine, Matai, Sydney cedar, Kauri pine, and stringy bark, are of very little use in wet or damp situations, or where excluded from the air, but, if kept dry and well ventilated, will last a great many years. One great cause of the decay of timber is its not being cut at the proper season, and when cut, not dried before used. All trees for building purposes ought to be cut down in winter, and have three months drying before being used. Painting unseasoned timber only hastens the progress of decay.

	NEW ZEALAND WOODS	**The piece was broken by**
White pine	Low land grown (Hutt)	232
White pine	Hill grown (Karori)	267
Matai	Hill grown	372
Matai	Low land (Hutt)	363
Red pine		313
Totara		231
Totara	Second specimen	238
Kauri pine	From the Pro. of Auck.	280
Black birch		472
Black birch	Second specimen	472.5
All birch	With a red grain	392
Rata		416
Manuka		411
	EUROPEAN WOOD	
Yel. Ceal	From the Baltic	288
	AUSTRALIAN WOOD	
Stringy bark		410
Blue gum		443
Iron bark		450
Cedar	Average of two specimens	190

In the act of breaking, the deflection was least in Totara and cedar, which are the most brittle of all the specimens; Matai sustained a heavy weight, then snapped suddenly; Matai, white pine, Kauri, red pine, rata and stringy bark stand next; iron bark, blue gum,

Manuka, showed the greatest deflection, and broke gradually; the strength and toughness of the fibres of iron bark and Manuka was most surprising.

The Commissioners having thus far, to the best of their judgement and ability, collected and collated all the evidence respecting the late earthquake, have now to bring their labours to a close. In doing so, they consider the present opportunity an appropriate one for concluding their report by making a few general remarks connected with the late earthquake.

Our fellow colonists in the other Provinces of these islands, appear to have been extremely anxious to attribute to Wellington an exclusive property in earthquakes but, without any desire to abdicate our rights, we do not see how we can honestly claim the monopoly in a property which appears unfortunately to be the partnership property of all New Zealand. The Taranaki Herald has adduced as a proof of its mildness there, that the Church built of stone, is still standing. We can show here in Wellington, four or five brick-built buildings which stood the earthquake of 1848, and the late one, and are still uninjured; some of them have been mentioned in the course of this report. Another remarkable fact connected with the earthquakes in this country, is, that they are eccentric in their movements; that they move in different lines, at times leaving Wellington uninjured, while other places suffer severely. This statement may surprise some of our neighbours, but such is the case, for on the 1st January, 1853, the shock of an earthquake was felt in Wellington, the shock was considered a long one, but so mild and slight as to be only felt by those sitting or standing, and of course not the slightest damage was done. It was felt in a slighter degree here, than the last one was said to be felt at Auckland.

But, from the following paragraphs, taken from the Nelson and Taranaki papers, at these places it was felt severely. "EARTHQUAKE. - A severe shock of an earthquake was felt on Saturday evening, last (Jan 1st.) about half-past eight o'clock. The vibration of the earth was considerable, and lasted for several minutes, the shock apparently coming from the N.E. During the subsequent 36 hours, several lighter shocks were felt, but none of them had the force of the first. The only damage done by this earthquake (which was the most severe we have experienced since the shocks of 1848) was the shaking down of the top of a chimney of a house belonging to S. Stephens, Esq., in the Rewaka - Nelson Examiner, Jan. 8, 1853.

In Wellington there were no subsequent shocks.

"EARTHQUAKE. - On Saturday night last, the town of New Plymouth and its vicinity, was visited with a more severe shock of an earthquake than the oldest settlers in this place can remember. The first and strongest shock took place about 22 minutes past 8 p.m., and appeared to come from seaward, and to take a south easterly direction across the island, lasting two minutes; although happily no injury to life or limb occurred, several narrow escapes are mentioned, and a number of chimneys were thrown down, and buildings and good seriously damaged. Among others, the houses of Mr. Norris, Mr Hughes, and Mr. Shaw, have suffered severely. The greatest alarm was for some time felt, and nearly the whole population fled from the houses into the streets. The

shocks have continued at intervals ever since, with more or less severity, but the principal damage was occasioned by the first shock, which was considerably the strongest one felt. We trust that before this account is before our readers, all apprehension from this startling visitation will have ceased. Taranaki Herald, Jan.5, 1853.

Now, had any person, anxious to make a book, or fond of appearing in print, been on the spot to witness the alarm, confusion and excitement consequent on such a distressing occurrence, he might have written an account as long as that which has been published with reference to the late earthquake in January last.

This Nelson and Taranaki earthquake which has been alluded to, was no ordinary affair; the brig Marmion felt it off Cape Farewell, and her passengers fancied she was bumping on the rocks.

These facts are adduced to prove that the earthquakes of this country change their line of direction, and that the whole of these islands are subject to them more or less. In 1848, Auckland and Otago, it is said, did not feel the shocks that were felt here; but, in 1855, they did feel them, and Auckland, in a very sensible degree.

There are parts of the Province of Wellington (the Ahuriri) which, during the last earthquake of January 23rd, felt it very little - in about the same degree that Canterbury did.

Since January 23rd, a shock has been felt at Otago; this was in last April, according to the Otago Witness, which was somewhat sharp, persons standing being conscious of a reeling sensation.

This evidence, the Commission feel convinced will satisfy all unprejudiced minds that the earthquakes of this country are not confined to Wellington and its neighbourhood, but that their ramifications extend through the length and breadth of these islands, every portion of them being more or less subject to them.

One fact, then, is now clearly revealed to all New Zealand, which is, that we live in a country subject to earthquakes - generally of a description hardly noticeable, but occasionally at lesser or greater intervals, of a violent nature. It is in vain to disguise this truth; our country abounds with evidence of volcanic action which everywhere present themselves from the Trap Rocks off Stewart's Island, to the Three Kings of the North Cape, and proclaim its igneous origin. We may, therefore, correctly assert that the whole of the Colonists of New Zealand are interested in this matter; for though some Provinces have, of late years, sustained no damage, yet they have been warned by the slight shocks they have already felt, that they are within the orbit of those mysterious and subterranean forces which have inflicted severe loss on their less fortunate fellow colonists in the other Provinces; and it behoves all to adapt their dwellings and other buildings to the country in which they live; for, though the earth does not sink or open and engulph the people, as it did at Lisbon or Jamaica, (on the contrary it appears to be undergoing a gradual upheaval in the neighbourhood of Wellington in a perceptible degree, it having been raised 2 feet during the recent

earthquake) yet serious damage and even loss of life must be the result if this precaution in building is neglected.

The phenomenon of this country being in course of upheaval, is not confined to New Zealand. Norway, at this time, is being gradually upheaved at the rate of 4 feet in a century, and other places at a more rapid rate. The recent sudden upheaval of part of the Province of Wellington, there is good reason to believe is a very rare occurrence. No white man that we can learn of, has ever witnessed it before. One of the oldest inhabitants of Cook's straits, Mr. John Guard, says "the last earthquake was the most violent one he ever knew in this country", and he has lived in it for a period of twenty-two years, and he never before witnessed a perceptible rise of the land after the shock of an earthquake; but this ought not to make us less careful in the erection of buildings, for we must bear in mind that nothing will prevent this country from being rapidly peopled; its unrivalled climate, its vast natural capabilities and unlimited resources, are temptations too attractive to be resisted by enterprising Englishmen. It is a remarkable fact that the two most favoured countries on earth in point of climate and soil, and almost insular in position - Greece and Italy, with their renowned and magnificent capitals of Athens and Rome, where liberty, the arts and sciences and literature were nurtured, and where they flourished and were brought to perfection, which modern civilisation is still proud to acknowledge as worthy of imitation; in fact the source of its own origin, - were and are now subject to earthquakes in comparison to which those in New Zealand sink into insignificance. Subjoined is a list of some of them, and also a number of minor ones, which have occurred in England from a very early date.

A.D.	GREECE
107	150 Cities swallowed up.
	ITALY
370	Nice destroyed.
1186	At Calabria, a city sunk in the sea.
1222	In Lombardy 200 lives lost.
1456	One in Naples, 40,000 people perished.
1688	Naples again, a third of the city destroyed.
1789	In Castello 30 houses swallowed up - 100 destroyed.
1794	Near Naples, city of Torre del Greco nearly destroyed.
1832	In Calabria and Central Italy.
	ENGLAND
1076	One.
1089	One again.
1090	One.
1142	One felt at Lincoln.
1175	One felt at Oxenhall.
1179	One.
1185	One that overthrew the church of Lincoln and others.
1199	One in Somersetshire.
1247	One, a church thrown down at Glastonbury.
1248	One.

1249	One.
1250	One at St. Albans
1551	One at Reigate, Croyden, Dorking, and Surry
1571	One in Herefordshire which overthrew Kingston Church.
1574	One in Yorkshire, Herefordshire, Worcestershire, Gloucestershire, &c.
1586	One felt in London and Westminster, when part of St. Paul's & the Temple Church fell, it was also felt at Sandwich, Dover, and Kent.
1583	In Dorsetshire, when it removed a considerable portion of ground.
1596	In Kent, where the hills became valleys filled with water.
1677)	One in Staffordshire and Dorsetshire.
1678)	
1679	One in Oxfordshire and Staffordshire.
1683	One at Oxford.
1689	Lyme in Dorsetshire nearly destroyed.
1734	One at Arundle.
1734	One in Ireland which destroyed 5 churches and 100 houses.
1745	One in Somersetshire.
1750	Two felt in London.
1786	One in Scotland and different parts of England.
1790	One in Westmoreland
1791	One in Scotland.
1792	One in Bedford, Leicester, Lincoln and Nottingham.
1793	One in Shaftsbury and Salisbury, but not much damage done.
1795	One in different parts of the North of England.
1808	One at Dunning in Scotland
1816	One in the North of Scotland
1822	One in Ireland
1852	A shock of Earthquake felt at Sep. 2 Liverpool, Holyhead, and at Manchester, about 4h.30m A.M.
1853 Apl.1	A shock of Earthquake felt at Havre, Constance, Caen, Southampton, and other places. At Caen barrels on the quay were set in motion and rolled along.

From the following paragraph taken from the Melbourne Argus, of March 5th, 1855, Australia appears to be subject to slight Earthquakes.

Earthquakes- A correspondent residing in Truro has communicated the following. "On Monday last about 8 a.m., a slight vibration of the earth supposed to be the shock of an Earthquake, was experienced in this neighbourhood. At Truro it caused a dull rumbling motion such as would be produced by a heavily laden wagon passing somewhat quickly by. At Barton, one mile distant, the sensation was considerable, buildings shook to their foundations, plates, &c., for the moment chattering on the shelves, and persons being conscious of a staggering impulse as they stood on the floor of their houses. How far beyond us this tremor extended I am unable to state, nor do I know if any other

cause besides that mentioned above, to which the shock felt here can be assigned. The air at the time was tranquil, and though hazy, the sky was cloudless, there were no indications of a tempest near or distant nor was the heat excessive".

The shock of an Earthquake, such as described above, if in New Zealand would be considered a sharp one, the movement appears to have been strong, and had it continued for one or two minutes serious damage to buildings must have taken place, nothing but its being a momentary one prevented such a catastrophe.

The Commissioners having now arrived at the conclusion of their report, trust, that though it may be found to be neither free from imperfections, nor so complete as it might to be, yet notwithstanding these defects, a portion of the information contained in it will be found useful to the community at large.

CHARLES MILLS.
CHARLES R. CARTER
Sept. 4th, 1855

MILNE, W. S.
Source: Milne, W. S. 1903. The silting of Wellington Harbour – an old settler's theory. *In: Evening Post*, July 15 1903.
Location: Wellington, Porirua, Palliser Bay
Keywords: primary/reminiscence, uplift/subsidence

An old Provincial Concillor, Mr W. S. Milne, of Taita, who shares with Mr John Plimmer the honour of being sole survivors of the third session of the first Wellington Provincial Council, makes an interesting contribution to the silting up of the harbour question. His view, as given to a member of the Post staff, is that the difference in the state of the harbour as shown in the old Admiralty chart and in the recent soundings of the Penguin is due, not to silting up, but to an earthquake in the interim. The soundings for the old survey were made, Mr Milne says, three or four years before January, 1855, the date of the greatest earthquake shock known in the Wellington district. At Te Aro, in the neighbourhood of the three wharves, the earthquake caused an upheaval to the extent of 6ft; At Korokoro, near Petone, the upheaval was 5ft; at Lowry Bay, near the outflow of the Hutt River, 7ft. The upheaval extended round the coast to Pencarrow, where it was as high as 9ft., and it continued further round to the east side of Palliser Bay. Prior to the earthquake, ground at Porirua, that has since been used as a racecourse, was always under water. Our own racecourse at the Hutt used to be boated over at high tide, the Hutt River was tidal to a dozen chains above the bridge, and at the bridge there was a rise and fall of a foot at spring tide. Is it to be supposed, asks Mr. Milne, that a convulsion that raised the coasts and converted sea lands into racecourses would not have greatly altered the bottom of the harbour? This is the probable cause of the present soundings differing so greatly from the old ones. The trouble is not silt from the Hutt, which piles up its debris about its own mouth. If there was any silting from the shallower into the deeper parts of the harbour, it was probably caused by the wave that followed the earthquake. The reason the alteration from the old charted soundings has not been brought home to us before is that there has been ample depth till modern vessels of greater draught drew attention to the position.

This article was written in response to discussion of the cause of the differences between the 1849 and 1903 hydrographic surveys of Wellington Harbour.

MOIR, Rev.
Source: Moir, Rev, 1855. Journal. Micro-MS-0492, Alexander Turnbull Library, NLNZ.
Location: Wellington
Keywords: primary, mainshock, aftershocks, casualty

> We have had during the last two days a series of alarming earthquakes. The first shock took place on Tuesday 23 January at 15minutes past nine in the evening. It was ? awful and continued for several minutes. We have had many hundreds of shocks since that time, and many very severe ones. There has been great loss of property, and one poor man was killed with the first shock ... There has been much? terror? and alarm among the people; and many are destitute of habitation. The shocks are continuing though not so severe or so numerous as they were at first.

MONRO, Sir David
Source: Monro, D. 1855. Diary 1854-1855. MS-Papers-1734, Alexander Turnbull Library, NLNZ.
Location: Marlborough, Flaxbourne, Awatere Valley, Wairau Valley
Keywords: primary, building damage, ground damage

> March 19, 1855 ... Mr. Dillon's station house which is very much shaken.... [C. A. Dillon of "Leafield" in the Waihopai Valley, Marlborough.]
> March 22 [1855] In the afternoon walked up to Flaxbourne Lake [Lake Elterwater] passing by the wool shed and the ruins of the clay cottages. Most of the houses are down level with the ground, and a wretched picture of destruction; in many places the ground is very much cracked and the sides of the hills have slipped.

The writer was apparently in England at time of earthquake. He arrived at Flaxbourne, Frederick Weld's station, on March 20 1855.

MOWAT, Alexander
Source: Mowat, A. 1855. Diary. *In:* Mowat Family papers 1855-56. MS-Papers-126, Alexander Turnbull Library, NLNZ.
Location: Marlborough, Awatere Valley
Keywords: primary, mainshock, aftershocks, building damage

> 1855 Jan 23rd ... At 9pm was visited by a most fearful shock of an earthquake which rendered our House uninhabitable and broke a great deal of glass, and earthenware. Got the children out side and lay down in front of the House, a great number of shocks through the night but none so severe as the first.
> Wednesday Jan 24th ... earthquakes nearly every half hour... At 9 p.m. another fearful shake.
> Thursday Jan 25th ... The ground in one continued shake ... at 9pm a very sharp shock of earthquake.
> Friday Jan 26th ... earth still on the move with frequent earthquakes.
> Saturday Jan 27th ... frequent earthquakes.
> Sunday Jan 28th ... Frequent shaking of the ground.
> Monday Jan 29th ... the ground in one continued shake and moving as if it had been afloat.

Tuesday Jan 30th ... numerous earthquakes.
Wednesday Jan 31st ... earthquakes frequent but not so sharp as the days previously.
Thursday Feb 1st ... felt four or five earthquakes throughout the day.
Friday Feb 2nd ... several shocks of earthquakes - at noon one very sharp shock indeed.
Saturday Feb 3rd ... two or three slight earthquakes.
Sunday Feb 4th ... felt one shock of an earthquake around 1pm and two at night.
Tuesday Feb 6th ... several earthquakes throughout the night.
Wednesday Feb 7th ... felt some slight earthquakes through the night.
Thursday Feb 8th ... several slight shocks of earthquake.
Friday Feb 9th ... felt three or four earthquakes (after 6.30pm).
Saturday Feb 10th ... at 9 had a smart shock of an earthquake and several after more slight.
Sunday Feb 11th ... early this morning felt an earthquake
February 12th ... felt a shock of an Earthquake at 4 A.M.
April 28th ... at 7 felt a smart shock of an earthquake.
May 26 - June 1
June 1... felt several Earthquakes during the week.
June 7th ... At about 4 am felt 4 Earthquakes the second one very sharp indeed.
July 25th ... felt two shocks of Earthquakes throughout the night.
August 28th ... felt a shock of an Earthquake.
September 6th ... at 1 P. M. felt a smart shock of an Earthquake.
September 22nd ... at 4 am felt a shock of an Earthquake
October 10th ... sharp Earthquake at 5 am.

According to Kennington (1978), the "*Altimarlock* [Mowat's station] cob homestead was badly damaged in the 1855 earthquake, but was patched up to serve for a few more years". In the diaries, there is no mention of repairs, but the day after the earthquake Mowat rigged a tent, probably to sleep in, although this is not stated. Feb.7 diary entry records that Mowat went to the Wairau district to find someone to build a house for him.

Kennington, A.L. 1978. *The Awatere. A district and its people.* Published by the Marlborough County Council. Express Printing Works, Blenheim, New Zealand.

NEWSPAPERS

AUSTRALIAN AND NEW ZEALAND GAZETTE (Published in London)
Source: Australian and New Zealand Gazette, May 26 1855
Location: Wellington, Canterbury, Nelson, New Plymouth
Keywords: secondary, mainshock, aftershocks, building damage, ground damage, uplift/subsidence, casualty, response/recovery

p 421

The principal intelligence from New Zealand is the accounts of an earthquake, which appears to have been felt for a considerable distance throughout the settlements on both sides of Cook Strait, even as far as Canterbury, where, however, it was but slightly felt.

As in 1848, its chief focus appears to be Wellington and its vicinity, landslips having taken place on the hills, and one or two currents of mud being thrown up from vents made in the earth during the shocks, which were prolonged. From all accounts the

town has literally been thrown down, including the newly erected - but fortunately not occupied - Government buildings. The Union Bank of Australia has shared the same fate. One life only appears to have been lost, and it is providential that the earthquake occurred in the summer season, when there were few fires in the dwelling-houses, on the conflagration of the whole town must have been added to the calamity.

Not withstanding the damage done, we are not inclined to attribute any great importance to the occurrence, except at Wellington. In the north and south of the islands the earthquake does not appear to have been felt, whilst at Canterbury, Nelson, and New Plymouth it is not reported to have inflicted any material injury. The liability of Wellington to calamities of this nature is however, beyond question, though even there we are rather inclined to attribute the destruction of buildings to their flimsy character than to the strength of the shocks, by which people have personally been more frightened than hurt. When ourselves resident at Wellington, we have felt repeated shocks of earthquakes, but few worthy of the name. On questioning the natives as to any damage done by them in former times, we were always told that there was no remembrance or tradition of injury near Wellington. Still the damage inflicted at Wellington is beyond dispute, as is the periodical recurrence of earthquakes in a sufficient degree to render their visits extremely undesirable, though not to cause much danger to life.

There is little question but that this portion of New Zealand is undergoing a gradual uplifting from volcanic agency. The present earthquake gives evidence of having raised the land several feet, even raising rocks in the harbour, which were formerly submerged at low water, one or two feet above the surface. It was remarked on the first founding of the settlement, that the southern portion of what is now the town of Wellington was largely composed of beach shingle, which, from its appearance, could not have been long elevated. The part called Te Aro showed evidence of this, and it is here that the severest shock was felt, ending in the destruction of the Union Bank. One of the chasms, vomiting forth mud, was also made here.

Henceforth, the inhabitants of Wellington will have to substitute in their buildings solidity for showiness. Since the last earthquake, we understand that all kinds of flimsy prettinesses have sprung up in the architecture of the place, as though the earthquake had left assurance that it would not return. A few minutes have laid these prostrate, and the return of the earthquake gives a pretty good assurance of another visit in a few years, when the inhabitants must be prepared to meet it in the shape of buildings which will set it at defiance; and we are convinced that it requires no great degree of strength to do this effectually. The New Zealand earthquakes are child's play to those which occur on the opposite coast of South America, but they are comparatively disregarded, from the great strength of the public and private buildings of the inhabitants. These erections are, for the most part, built of stone, and arched so that they can neither be thrown down or burned. The latter catastrophe is the one most to be feared in the recurrence of earthquakes in New Zealand, as if they occur in winter, when fires are burning in every dwelling, the consequences must be disastrous. Nothing can avert this but the erection of low, substantial dwellings, which will stand the shocks, and these even in the present instance, do not appear to have been of such severity that they cannot be withstood.

Extracts from Wellington newspapers are given on p432 of the Australian and New Zealand Gazette. They appear elsewhere in this database and so are not repeated here.

LYTTELTON TIMES (Published in Lyttelton)
Source: Lyttelton Times January 24 1855
Location: Lyttelton, Christchurch, Canterbury
Keywords: primary, mainshock, aftershocks

> 1855 January 23, 24
> Two shocks of earthquake were distinctly felt in Lyttelton last night at about the hours of 9 and 12 o'clock, and another this morning at about 7 o'clock. Several people mention having felt other minor shocks during the night. None of them were violent, but the first was of longer duration than any we have yet experienced here. Several pendulum clocks were stopped by the motion. Many old settlers say that they do not remember an earthquake before of such long duration in New Zealand.... We have just heard the first shock at Christchurch was felt very severely.

MAORI MESSENGER (Published in Auckland)
Source: Maori Messenger (Te Karere Maori) 11, No. 3.
Location: Wellington, Auckland, Waikato, Bay of Plenty, Rotorua
Keywords: primary, secondary, ground damage, tsunami/seiche, uplift/subsidence

p1

> Auckland March 1, 1855
> The news from Wellington is of a most distressing nature, and certainly, calculated to enlist our deepest sympathies on behalf of our Southern brethren. The slight tremulous motion felt here on the night of the 23rd of January, and noticed in our last issue, seems to have been the mere vibration of an earthquake most severely felt at Port Nicholson, and its neighbourhood. Through private sources we learn that the land had, in some localities, fallen four feet, and that hills had been removed from their original positions. This painful visitation cannot but be detrimental to our national prosperity, but we discover in it the signal mercy of the Almighty, in permitting the principal shock to occur, at an hour when the inhabitants were in circumstances to make their escape from the stone and brick buildings.

p15-16

> EARTHQUAKE AT MAUNGATAUTARI
> (Communicated by a Native)
> On the 23rd of January, in the middle of the night, came the shaking of the earth. When the shaking of the earth had ceased, a great noise was heard from the earth like the report of great guns. The natives supposed that some of the people were fighting; but the minds of the Ngatihaua were not certain on this point, as the noise was similar to that of thunder.
>
> The Ngatihaua were afraid, and assembled at Horotiu; the people of Maungakawa also assembled, and those of Maungatautari and Matamata; the natives of Patetere, of the Ngatiraukawa tribe also met together during that night. The reason why they all did this, arose from their dread of the Almighty.
>
> On the following morning a man came to our settlement, and informed us that a portion of the mountain of Maungatautari had been cleft asunder, and carried to the

stream of Mangahoe, blocking up the source of that river. The Ngatihaua now began to reflect, that the sin of the people of Maungatautari must be very great, in being visited by the Divine Being with such a sign. They are still in fear.

p19

Friend, the Editor of the Maori Messenger
Do you hearken. Information has been received by me, to the effect, that during two days and one night, the warning of the Almighty has stood over Rotorua, Rotoiti, Rotoehu, Okataina, Tarawera, Motutawa, and Taupo. It is also said that Tongariro has been thrown down, and a lake now covers the site of that mountain.

The people of Mokoia fled to the summit of the hill, and the people of Ohinemutu went in land to the heights of Pukeroa; while the children were crying "O father take care of me, O mother take care of me." Those who were foolish, fled in indecent haste, while the Maori priests prayed to their gods, but the elders of the true faith prayed to the living God.

The tribes at Maketu heard the noise, and supposed that the people were fighting, for it seemed like the storming of a fortress. The waves of the sea were dashing one against the other, and lifting themselves high in the air.

The people of Rotorua, were in great consternation, never having before witnessed anything like this, so great. The shrimps died, the inanga died, the toitoi died, and all the shellfish was thrown on the land by this earthquake.
By me WAHAKORE

p36

THE EARTHQUAKE AT AUCKLAND
The vibration did reach Auckland; in fact, we felt it ourselves; but so slightly, that it was a disputed point, whether a shock had taken place or not. It lasted only a few seconds and many were altogether unconscious of what had taken place. It did not extend so far north as the Bay of Islands at all. - *Southern Cross*, March 13.'

NELSON EXAMINER AND NEW ZEALAND CHRONICLE also referred to as the EXAMINER. (Published in Nelson).
Source: Nelson Examiner and New Zealand Chronicle, January 24, 27, and 31, February 3 and 21, March 7 and 10, 1855
Location: Nelson, Wellington, Wairau Valley, Taranaki, Auckland, Palliser Bay, Wanganui, Marlborough, Wairarapa, Awatere Valley
Keywords: primary, secondary, mainshock, aftershocks, building damage, ground damage, tsunami/seiche, uplift/subsidence, casualty, response/recovery

January 24 1855

Last evening, about nine o'clock, one of the most severe shocks of earthquake ever experienced in Nelson took place. Several chimneys were damaged or thrown down, and some property, we hear, has been destroyed in stores, and in private houses. We have not heard of any accident of a more serious nature.

January 27 1855

Since Tuesday evening last, when the whole of the Blind Bay district was startled with the shock of an earthquake fully as severe as that experienced by us in October, 1848, the earth has continued in a more or less tremulous state, but no further shocks of any great severity have occurred. The first shock took place about a quarter past nine in the evening, and appeared to come from a N.E. direction, and is believed to have lasted from three to four minutes, but not with the same uninterrupted violence, for it rose and fell several times, and instead of being one shock was probably a succession of shocks, but so closely following one another as not to be distinguishable. Although from this shock a few brick buildings have sustained great damage, they are those which were injured in the earthquakes of 1848, and ought to have been repaired after that event; instead of which, by being allowed to remain as then left, they are now so far damaged as to require in part taking down. This applies to the premises in Trafalgar Street, occupied by Mr. Nicholson as a warehouse; the premises in the same street lately occupied by Mr. Foy; Mr. A. Aitken's residence in Bridge Street; a small building adjoining Mr. Hargreave's butcher, and the Wesleyan Chapel. The three first names are two-storey buildings. Beyond the demolition of several chimnies, we are not aware that any other buildings have suffered, except a pisè house, the residence of the Rev. H. F. Butt; all the remaining brick and cob houses in the town and neighbourhood being uninjured, while the wooden and lath- and plaster buildings are not of a character to be affected by such an occurrence. In three or four stores property to the amount of from £20 to £50 was destroyed by breakages, but in private houses little if any loss of this kind was sustained. It is satisfactory to be able to state, that no personal accident occurred of a serious character, and the only instance in which an injury was sustained was by a little boy, son of A. McDonald, Esq., Manager of the Union Bank of Australia, who, while lying in his cot was slightly struck by some falling brickwork.

EARTHQUAKE AT WELLINGTON. We have received the painful intelligence that the city of Wellington and its neighbourhood has again been visited with a most severe earthquake; and we find that the shocks which have been experienced in Nelson during the present week, like the shocks of October, 1848, have been but the half spent wave which first rose somewhere on the shores of the southern extremity of Cook's Straits, but the exact locality of which we have yet to learn. To the arrival last night of H.M. Sloop Pandora, we owe the receipt of this intelligence; and Captain Drury, with a kindness we can scarcely sufficiently acknowledge, has placed at our disposal a copy of his journal, which narrates the whole calamity as it passed under his eye. To this document, which we publish in its entire form, we may safely refer for the history of the most dire calamity which has ever befallen New Zealand since it has been a British colony: but while on the one hand we may turn to it to learn the full extent of the disaster, as far as known when the Pandora left Wellington early on Thursday morning, it will also be most valuable for the purpose of showing the real extent of the mischief done, and thus prevent our readers from being misled by stories already in circulation, which magnify the calamity, great as it has been:-

[The extract from Commander Drury's remark book was printed here. It was later published in the *New Zealand Spectator and Cook's Strait Guardian, February 3 1855*(q.v.).]

January 31 1855

... intelligence has been received from the Wairau, and we find that the shock of the 23rd was felt very severely at the lower end of the valley, where several buildings were more or less damaged, but ascending the valley, the shocks became less severe as the distance from the sea increased. From the mouth of the Wairau River we received no accounts, but we hope to find that no very serious damage has been sustained there, although we hear that cracks in the ground had taken place in the neighbourhood of the wood, and that sand or mud had been thrown up there in places.

We learn from Taranaki and Auckland that the shock of earthquake last night week was felt at both those places; at Taranaki severely, but not sufficiently to do material damage, while at Auckland the shock was so slight as not to be generally perceived.

[and a letter to the editor, signed "Observer"]....
The earthquakes in these colonies, if properly provided against, are not really dangerous, nor is there any tradition that they ever have been. The damage done by this one was occasioned by the absence of proper forethought and judgement; for if people, knowing they are in a country subject to earthquakes, will build houses of brick and other material not properly secured and braced, and in situations liable to land slips, they run the risk of the accident that has befallen them. It is shown that well built one-storey wooden houses have not seriously suffered even at Wellington, the focus of the shock; whilst here, no wooden buildings have been affected.

It is the duty of every member of the community (I allude more particularly to wives and daughters), to exercise moral courage and quietness, which not only enables them to do that which is most to their security, but also inspires their families and neighbours with a spirit and calmness most desirable at such a time. They should avoid writing to friends on the impulse and excitement of the hour, for most assuredly any exaggeration will fall heavily on the colony, and materially affect every individual interest and prosperity therein....

[And a second letter, signed Samual Ironside]
Permit me to point out and correct an error which appeared in your Saturday's [Jan 27] issue. It is contained in the summary of accidents by the earthquake of last week. The paragraph is as follows: - "Although from this shock a few brick buildings have sustained great damage, they are those which were injured in the earthquakes of 1848, and ought to have been repaired after that event; instead of which, by being allowed to remain as then left, they are now so far damaged as to require in part taking down. This applies to (among several places enumerated) the Wesleyan chapel."

You are quite in error, sir, as to the latter building. It was thoroughly and substantially repainted nearly four years ago by Mr. John Ladd, whose ability and experience are well enough known in Nelson.

There is a singular correction of your statement too in the fact, that while the chapel is but slightly injured, as we conceive, in the front gable, the school-room, a recent building, not so lofty as the chapel, and as substantially built as any brick building of

its size, has received far greater injury than the loftier and older building which it adjoins.

I should not have noticed the mistake in your columns, but for the implied censure which it contains....

February 3 1855

[Letter to the editor from W. F. M., Lower Wakefield.]
The recent earthquakes having pointed out the necessity of paying more careful attention to the construction of buildings better adapted to these visitations, I would, with the desire of giving sound information, and practical experience, being one of the greatest travellers who has settled in Nelson, having visiting the four quarters of the globe, and residing upwards of fifteen years within the range of the lofty Andes of South America, where earthquakes are almost a weekly occurrence - beg to advise all who may intend building, that they should on no account erect their houses above one storey high, whether of wood, lath and plaster, or pisè; and invariably all buildings of any other material, such as bricks, stone, &c., sooner or later, fall to the ground, and generally in a mass. I have seen churches of enormous thickness and strength, which had been built by modern architects, the first to fall, and one in particular - thought, from its great solidity, to be the safest - fell, and buried two hundred souls within its massive walls; and why - it was too solid, and above the general rule for height, as no building should exceed 10 to 12 feet, those which are carried up much higher being always the first to come down, as it seems a top weight must be carefully guarded against, also any wells, or cellars under the houses, which are equally very dangerous, for the house in a sharp earthquake will rock at times one way, and the foundation another.

It is a fact, a well deepens itself a few inches after a severe shock, and a stone foundation, where it is exposed, like in a cellar, to view, actually is pushed out, or forced from, the side next to the solid earth.

... But to the purpose. Let all build, for the future, their dwellings of either pisè or wood, with lath and plaster; make their scantling always 1-2 inches wider than what is used here, excepting in the well and properly built new printing office of the Messrs. Elliott, in Trafalgar Street, and the new house in course of erection on town acre No. 503, behind the Scotch Kirk, to which the writer (and owner) calls inspection, as it is for his own residence (D.V), with all the chimneys to be carefully enclosed within the walls (never on the outside, as they are pushed over by the counter rocking of the building); and then you are providing against the generally worst consequences of earthquakes, namely, that of being injured by one's own want of foresight, and false economy of a few pounds, in the expense of wider timbers, with shingled or tinned roofs, coated over with a layer or two of rosin and bees' wax, first well boiled together, and sanded during the process, once in five years....

February 21 1855

Since the arrival of H. M. S. Pandora, which brought us the information of the sad effects of the earthquake at Wellington on the 23rd ultimo, we received no additional intelligence respecting the occurrence until Saturday last, when the Onkaparinga arrived, with papers to the 31st ultimo. On turning to the Independent of the 24th, we

found in the following paragraph the only notice taken of the calamity: - "On Tuesday evening a little before ten o'clock, the community were alarmed by a smart shock of earthquake, which lasted several seconds, and was succeeded at intervals by tremors of less violence. The first shock knocked down many chimneys, by the falling of one of which, we regret to say, one old colonist, Baron Von Alzdorf, who was infirm and unable to get out of the way, was killed. At the hour of our going to press, there is every appearance of all commotion having ceased, and we trust that the partial damage above referred to, will prove to be all that we shall suffer."

The Spectator, however, does not attempt to gloss over the lamentable event in any such indecent manner; but while treating it as briefly as it well could do, gives some interesting particulars of the occurrence. As respects the effect of the shock on the town of Wellington itself, the account furnished us by Captain Drury, of the Pandora, is by far the fullest we have seen; but we learn from the Spectator, that in the Wairarapa the shock was very severely felt, and that four Maories were killed there by the fall of a house. At Te Kopi, a small boat harbour at the Wairarapa, a heavy wave swept the beach, washing away the sheds, buildings, and the bales of wool that were lying there awaiting to be conveyed to Wellington. The road by Mukamuka Rocks, which was the worst part of the coast road to Wairarapa, has been greatly improved, by what we imagine to have been an upheaving of the land, for between these rocks and the sea there is now a considerable space at high water, which was not formerly the case. Particulars of the manner in which the shock was felt at Wanganui, the Spectator gives from a private letter: - "Last night we had as heavy a shock of an earthquake as ever I have felt, and of longer duration in respect to its steady violence. I should think it lasted about two minutes, and it was scarcely possible to stand without holding by something while it lasted. The mischief it did was considerable. It threw down nearly all the chimneys.

The bed of the river at low water this morning looked like an ill-ploughed field, although a high tide had intervened, which must have helped to fill up the fissures made, and it had sunk in many places and rose in others, presenting a very ugly appearance. Taylor and Watt's wharf is a wreck nearly, warped and bent up and down all along, and the extreme end sunk obliquely." [The same extract appears in *Spectator* January 31.]

Within the last few days we have also received letters from the Wairau and Awatere, giving particulars of the extent of damage which the earthquake caused in those districts. In the Awatere, the shock was very severe, and nearly all the cob buildings, within twenty miles of the sea, were more or less damaged, but beyond this the force of the shocks sensibly diminished. At the mouth of the Wairau river a gigantic wave swept the beach, similar to what is described to have occurred on the opposite side of the Straits, at Wairarapa, but fortunately without inflicting a similar damage; and the ebb and flow of the tide, at short intervals, occurred in the manner in which Captain Drury described it to have taken place in Wellington harbour.

From the information we now possess, it appears that the shock was felt with equal violence on the coast on both sides of the southern end of Cook's Straits, but the force of the shocks was less severe on elevated land than on the low levels, and travelling inland their violence rapidly diminished. We learn from Captain Drury, that on his passage from Wellington to Nelson, on the 25th, violent shocks were felt at sea in the

Straits, and this leads us to the conclusion that it was from beneath the Straits that the shocks radiated.

March 7 1855

[Letter to the editor signed "A carpenter", Nelson.]

In your publication of February 3rd, appeared a letter from W.F.M., headed "the late Earthquakes," pointing out the necessity of careful attention in the construction of buildings adapted to resist the action of such visitations. He being the greatest traveller settled in Nelson, and having much practical experience, considers himself competent to impart sound information to the public on that subject. After passing an indirect censure on the Builders of Nelson, by stating there is not any building properly constructed excepting the new Printing Office, and a new house in course of erection behind the Scotch Kirk, which he, the writer, is building for his own residence, he invites the public to inspect this production of his best ideas and practical experience. Sir, should you be induced to visit this superior building, you will have occular demonstration of the ignorance of this explorer of the globe, in the rudiments of carpentry; he has yet to learn that not only strong timbers, but the art of framing them together is required to produce strong buildings. I would ask in what quarter of the world he studied carpentry; and where he obtained his methods of abutments in bracing and drawing up his shoulder; also his plan of securing his strong corners with iron pins. Let him study where he would, he has adopted the true colonial style. Looking at the building, you might fancy it made for the same purpose as the Jew's razors (to sell). He must not puff the bairn too hard; its limbs look strong, but may prove rickety, and the support insufficient for its Herculean frame. Does he depend on his superior coating for strength? I can discover nothing like strength in the building, excepting the size of the timbers. I should advise him to put on its coat as soon as possible, to hide it from the gaze of the public he has invited to inspect it.

The Messrs. Elliott must feel happy, they being so fortunate as to possess the only building approved of, by this great traveller.

Sir, would you prevail on W. F. M. to publish the general knowledge he has obtained in his travels, which must be very instructive, and confer a precious boon on the settlement, if we may judge from his gatherings in carpentry; but let him do it in a manly way, and not assail the character of others.

March 10 1855

[Letter to the editor signed "A master of my trade"]

In your columns of the 7th ultimo I observed an unmanly letter signed "A Carpenter," exclaiming against certain buildings - one, the office of the Examiner, the other, a building in course of erection behind the Scotch Kirk. Hearing these complaints, I made it my business (although quite disinterested) to examine each of them; and, having gone over the whole constructions, paying particular attention to the parts spoken against in his letter, I, beg to state my opinion of them. I certainly consider that no man knowing his trade, could write such a letter, unless he was suffering under the strongest feelings of jealousy (which I have no doubt is the case in this instance); for I consider each of these buildings, so far as they are executed, to be exceedingly strong and well-built, in every point of view. I therefore cannot, with anything like a manly feeling, let such a letter as I refer to, and which is calculated to be so injurious to a foreigner, pass unnoticed. I therefore offer this as my only excuse

for troubling you, as I consider the man against whom the remarks are directed to be a man who understands his business, and a most useful mechanic.

NEW ZEALAND SPECTATOR AND COOK'S STRAIT GUARDIAN also referred to as the SPECTATOR. (Published in Wellington)
Source: New Zealand Spectator and Cook's Strait Guardian (also referred to as the *Spectator*) January 25 1855
Location: Wellington, Hutt Valley
Keywords: primary, mainshock, aftershocks, building damage, casualty, tsunami/seiche

Many issues of the *Spectator* had articles about the earthquakes. Each day's extracts are given their own source, location and effects keywords, so that the reader does not have to search some 30 pages to find one reference.

On Tuesday night the town of Wellington suffered from the calamitous visitation of an earthquake, as severe and as destructive in its effects as those which previously occurred in the year 1848. During the day there had been a strong wind from the North West, with heavy showers about one o'clock. Towards evening the wind fell, and it again commenced raining; the rain ceased about seven o'clock and the weather was still calm. The first shock, which was very severe, and of about two minutes duration occurred about ten minutes past nine o'clock, p.m.; and was followed at intervals of a few minutes with sharp shocks, the earth during the greater part of the night having a tremulous motion. The shock appeared to come from the North West. The injury which has been occasioned to the buildings in the town was caused by the first shock, - the others not being of a destructive character, - but this has been very considerable, chiefly among buildings of a substantial class, constructed of brick; of these, the Bank has suffered most, the Gaol has also received considerable damage; the wooden buildings have mostly escaped without injury. In the country districts in the neighbourhood of Wellington the earthquake was very severely felt; in the Hutt district, from the rising of the water and the action of the earthquake together, the bridge over the Hutt River has been thrown down so as to interrupt the communication between the two banks of the river.

This visitation has been as sudden and as unexpected as it has been disastrous. It is, however, consoling to reflect that under the mercy of Divine Providence, with one exception, it has been unattended with the loss of human life, as might have been the case if it had occurred during the busy part of the day, or at a later hour when the inhabitants had retired to rest. The exception to which we refer is that of Baron Alzdorf, who had some months previously suffered from an apoplectic stroke, from the effects of which he was slowly recovering. He was struck in the body by portions of the brickwork of the fire-place of the room in which he was sitting, and died immediately. He was one of the earliest colonists, and was very generally and deservedly held in high regard by his fellow-settlers for his many estimable qualities.

During last night (Wednesday) several severe shocks were felt, but none we believe to occasion any injury.

We must beg our numerous readers to excuse the non-publication of the *Spectator* yesterday, it having been found impossible under the circumstances to publish it at the usual time....

At this particular juncture it appears very desirable to give a word of caution respecting fires. The greater part of the fireplaces in the town having been more or less damaged by the Earthquake, unless very great care is taken it is possible in the shifts which must necessarily be made in many cases in lighting fires for domestic purposes, that accidents from fire may happen, which may lead to the disastrous consequences. We would therefore generally suggest the necessity of greatest care being exercised in the town in this respect, and that fires should not be kept alight any longer than absolutely necessary.

Source: New Zealand Spectator and Cook's Strait Guardian (also referred to as the *Spectator*) January 27 1855
Location: Wellington, Wairarapa, Hutt Valley, Kapiti Coast
Keywords: primary, mainshock, aftershocks, building damage, ground damage, casualty, response/recovery

Many issues of the *Spectator* had articles about the earthquakes. Each day's extracts are given their own source, location and effects keywords, so that the reader does not have to search some 30 pages to find one reference.

Since our last publication accounts have been received from Wairarapa and other districts where it would appear the Earthquake has been felt as strongly as at Wellington. One house at Wairarapa was thrown down, and four Maories who were within, were unfortunately killed by the ruins. The road from Wellington to the Hutt, and up the valley, has been a good deal injured, as has also the coast road near Wainui, by a heavy land slip. Several smart shocks have since occurred at intervals during Thursday and yesterday, but not so severe as to occasion further damage. .In reference to our former account we may take this opportunity of correcting one or two inaccuracies. The first shock, which proved so destructive, we are assured by a careful observer at 17½ minutes past 9 o'clock, p.m., and its duration was 50 seconds. It was followed so closely by another that two shocks, by common observers, have been confounded together. The shock is also stated by the same authority to have proceeded from E.S.E. towards E.N.E., describing an arc of about 40 degrees.

We cannot help noticing in terms of strong reprobation, the short paragraph in Wednesday's *Independent* referring to this visitation, the falsehood and flippancy of which has excited very general disgust. Possibly the writer of it thought by this manner of treating the subject, to do away with any unfavourable impression out of the colony which such news was likely to produce; if so, like most cunning but shallow persons, he has overshot his mark, and will, we think, create a very opposite feeling, an utter want of confidence in anything the *Independent* may say, and a disposition to believe any exaggerated accounts from private sources which fear or despondency may dictate. In this, as in every case, honesty is the best policy; - for ourselves, we may add we have stated the plain truth, without concealment and without exaggeration. Considerable loss has been sustained by the community, and it has been borne with manly fortitude and in a cheerful spirit of submission to the Will of God, "whose Providence ordereth all things both in Heaven and Earth.". Already, in many parts of the town preparations are being made to repair the damage that has been done, and the effect of the Earthquake will be to call forth to increased activity in the energies of the settlers and a steady determination on their part to overcome their present difficulties.

Source: New Zealand Spectator and Cook's Strait Guardian (also referred to as the *Spectator*) January 31 1855
Location: Wanganui, Wairarapa, Wellington, Palliser Bay, Manawatu
Keywords: primary, mainshock, aftershocks, ground damage, building damage, tsunami/seiche, uplift/subsidence

Many issues of the *Spectator* had articles about the earthquakes. Each day's extracts are given their own source, location and effects keywords, so that the reader does not have to search some 30 pages to find one reference.

> The accounts received from Wanganui by the Overland mail on Saturday describe the earthquake to have been as severe as at Wellington. The following is an extract from a private letter: -
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> "The Rosebud left last Sunday forenoon with a N.E. wind and got well away. Last night (Tuesday) about 9 o'clock we had as heavy a shock of an earthquake as ever I have felt, and of longer duration in respect to its steady violence. It was very dark, and raining at the time. I should think it lasted about two minutes, and it was scarcely possible to stand without holding by something while it lasted. The mischief it did was considerable. It threw down nearly all the chimnies. The bed of the river at low water this morning looked like an ill ploughed field, although a high tide had intervened, which must have helped to fill up the fissures made, and it had sunk in many places and rose in others, presenting a very ugly appearance. Taylor & Watt's wharf is a wreck nearly, warped and bent up and down all along, and the extreme end sunk obliquely. There has been no long interval occurred since the shock without further ones occurring of more or less violence, for now near 24 hours. I am afraid you will have had them as badly as us, and if so I hear we shall bear of serious damage at Wellington. The postman brings word it was very bad as far as Manawatu. We had no personal accidents".
>
> TE KOPI
> We understand that Te Kopi, a small boat harbour at the Wairarapa, a very heavy wave swept the beach, washing away the sheds, buildings, the bales of wool that were lying there to be taken to Wellington, and all that was on the beach. The Muka Muka rocks, which were the worst part of the coast road to Wairarapa, have now become the best by the alteration caused by the earthquake, the beach now extending a considerable distance beyond them above the level of high-water.

Source: New Zealand Spectator and Cook's Strait Guardian (also referred to as the *Spectator*) February 3 1855
Location: Wellington
Keywords: primary, response/recovery

Many issues of the *Spectator* had articles about the earthquakes. Each day's extracts are given their own source, location and effects keywords, so that the reader does not have to search some 30 pages to find one reference. Note that February 3 1855 extracts have also been separated into to parts as one deals solely with political issues and hence response/recovery is the only keyword applicable.

> Whatever extravagancies the unhappy infirmity of temper of the Provincial Secretary may lead him into, few we imagine of those who were present at the meeting at the

Council at the Athenaeum on Thursday could have expected to witness what then took place. Before giving an account of Thursday's proceedings, however, to render them more intelligible to our readers out of Wellington, it will be necessary briefly to advert to the previous occurrences which occasioned them. At the meeting to the Provincial Council on Tuesday, in answer to a question from Mr. Lyon as to what arrangements had been made by the Government for providing a Council Chamber in the place of the building destroyed by the Earthquake, the Provincial Secretary took occasion to make a deliberate attack, as unfounded as it was malignant, on Mr. Hamley of the Ordnance and Colonel McCleverty commanding the troops, charging them with inhumanity and cruelty, the former for refusing to the Provincial Executive the use of Government House, the latter for withholding from the settlers the tents belonging to the military. Shortly after the Council broke up Colonel McCleverty was informed of what had occurred; he at once sought out Mr. Fitzherbert and expressed to him in severe terms his sense of the unjustifiable attack which the latter had made on him.

The motion of breach of privilege which Mr. Fitzherbert chose to found on this affair, occupied nearly the whole of Thursday's proceedings in Council. In an elaborate paper which he read to the Council and in which he had carefully got up his case, after detailing Tuesday's proceedings of which we have furnished an outline above, he gave the following account of what passed between Colonel McCleverty and himself -

"He burst upon me with 'I am just told, Sir, (I think he said by Mr. Stokes, but on this point I am not positive) that you have made charges against me in Council about want of humanity... Shameful Sir, shameful!... Is it true? What have you to say, Sir?' I replied. 'It is true that I publicly complained of your conduct, I considered that I was justified in making the remarks I did, and shall repeat them, if necessary. But let me tell you, Sir, I will not be questioned by you or any other man, as to my freedom of speech in Council, I will not be intimidated by you or any other body from doing my duty as a Representative of the People.'"

After a few touches of description, as where he says, the Colonel flourished his whip, "postured his right nether portion on the left flap of his saddle, the next moment he dextrously shifted his left nether portion to the right flap," &c., and that he (Mr.F.) kept his own whip slightly elevated, *"but still not so as to frighten the Colonel,"* he proceeded--

"He (the Colonel) suddenly roused himself and shouted "Don't speak to me, Sir! Never speak to me again, Sir." I retorted "I never asked to speak to you, it was you who wished to speak to me" I bawled out the latter part of the sentence, for he had already wheeled round his black charger and placed a waggon between us. No sooner had my words reached him than he seemed irritated by the retort, and turned round his head and literally screamed out in a fury, "You, Sir, you of all men, you ought to be ashamed of yourself, you ought to be transported, you ran away from the Earthquakes last time, you ought to have been convicted of felony." I am not absolutely certain as to the word transported, I am quite positive as to the other expressions."

After reading this paper, the Provincial Secretary continued in a speech of considerable

length, in which his rage and abuse seemed to be divided between the Editor of the *Spectator,* Col. McCleverty, and the 65th Regiment. Supposing Col. McCleverty to have received his information of what took place in the Council from the Editor of the *Spectator,* Mr. Fitzherbert said the Colonel should have written to him to know whether the report made to him was correct, "especially as it emanated from a suspicious quarter," and talked of the Colonel's "taking from so foul a source the wicked poison." Of course these expressions were cheered by Mr. Revans, and re-echoed by Mr. Fox, who, in his remarks, said that the Colonel had received his information "from the mouth of a malignant tale-bearer." It turned out, however, that the Editor of the *Spectator* was not "the foul source" from which the report issued; "the poison" came from another quarter; the Colonel had acted on information received from Mr. Bell, a member of the Provincial Council and a colleague of Mr. Fritzherbert in the Executive Council. Mr. Bell said, in explaining the circumstances so far as he was connected with them, "I was riding up the beach, when I met Col. McCleverty, and entered into conversation with him, we were afterwards met by Mr. Stokes; some remark passed to the effect that some very strong language had been used by the Provincial Secretary towards Mr. Hamley and Col. McCleverty. The Colonel turned to me, when I observed, I regret to say that Mr. Fitzherbert said that great inhumanity had been shewn by Mr. Hamley and Col. McCleverty to the settlers."

That Mr. Fox and Mr. Fitzherbert should have a rancorous hatred towards the Editor of the *Spectator* is perfectly natural; after having for so many years exposed the underhand manoeuvres, the jobbing, the dodges of these "shallow", unscrupulous, and corrupt politicians, it is quite natural that they should feel a strong antipathy to the *Spectator* - the same sort of antipathy which a thief feels towards one of the detective police. As far as we are concerned, we are quite content to be abused in such company, and by such persons; and we hope it may ever be our good fortune to enjoy the friendship of men who stand so high in the esteem and regard of the settlers as Col. McCleverty, and be subject to the enmity of such persons as Mr. Fitzherbert, Mr. Fox, and Mr. Revans - *Malisdisplicere laudari est.*

But it is something new to be told, as we are now told, by these members of the Executive --that the freedom of speech which they claim as their unquestioned privilege is to degenerate into such licentiousness as this that all sorts of unfounded charges and calumnies are to be uttered in Council against those who are absent, and not in a position to defend themselves, and that such a course is to be justified under the plea of freedom of speech. It is something new and unheard of that a Provincial Secretary drest in a little brief authority-shall get up in the Council and make a deliberate statement affecting the character of some of the worthiest persons in the Province; that this is to pass unquestioned as his privilege, and that any allusion to this by any one out of the Council is to be regarded as the work of "a malignant tale-bearer." This claim of privilege thus set up has, we believe, no foundation in law, even as regards the British House of Commons it has been successfully resisted on some points; the assumption; therefore, of its existence in a Provincial Council (the creature of an Act of Parliament which can always be altered or repealed) betrays the most lamentable ignorance in those who make it; and it will be found to be only another instance of

insatiable grasping after arbitrary power, of which they attempt to exercise-in the name of the people.

We cannot attempt to give all that Mr. Fitzherbert said on this occasion, and yet there are one or two bursts of provincial eloquence that ought not to pass unrecorded, one or two choice flowers of his rhetoric that ought not to be lost to posterity, that we cannot willingly let die.

Many years since, when animadverting on Mr. Fitzherbert's conduct at a public meeting, we described him as the *Thersites* of the Colony, half bully, half buffoon, - and his public conduct on all occasions has shown how well he deserves the character we then gave him. Take from his last public exhibition the following illustrations. In commenting on what had passed between Colonel McCleverty and himself, Mr. Fitzherbert said.

"If poison had been instilled into our ears from the nether hell, I could not think that a man could have so little restraint over himself as to rush into so towering a passion. *So help me God,* Col. McCleverty addressed me as if I had been the most abject slave; if I had been the dirt under his feet he couldn't have done worse. Thank heaven he had placed a wagon between us, *or I would surely have torn him limb from limb* as I now stand here now. But I had my passions entirely under control; but if I had been near him I would have done what I have said."

The mere words spoken, without the, gestures, the tone, the temper exhibited, convey but a feeble notion of the scene. It was lamentable to see an old man, quivering with impotent rage, boast of the restraint he exercised over his passions, it was more lamentable still to hear him profane the awful name of the Deity after such a fashion as this. And the waggon that so providentially interposed between the Provincial Secretary and the object of his wrath, that was the means of preventing such desperate deeds, it is said was after all apocryphal, a *Deus ex machina,* expressly contrived to prevent this tearing limb from limb. No doubt Mr. Fitzherbert thought, like Bully Bottom, that was lofty" yet those who heard him inclined to the opinion of Bottom's friends; "We must leave the killing out, when all is done." The other illustration is of another stamp.

"Suppose," said Mr. Fitzherbert, "and I hope I may be pardoned for the illustrations, suppose I was Lord John Russell, and suppose the Colonel had been the Great Duke, if Lord John Russell had made in the House of Commons certain remarks which were unpalatable to the Duke, and after having retired to his club (to wit, German Brown's) such an altercation had ensued between them, I know one consequence that would inevitably have ensued. The next day the Duke, great as he was, would have ceased to hold any commission in the army.

There was something so irresistibly ludicrous in this comparison that the audience fairly lost their gravity. It was but one step they were asked to take-from the sublime to the ridiculous but they could not take it. The wildest flight of the imagination could not suppose the supposition,. they could not realise any thing so ridiculous as Mr.

Fitzherbert had supposed, and the appeal was received with hearty unrestrained roars of laughter. But said we not rightly? Is not this the language of a Thersites half bully, half buffoon?

It is unnecessary to defend Col. McCleverty and the 65th Regiment from the aspersions of Mr. Fitzherbert. Both Mr. Bell and Mr. Ludlam declared Mr. Fitzherbert's attack on Tuesday to be perfectly unjustifiable, and this expression of opinion on their part met with a ready sympathy from the crowded attendance of settlers present. But when Mr. Ludlam in a manly straightforward way denounced such conduct, and said he did not think it right that they should sit within those walls to blacken the characters of the absent, and that he considered such a course to be a cowardly proceeding; the applause which followed from the numerous settlers who were there shewed how entirely they disapproved of Mr. Fizherbert's conduct; and the Speakers's faint muttering about clearing the gallery, only tended to increase the scorn which the proceedings of the Council had excited.

This attack, we repeat, has been perfectly unjustifiable, as it is most unfounded. This was sufficiently proved by the official correspondence which was read. So far from any want of humanity either on the part of Col. McCleverty, or the Officers of the 65th Regiment, towards the settlers. It is well known as it is cheerfully acknowledged and gratefully appreciated that the gallant Colonel has on all occasions shewn the greatest desire to assist them, that he has won the esteem and respect of settlers of all classes by his ready sympathy with them, and by those kindly qualities which have always marked his intercourse with them. That on the occasion of this recent visitation he has been most active in rendering assistance, and on the very day this attack was made by Mr. Fitzherbert the Officers of the 65th Regiment had given up their tents for the use of the settlers.

Ever since the Earthquake the soldiers of the 65th Regiment have been most actively employed, by the direction of the military authorities, wherever their services were required in clearing away the ruin caused by its effects; and in the present state of the Province and the want of labour it is difficult to say what could have been done but for the ready aid they have afforded. And so it has been on all occasions since the regiment has been stationed in the Province, whenever assistance has been required either by the community or by individuals, assistance has always been cheerfully given; and we sincerely trust the cordial sympathy and intimate and close relations which have always existed between the settlers and the military will not be disturbed by these proceedings of the members of the Provincial Executive.

It may be as well to note in passing, that while in their official Organ the Provincial authorities affect to ignore the Earthquake, and to the great disgust of the community treat it as a most light and trivial occurrence, yet are they ready under the plea of this visitation to divide and distract the community with the most serious dissensions of their own creating.

At the meeting of the Council yesterday Mr. Fox brought up the report of the Committee appointed on his motion, in which they require Colonel McCleverty to

apologise to the Council and in the event of his not doing so, suggest that copies of their report should be forwarded to the Commander-in-Chief, and to other influential quarters in England. We have no doubt, if these men persist in their present course that an address will be presented to Colonel McCleverty by the intelligent portion of the community expressive of the high regard they entertain for his public and private character, and entirely repudiating these most unworthy proceedings.

Source: New Zealand Spectator and Cook's Strait Guardian (also referred to as the *Spectator*) February 3 1855
Location: Nelson, Taranaki, Auckland, at sea, Wairarapa, Hutt Valley, Wellington
Keywords: primary, mainshock, building damage, ground damage, casualty, response/recovery

Many issues of the *Spectator* had articles about the earthquakes. Each day's extracts are given their own source, location and effects keywords, so that the reader does not have to search some 30 pages to find one reference. Extracts for February 3 1855 have also been separated into two sections, this one dealing with effects while the previous section dealt solely with political issues and hence, response/recovery

The Steamer 'Nelson' arrived this morning from Auckland, Taranaki, and Nelson. The Earthquake had been severely felt at Nelson and Taranaki, and more slightly at Auckland.

To the Editor of the *New Zealand Spectator*
Wellington, January 29, 1855.
Sir, - The numerous requests made to me by parties fallen in with along my line of road into the Wairarapa district to enlighten their friends as to the state of things up country, as well as the possible utility to the colonists at large to possess correct information of the effects of the late Earthquake in the interior, determine me to convey the experience of my last four days of travel by the most efficient mode of all - through the medium of the local press. I shall endeavour to be brief and correct, and shall expect to return due allowance to be made for the possible exaggeration and errors of your correspondent - at once a perfect stranger to the colony, and totally inexperienced in such phenomena of nature as occurred here on the night of the 23rd inst. I may mention, in the first place, that the effect of the shock on shipboard - where I first experienced it - reminded me very forcibly of being hurried most violently over a jagged bottom of rocks, with anchors dragging and cables running out; or of the tremulous jumping shaking motion of a railway train at top speed; while an influence ran along and shook the whole nervous system.

Left Wellington on Wednesday at 10 o'clock, the morning after the shock; found several landslips on the Petoni Road; only one of any size, and, that at present but a slight obstacle to the communication into the Hutt, a road now being rapidly pushed round its base; swing bridge over the river gone, broken, and ground burst up at each abutment, lower end fallen into the water, the whole aslant up stream: visible effects of the shock on the roads and country in general; presented stronger manifestations on entering the valley: as a rule, chimneys are down along whole line; mills reported as damaged, houses damaged internally rather than externally: road, for seven miles, that is, up to three miles the other side Buck's Hotel, [Taita] considerably injured; many of the smaller bridges gone at the lower gorges; several considerable landslips occur, impassable for carts; from this point, for thirteen miles, as far as Hodder's

[Kaitoke] the roads are all right, but three miles beyond, on the ascent up the Rimutaka gorges, for upwards of seven miles, the landslips and crevices are both numerous, dangerous, and almost impassable, even on foot. Barricades of the largest trees, stumps, and rocks, valances of earth, underwood, decayed trees, and boulders, bar your progress, and conceal your line of road, while loose logs and stones hang in threatening positions far above your head, so that a steady hand and cool head are necessary to carry you safely over the precipices that sweep down below you to the bottom of the valley: no sort of conveyance can pass; all horses are left at Hodder's Hotel, on this side the gorges, and you proceed on foot to Burling's [Featherston], at the entrance of the valley: all parties should avoid the Blue Rock, and diverge to the left down the stream.

On entering the district and proceeding to Nick's on the river, the shock appears to have been generally felt as seriously as with yourselves, and the only casualties I heard of were four natives reported dead in the lower valley. The shocks appear to have occurred simultaneously throughout the whole line of country, and the depression of people's minds to be both considerable and general. On my return I found Messrs. Roy and Nicholson had got a gang of maoris vigorously at work on the lower gorges and the valley road, and learnt that an insignificant expense would put this point to rights in a short time, and reopen the road completely as far as the Pakuratahi. When the Rimutaka can be cleared, and at what expense, I could not learn, nor can I form any idea, and no one but an experienced engineer can inform you.

I will only add, in conclusion, there can be no doubt that the country has suffered considerably, both physically and morally. Men and money can rectify the material damage, while nothing but prompt and efficient measures will reanimate the people's spirits, and restore general confidence in the capabilities and resources of this fine colony.
I am Sir,
Your obedient servant,
R.E. WILLRAY.

Source: New Zealand Spectator and Cook's Strait Guardian (also referred to as the *Spectator*) February 7 1855
Location: Wellington, Wairarapa, at sea, Auckland, Hutt Valley, Porirua, Palliser Bay
Keywords: primary, mainshock, aftershocks, uplift/subsidence, tsunami/seiche, ground damage, building damage, response/recovery, atmospheric effects, biological effects

Many issues of the *Spectator* had articles about the earthquakes. Each day's extracts transcribed here are given their own source, location and effects keywords, so that the reader does not have to search some 30 pages to find one reference.

From the crowded state of our columns we can only briefly state today, that after a long discussion the report of the committee on the privilege question was adopted by the Council by a majority of 9. Messrs Fox, Fitzherbert, Hart, Dorset, Lyon, Watt, Brandon, Daniell, Revans, Bromley, Schultze, and Wallace voting for the adoption of the report, and Messrs. Bell, Hickson, and Ludlam, voting against it. As there are several points connected with this question which have been raised by this debate, and other matters introduced by Mr Fox, especially a gross personal attack on the Editor of the *Spectator* who seems to be the *bete noir* of Messrs. Fox and Fitzherbert,

we shall, in our next number, take an opportunity of going fully into this question.

A meeting was held on Monday afternoon at the Mechanics' Institute, pursuant to advertisement, for the purpose of considering certain questions connected with the recent earthquake. A. Hort, Esq., was called to the chair. After some discussion, it was agreed that the meeting should be adjourned to Thursday [Feb 8] evening next, at seven o'clock.

In compliance with the request of numerous subscribers, we have collected together the notices that have appeared in the journals of the other Provinces relating to the recent earthquake, reprinting the observations published at the time in this journal. To these we now add such other particulars as we have collected from other sources. The earthquake seems to have been generally felt about the same time throughout New Zealand, at least information to that effect has been received from every Province except Otago, from which there has been no arrival; and the *Taranaki Herald* states that the *Josephine-Willis*, which had arrived there, felt the shock about 9 o'clock, p.m. on the evening of the 23rd, at a distance of one hundred and fifty miles from the coast of New Zealand. From measurements which have since been made it has been ascertained that the land has been raised to a height of from three feet six inches to four feet. All the shell fish attached to the rocks, that live below low water mark, in consequence of elevation of the land are dead, and the number is considerable enough to cause a strong smell to be perceived by those walking round the east side of the harbour towards Evans Bay. The Bally Rock off Point Jerningham, which was formerly 18 inches below low water (spring tides) is now about two feet above low water. About ten minutes after the first great shock a great wave entered the harbour, which was estimated to have been above twelve feet in vertical height; from the narrow entrance of the harbour compared to its area very little damage was done by it, but in the open and exposed boat harbour at Te Kopi, all the buildings, etc., on the beach were swept away by a similar wave. Two coasters, one from the Kaikoras, the other from Point Underwood, on their approaching the harbour the next morning at daylight, passed through an immense quantity of dead fish, principally ling, and quantities of dead fish were found on the beach, and at Burnham water. It is worthy of remark that Captain Fitzroy in his description of the great earthquake at Concepcion, in1835, notices two similar effects. He says: - "At the time of the ruin, and until after the great waves, the water in the bay appeared to be everywhere boiling; bubbles of air or gas were rapidly escaping; the water also became black, and exhaled a most disagreeable sulphurous smell. Dead fish were afterwards thrown ashore in quantities; they seemed to have been poisoned or suffocated; and for days together the shores of the bay were covered with fine corvinos, and numerous small fish."

And again - "For some days after the devastation the sea did not rise to its usual mark, by four or five feet vertically. But this difference gradually diminished, till, in the middle of April, (the earthquake happened 20th February 1835) it amounted only to two feet between the existing and former high water marks. It was considered as a proof that the land had been elevated".

In the dividing range of hills between the Wairarapa and Wellington on the east side of the harbour, there have been several very heavy landslips from their summits, which are plainly visible from Wellington. The Earthquake appears to have exerted great force on this range.

We have reprinted Captain Drury's account of the Earthquake published in the *Nelson Examiner*. Though correct in its details, yet having been written at the time, it conveys a strong impression of the catastrophe. We think, on the whole, much less alarm has been felt by the inhabitants generally than on the occasion of the Earthquake of 1848. The work of repair and of re-edification has been commenced, and is going on vigorously; and owing to the ready assistance afforded by Col. McCleverty and Col. Gold, in the various fatigue parties from the 65th regt., the debris of the different buildings are being rapidly cleared away. None have left, or are preparing to leave Wellington.

The Bank has resumed business in the back part of the same building. Commercial credit is as good, and discounts are as freely allowed by the Bank as before the Earthquakes. The portico of the Bank was built on a foundation of loose blue clay, and the effect of the heavy weight of the portico on this, when affected by the Earthquake, was to squeeze it, forcing a small quantity of the blue clay upwards into the road.

We may add, in conclusion, that shocks of earthquake have been experienced every day since the 23rd, but none of sufficient force to occasion further damage. A sharp shock occurred last night about 20 min. past eleven o'clock, followed by several slighter shocks during the night: -

[Article in *Spectator* January 31 1855 repeated (q.v.)]

[Willray's letter in *Spectator* February 3 1855 repeated (q.v.)]

Extract from Commander Drury's Remark Book.
Cook's Straits, January 25, 1855.
The anniversary of the Wellington Settlement was most auspiciously celebrated - a brighter or a calmer day never beamed on the harbour. The boat races, and every description of sports on shore, went off with much good humour and *éclat*, and the only drawback was want of wind for the sailing boats.

In the evening, a light N.W. wind sprang up, which increased gradually during the night; and at 8, on the morning of the 23rd, it blew violently. The sports, however, continued and the race-course drew nearly the whole population of Wellington; but a drenching rain at noon checked the further progress of joviality, which was to be repeated on the morrow.

At 11 minutes past 9 o'clock, p.m., the gale still blowing strong, we felt suddenly an uncommon and disagreeable grinding, as if the ship was grating over a rough bottom. It continued with severity for more than a minute, the ship slewed broadside to the wind; we were then in 6 fathoms, so there was little doubt but that it was an earthquake. Lights were seen running to and fro in all parts of the town and evidences of consternation combined with a loud crash. Lieutenant Jones and myself immediately landed. We found the tide alternately ebbing and flowing.

The first scene before us on landing was the Government Offices, entirely destroyed, the upper story (the falling of which had caused the crash we heard)

lying on the ground; the staircase, the Council Chamber, the papers and documents in heterogeneous confusion; an adjoining chemist's shop, whose samples and compounds admixing, had a decided bias to peppermint; while the doorway of the public house was a confusion of broken bottles. The sentinel in charge of the Government building, who had just been thrown backwards and forwards, was now walking in front of the wreck with perfect *sang froid,* no doubt crying "All's well" to the hour.

It is not my intention to narrate more than the general effects and disasters of this severe shock; and firstly we have to be thankful to God, that amidst the general wreck of property but one life has been sacrificed, and not more than four others seriously wounded, up to the time of our departure. This would appear astonishing to a person viewing the wreck of the houses, the mass of brickwork from falling of the chimneys, the dislodgement of furniture, the fissures in the earth, the extraordinary rise of tide, the entire destruction of some tenements, the collapse of others, the universal sacrifice of property, and the natural terror and despair among the inhabitants, all tending to far greater personal disaster than fortunately I have to narrate. And here I would especially dwell upon the benefit of the warning of 1848 to inhabitants, which, under Divine Providence, by causing them to occupy wooden houses, has been the salvation of many lives; and the hour, too, was favourable to the escape of adults, who seized the children from beneath the tottering chimneys, themselves not having generally retired to bed.

Few, if any, since 1848, have been rash enough to build a brick house; the chimneys had generally been secured as well as possible by iron braces, &c. The most substantial two-storied house - Baron Alsdorf's hotel of lath and plaster, buried its owner in the partial ruins, Government House, had it been occupied, must have destroyed its inmates, for every room was a pile of brickwork, the chandeliers, &c., utterly destroyed. The guard had a wonderful escape from the Guardroom, and the gun at the flagstaff turned over.

I have already mentioned the entire destruction of the Council Chamber, the upper story being completely severed from the lower; the Treasury strong box, and the papers and documents apparently in irretrievable confusion.

The elegant and substantial new building, the Union Bank, is in its front, a perfect ruin, and I hear the damage within is not much less. Opposite this building, on the road, a considerable opening emitted slimy mud, and the main street was overflown by inundation. The most substantially built wooden houses of one story, with the exception of the chmineys, are mainly standing. Those of less substantial calibre (and I am sorry to say there are many) are in a state of collapse. There is a universal destruction of crockery, bottles, &c., and a pitiful loss of valuable ornaments, clocks, &c. Several stores are unapproachable, until neighbouring dangers are removed.

The principal shock occurred at 9h. 11m. p.m., and it was far the most severe. During the night scarcely half an hour elapsed without a lesser shock, more or less violent, accompanied by a deep hollow sound; but all these subsequent ones were of much shorter duration; and the first having levelled every portion of brickwork, in the lower part of the town, there was less to fear; but the inhabitants

generally removed to the open ground, and the following day the streets and gardens were the scene of an involuntary pic-nic.

From what we noticed, it appeared that the elemental wave proceeded from about W.N.W. to E.S.E, that its actual effect upon terra firma was slight, and that the fissures were generally where the road was made, although the mud emitted from the crack at Te Aro must be considered subterraneous deposit, from what depth not easily decided.

From close observations on the barometer, I have no reason to believe that the effect before or after the principal shock was evident (it ranged from 29.30 to 30.00) nor that the calm proceeding, or the gale attending, the earthquake, had any connexion with the subterraneous convulsions. We witnessed, during the 48 hours following, every variety of wind and weather, yet with repeated shocks; but although I would disconnect the atmospheric influence with the earthquakes, we had every reason to believe the latter had immediate local influence on the atmosphere, producing violent gusts after the shocks.

It is a fact that an action, or firing will produce a local calm by the disturbance of the atmosphere, the phenomenon here may be more easily accounted for. But a more interesting and extraordinary phenomenon occurred (I say extraordinary, because no person appears to have observed it in the earthquake of 1848); for eight hours subsequent to the first and great shock, the tide approached and receded from the shore every 20 minutes, rising from eight to ten feet, and receding four feet lower than at spring tides. One ship, I heard, was aground at her anchorage four times. The ordinary tide seemed quite at a discount, for the following day (24 h) it scarcely rose at all.

The general effects of the earthquake were evidently felt more upon the lower parts of the town; at the Hutt most severely. The bridge there was destroyed, and the houses much damaged. I am also informed the Porirua road is sunk in places.

Recurring to our landing after the first shock, Lieutenant Jones and myself went into several houses. The panic was certainly great, and many accepted the offer to go on board, the houses we were in swinging to and for, and the ground in a constant tremulous motion. It was sufficient to unnerve the stoutest hearts: but after a delay of three or four hours (in which we were visiting other parts of the town), on returning to the parties who had accepted an asylum on board, we found one and all had determined to abide on shore - indeed they were getting accustomed to it. The wives would not desert the husbands, and the husbands would not desert the town.

We returned to the ship at 2 a.m., the tide having at that time receded about 4 feet lower than at ordinary spring tide.

On the 24th the shocks continued, but at greater intervals as the day advanced; but the tremulous motion was continuous.

The scene on the streets was novel; some people standing at their thresholds, groups upon mats, clear of the houses, or in tents in their gardens. Those who had suffered less than their neighbours were assiduous in rendering assistance.

What a different scene would have occurred in the fatherland! With shops exposed, and every temptation to plunder, there seemed to be neither fear nor thought of robbery, but a generous and manly feeling to lessen each other's burdens pervaded all classes, from the Superintendent to the lowest mechanic, from the Colonel to every soldier of the 65th regiment; nor can I forget to mention the ready asylum afforded by the merchant vessels in the harbour to the houseless and nervous inhabitants.

On the 25th, at 00h. 55min., there was a very sharp but comparatively short shock.

Having ascertained we could be of no further assistance, we weighed for Nelson, and in crossing Cook's Straits we felt one shock in 26 fathoms, at noon, off Sinclair Head (exactly the same feeling as when at anchor), and a slighter shock in 80 fathoms, off Queen Charlotte's Sound. In these events there is much to be thankful for in the absence of fire; had it been winter, the universal falling in of chimneys would have assuredly fired the wooden houses; had the first shock been an hour later, many lives would probably have been lost, as the populace would have been in bed. Much test is entertained for the soldiers at Wanganui barracks. I trust we shall find that Nelson has suffered as slightly as on former occasions.

CANTERBURY
[Extract from the Lyttelton Times, January 24 (q.v.)]

NELSON
[Extract from Nelson Examiner; January 27(q.v.)]

WAIRAU
[Extract from Nelson Examiner, January 27 (q.v.)]

TARANAKI
[Extract from the Taranaki Herald, January 24 (q.v.)]

AUCKLAND
A private letter from Auckland, received by the Nelson, states -
"We had a slight shock of an earthquake at a quarter past 9 o'clock p.m., on the 23rd Jan.; weather calm and hot, barometer high; duration of shake, one minute; direction from East to West."

Source: New Zealand Spectator and Cook's Strait Guardian (also referred to as the *Spectator*) February 10 1855
Location: Wellington
Keywords: primary, mainshock, aftershocks, building damage, response/recovery, uplift/subsidence, ground damage

Many issues of the *Spectator* had articles about the earthquakes. Each day's extracts are given their own source, location and effects keywords, so that the reader does not have to search some 30 pages to find one reference.

The length to which our report of Thursday's Meeting extends, obliges us to defer our observations on the privilege question to next Wednesday.

ADJOURNED PUBLIC MEETING.

An adjourned Public Meeting, which was very respectably attended, was held on Thursday evening, at the Wellington Athenaeum, "to consider different public questions arising out of the recent Earthquake." A Hort, Esq., in the chair.

The CHAIRMAN explained the objects of the meeting; he said they had met together for the purpose of expressing their mutual sympathies on the occasion of the great calamity that had befallen them. The first object for which they had met together was, to request the Superintendent to name a day to return thanks to the Creator of the Universe for His late mercies, and to make due acknowledgements to Him for the safety they had experienced. Their next object was, to induce the Legislature to make inquiries whether there were any persons in the community who from losses caused by the Earthquake stood in need of assistance. Another duty was, to express their sense of the kindness received from the military authorities, particularly from Col. McCleverty and Col. Gold, who had afforded every assistance to us in our emergency; it was also in tended to petition the Legislature to make such regulations for the future construction of buildings in the town as might, so far as human prudence could provide, prevent future misfortunes; and lastly, it was proposed to pass a vote of thanks to the masters of vessels in harbour for their ready assistance in providing an asylum for those who stood in need of it (cheers).

Mr. St. Hill, in moving the first resolution, said, he believed there were none of those present who did not admit they had been mercifully protected; there were few in the room who were not sensible of a Providential escape, either in their own case or of some of those connected with them, during the late visitation.

When they saw the accumulation of building materials in different directions which had been thrown down by the Earthquake, they could not but feel how much they were indebted to Almighty God for their preservation.

Though many had experienced severe losses, those losses were borne without a murmur, and he was glad to say a general spirit of thankfulness seemed to pervade the community (cheers). He concluded by moving the following resolution.

That it is the opinion of this meeting that it is the duty of the people of this Province to observe a day of public humiliation and thanksgiving to Almighty God for his mercies vouchsafed to them during the recent Earthquake, and that the Superintendent of the Province be requested to appoint a day for the purpose.

The Rev A. Baker said that when requested to second the resolution which had been briefly but so effectively moved by his friend, Mr. St. Hill, he had gladly consented to undertake the task, because he most thoroughly concurred in the terms of the proposition, whether regarding it in his private or professional capacity. As a minister of religion, and as a private Christian, he could not but rejoice at the opportunity afforded by occasion of this meeting, not simply of expressing assent to but of once more publicly inculcating upon others also, the duty of acknowledging the direct,

particular, and personal interposition of a wise and good Providence in their late calamity, the duty, too, incumbent upon every individual in the community, of humbling himself under the mighty hand of God in acknowledgement of his Fatherly correction, and of testifying his thanks in some public manner for the mercy with which that chastisement had been tempered, and in which, if he might reverently say so, an appeal had been made to their hearts and affections, no less than to their natural fears. He would not detain the meeting by any lengthened remarks upon the subject, because with the mover of the resolution, he took it for granted that there was not an individual in the whole a Province less sensible than he himself was, that in the many hairbreadth escapes through God's Providence vouchsafed to them, they were indebted to His fatherly protection, when, considering all the circumstances, they might have anticipated a very different result, a result even equal to that when it was said of the idolatrous and gainsaying people of Egypt that there was not a house where there was not one dead. Yet amidst the crash and ruin of heavy materials in almost every house, they had escaped with marvellous little loss of life and limb....

By the kindness of a friend, a gallant individual of whom he was proud to testify in anticipation of a subject suggested by the Chairman that perhaps to no single individual were the settlers of Wellington more indebted for *humane,* and he laid a stress upon the epithet, and generous forwardness in sympathy and Christian charity on the late occasion, --of whom it so happened he could testify, that on the might of the calamity, before the terror occasioned by the first shock had passed from the hearts of people, he had been among the first in the field rendering assistance, for the (speaker) had accidentally met him at the door of the Head of the Executive tendering his services and those of the men under his command, to whom therefore the Executive in particular, and the settlers generally were specially indebted, a man too, he would add, who not on this occasion only but in his conduct and character habitually appeared to him, even more than most others, to realise the sentiment of the ancient dramatist, *" Homo sum, nihil humani a me alenum puto"* by the kindness of this gallant gentleman, as he was saying, he was able to refresh his knowledge of the theory of earthquakes in the work of the great philosopher to whom he had previously referred, and he found much comfort in the fact that so much was known about them, and that they were such ordinary occurrences in many and even most parts of the world, for it was even said..

[Much irrelevant detail]

He would therefore second the resolution before the meeting, with the rider, if it were carried, as he did not doubt it unanimously would be that the Chairman be requested to forward a copy of it to his Honour the Superintendent of the Province.

Mr. HART said, it was a natural consequence of such disturbances as those through which they had recently passed, to throw the mind back upon itself to consider its state in the world in life and in futurity, from an intense consciousness of utter inability to control these movements. Considerations of this kind had led many to draw the erroneous conclusion that they were at such times in the hands of an overruling power against whom no precaution, exercise of prudence, or caution to escape would avail. But by the same rule, the mariner should desert the well-appointed vessel which enables

him to connect the extremities of the earth together, and betake himself to the primitive bark in which the ancients hardly leaving the shore, never ventured out sight of it. It would be obvious to every one present that no one could leave this colony and make the voyage to England without encountering as much danger as he had passed through during the recent earthquakes (hear).

And how was this danger on sea obviated, but by taking every precaution to meet it. An if earthquakes are among the necessarily recurring natural phenomena of this country, the instinct of self-preservation should lead them to use the judgement which had been given to them to devise the means within their power to establish an efficient remedy for rendering their dwelling--not earthquake proof --for the term when used by any one who had read the accounts of earthquakes which had happened elsewhere, was simply absurd, --but such as would, by means of sound construction and honest work, avert the ordinary consequences.

As an instance of the contrary he would refer to the Council Chamber, which was very slightly and cheaply built the upper story being, for a purpose for which it was originally erected, loaded with brick nogging to prevent the transmission of sound; and they would recollect that whenever an assembly was held in that room it was shored up from below; so that it was not so much a matter of surprise that it had been thrown down by the earthquake, as it was that it had stood so long. Then there were buildings in the town which had stood the shocks without apparent damage. From a careful comparison and contrast of cases, an amount of facts might be gathered from which all might take warning, and new comers derive the information requisite for the construction of buildings in which they might lay down in confidence that they incurred no danger from ordinary earthquake shocks. For the requisite inquiry it was necessary to apply to the Government to appoint skilful men; and pay them for their work. You cannot expect good work without pay. In running away from one danger they risked falling into another. Under the notion that brick chimneys were dangerous, some were for employing iron tubes; but these, unless erected upon scientific principles, constantly involve the risk of fire. In his opinion brick chimneys upon an improved construction would be found safest. No man could see all that his neighbour would do in erecting an iron chimney, and if from erroneous construction, a fire should break out, the consequences in a town built principally of wood would be more disastrous than those from an earthquake, such as had recently been experienced. With proper care in the erection and maintenance of buildings, he thought there would be no risk of life from ordinary earthquake shocks. There was another topic upon which he would touch: the actual damage resulting might in description be considerably exaggerated by descriptions written under the influence of excitement occasioned by the circumstances. There were two courses open. One was to let the matter alone to be silent upon it. In that case accounts would be sent home not having the stamp of authority, by persons from their position unable to give a fair picture of the results. And on this point he might refer to the account published by Captain Drury, of H.M.S. *Pandora*, honestly written, but containing statements which, in the absence of explanation, would convey exaggerated impressions of the facts. He had looked in vain for that "Considerable opening" near the Bank, through which blue mud had spouted. The fact was that the Bank stood in part upon made ground, over a substratum of almost fluid blue clay, and

when the heavy mass upon which the portico was erected, with that heavy weight above it, was shaken by the earthquake, the natural consequence was, that some of the clay forced its way up through a small crevice near the fence. The description would lead any reader to suppose that a formidable danger had existed, that the opening was of a fearful extent. A correct report of the results of the earthquake would put more confidence in the minds of persons residing here and of those who contemplated doing so.

The effect of suppression in these cases would be that a settler arriving, and acting in ignorance of the dangers to which he might be exposed, would, on the happening of such an event, leave disgusted with the place, and with the people who had suffered him to proceed in ignorance. But if fairly informed of the risks he was incurring when he cast in his lot among them, the happening of the danger would find him prepared to meet the consequences, and to put his shoulder to the wheel making common cause with those with whom he had passed through a common danger. It would only be looking at part of the case to consider the position of this country in reference to earthquakes alone. What would the whole amount of damage when ascertained be found to be in comparison with that produced in other places by fires, floods, hurricanes, droughts, and pestilences. And when they took into consideration the healthiness of the climate, fertility of the soil, and freedom from evils to which other places were subject, they might fairly conclude that earthquakes were not among the greatest evils to which men in one from or other must be subject in whatever part of the world their residence might be fixed.

And when they reflected, referring again to the report of Captain Drury, that in the midst of alarms produced by the earth trembling beneath their feet, they were able to leave their houses to encourage and support their more timid neighbours without the slightest apprehension that their unbarred doors would afford access to the midnight robber, and contrast that state of things with the accounts received of a neighbouring colony in which so far from being able to leave houses unfastened, the inhabitants could scarcely walk the streets in the day time in safety; they might be of opinion with him (Mr. H) that rather than live under such slavery to circumstances it was preferable to incur all the risks which are occasioned by earthquakes (loud cheers). He would not detain the meeting further but proceed to move.

That a Memorial be prepared and presented to His Honour the Superintendent, praying him to recommend to the Provincial Council the requisite measures for establishing a Commission to inquire into and ascertain the nature and extent of the damage in the district of Wellington, occasioned by the earthquakes, and to collect and report upon such evidence as they may be able to obtain, of the best methods of building to resist the ordinary operation of the shocks, and at the same time guarding against the danger of fire.

Mr. JERNINGHAM WAKEFIELD seconded the resolution. He thought the course recommended a very desirable one; not to take it indeed, would be a blameable neglect on the part of this community, and injurious to it. Accurate and authentic information is required to avert two evils. The first is the concealment, or glossing over, the real

occurrences and results. Such a course is not only dishonest, but inexpedient. Those in other places who might wish to join us soon find out the deception; they then believe the facts to be much worse than even true statements and afterwards; and we acquire the character of being dishonest, and of desiring to take immigrants in by misrepresentation, which would be far more mischievous for our own interests than that our country should have the character of being disturbed by earthquakes; precisely to the extent which it deserves it. (hear, hear). The second danger is that of exaggeration of the facts; not from intentional misrepresentation, but from writing in haste while the first panic lasted, instead of taking time for a correct estimate of both causes and effects. He met to-day, a friend who had left Canterbury after the steamer reached it, and who was quite surprised to see so little damage done, as they had heard there that Wellington was almost in ruins. Captain Drury's hasty account would convey false impressions to distant readers. He felt sure from the high character of that officer that he had intended to give a true account, but had been betrayed by haste into expressions which he would probably have modified on further examination and reflection. But it was that very high character, the well-known accuracy of his former observations on the coasts of New Zealand, and his command of the Admiralty survey here, which would give the report great weight. It should, therefore not be allowed to pass unnoticed. Captain Drury's actual words, indeed, were correct in most instances; but it was the absence of explanation which produced false impressions. He describes "the Government offices entirely destroyed;" but he does not explain that this was a very slight wooden building, of inferior construction, 12 or 13 years old, and of which the uprights were, and had long been, perfectly rotten at the level of the ground (hear, hear). Then "fissures in the earth;" and "the universal sacrifice of property" are spoken of. Those words also, without explanation, would mislead. There are no rents in rock, or in solid ground of any kind, but there are two or three small cracks where the ground has been artificially made, and is, therefore, of the loosest description. Nor is the loss of property so great. In a few cases considerable loss has fallen upon individuals; but the whole loss summed up would be found comparatively trifling, nothing like that which might have ensued from a failure of the crops or other natural mishap (hear, hear). Again "the most substantial two-storied house Baron Alzdorf's hotel of lath and plaster buried its owner in the partial ruins."

Really, it was an extraordinarily heavy stack of chimneys which fell, tearing itself out of the otherwise almost uninjured building. "The guard had a most wonderful escape from the guard-room," there again, the escape was from a chimney overhanging the room, and not from the house itself, which stands all right now. Then, "opposite the Bank, on the road, a considerable opining emitted a slimy mud, and the main street was overflown by inundation," and further on, "the mud emitted from the crack at Te Aro must be considered as subterraneous deposit, from what depth not easily decided." Now the foundation of the Bank, just under the portico, was originally laid in a bed, or rather pond, of this very same slimy mud, almost in a liquid state, so that it had to be baled out, and piles driven in 17 feet deep, to make what after all was a sort of floating foundation; and when the heavy building was shaken above it, some of the mud was of course squeezed out on to the road. Indeed, ever since the Bank was built, some of this mud has oozed out, and spouted up whenever a heavy cart wheel has passed over a certain spot in the road. To conclude, the first shock is said to have "levelled every

portion of brickwork in the lower part of the town;" whereas there is much brick-work still standing without crack or scratch (hear, hear).

Such a report as is recommended by the resolution would enable us to understand why, close together, one brick wall is shaken to pieces, and the next is perfectly sound; what differences in material, workmanship, bracing together, and foundation, have allowed one to stand and not the other. These remarks on Captain Drury's account, which is quite sure to obtain weight in other places where his name and position are known, proved the necessity for a deliberate and careful, and thoroughly accurate account of the extent and nature of this convulsion and of the consequent damage to property and danger to life. Such an account might even bring to light good results. It was reported on good authority that the land had been permanently raised about 3ft 6in.

If this should be the case, several advantages would arise, such as greater facilities for averting floods and draining swamps in the Hutt valley, a coast road to the Wairarapa, rendering needless any further expense for a mountain one, and the reclaiming of the shoal part of the harbour at less expense. The report of a Commission as to the best way of building, especially chimneys, so as to combine the greatest possible amount of safety against both earthquakes and fire, would also be very advantageous. It is proposed to ask the elected head of the people, the Superintendent, by memorial, to appoint a Commission to inquire into and report on these subjects. It would thus be appointed by the people themselves, through their elected Legislature and Executive; for, by the law of this Province, his Honour could only act in the matter by the advice of his Executive Council. It would be for them to consent to, or refuse the prayer, and to be responsible for the efficiency of the Commission. They would probably not despise such a memorial? general feeling on the matter. If this Commission were to make a careful report, that would very much re-assure the inhabitants, and also persons elsewhere who may be desirous of settling here. It would convince such persons that we possess the British qualities of forming a just estimate of our circumstances, whether adverse or favourable, and of the causes of any difficulties which may occur to us; so that we may learn how best to overcome them, and to provide against their reoccurrence: that we are neither unreasonably elated by prosperity, nor foolishly weighed down by misfortune, which arises from no fault of our own, and over which we have no control. And he felt sure that the people of Wellington did possess those qualities of prudence and endurance; that as they had already struggled through far more grievous afflictions, so they would cheerfully meet this, and be prepared even to triumph over difficulties involving far greater danger to life and property than that from which we have fortunately escaped with so little of either (cheers).

Mr. ALLEN suggested it would be desirable to have a re-survey of the harbour to ascertain if any changes of importance had taken place.

After some discussion it was agreed that all matters of detail had better be left to the committee to be appointed.

The resolution was then put and carried unanimously.

Mr. RAYMOND, in rising to propose the third resolution said that it was seldom a resolution was put into the hands of any one to propose which could be approached with so much confidence, as the one he was now about to put to the meeting. He felt sure that the simple reading of the resolution would so engage the sympathies, so meet the wishes, so obtain the most hearty concurrence of the meeting, that, although he in whose hands it was placed to propose could not support it by any eloquence whatever, yet that his inefficiency would be forgotten in the merits of the resolution he was about to read. It had been his privilege on former occasions in this hall and elsewhere to address a few feeble words to his fellow settlers upon social matters in which he had taken a part, and which were of a nature important to us all, and most kind and indulgent had been the hearing ever granted to him. He came forward upon these occasions believing that he possessed all the feelings of a settler in New Zealand, and doubting whether anything could occur which would heighten or increase the bond of union which he felt attached them one and all. But he was then but a fair-weather settler after all. The airs of prosperity, hospitality, and comfort, had so filled his sails, that he began to think it almost possible to go "down the stream" without a check, without even a contrary current to stem, or an exertion beyond what was wholesome to make to keep the system in health. Not so now. How true it is that though "Man proposes, God disposes." It would ill become him, after the eloquent speeches they had heard on the subject, to attempt to enter into any description of the recent earthquake, or to try to tell how having suffered danger together strengthens the cords of sympathy and friendship; but it would not perhaps be out of place to narrate in as few words as possible his own experience in the matter, and be would do so as the best means of showing why it was indeed from his heart that he asked assent to the resolution, conveying a vote of thanks to the military, which he would presently submit to the meeting. (Cheers) One the violence of the Earthquake it was not necessary for him to dilate. We all know how dreadful it was, and those only who have felt a parent's cares, could tell the feelings with which he collected his family after the first shock, and found them, with one exception, uninjured. Dismayed as he felt by the suddenness of the change; words would but ill explain the feelings of pleasure with which he beheld a Sergeant's Guard of H.M. 65th Regiment at the door, kindly sent by Captain Meyler, as Captain of the Day, to see if service could be rendered the gallant sergeant and himself went through the house; it was still shaking, and it was with feelings reassured by his bearing that he was enabled to examine with some care the building, and to see with comparative pleasure that it was much less injured than he should have been prepared to find it. Next morning he heard with pleasure that Colonel McCleverty, Colonel Gold, and the military generally, had been unceasing in their exertions since the shock, and that he in common with all others who required them, had only to ask for soldiers to lend their aid, and they could have them. He could tell the meeting of many acts of kindness done to private families by our gallant friends, but on an occasion like the present he deemed it best to confine himself to the public aid rendered to the Bank, and through the Bank to many generally, by the military. On the Wednesday morning a little before 10, in the midst of his dilemma he owned to having received a good fillip by the enquiry made by a *cool customer* of the Bank, whether it would be open at the usual hour; he told him that was impossible as they had not yet got at the safe: he saw at once, however, that it was his duty to open the Bank as soon as he possibly could, and here again he received the greatest aid from the military. Mr. Hamley, the Ordnance

Storekeeper, at once assented to allowing him the use of his office for a few days. Captain Chesney and Mr. Graham of the Engineers, kindly placed their rooms at his disposal, and all that was wanting was to get at the money. The heavy chest, a weight of nearly 4 tons, had been thrown on its face, and it was necessary to raise this before they could get at the needful. On Thursday a party of soldiers were kindly sent to him to make the attempt, but it was found impossible to raise the safe without machinery, and the shocks continued so violent and so frequent that it was thought better to defer doing anything until the Friday. Aided by his kind friends, Mr. Roberts, Mr. Carter, and Mr. Thomas, to whom he would take this opportunity of expressing his gratitude, with the additional assistance of the soldiers, all was got in shape on the Friday night, and business was commenced on the Saturday, carried on for some days in the Office of the Ordnance Department, and is now again carried on in the dwelling house part of the Bank premises. He was aware that many of those he was now addressing could tell of equal, if not greater services rendered in the hour of need by our gallant defenders; those glorious fellows, ever ready to aid and defend us and through and by whom with our gallant Navy, are we able to boast of our great Constitutional rights an privileges, which they have ever been ready to die if need be, in defence of. Before reading the resolution he would explain in the meeting how closely connected appeared to him to be the obligations we are under in the Officer commanding, who permits, and the soldier himself who gives the aid. Willing as the gallant fellows have shown themselves to work in our service it must be remembered that the Regimental Commanding Officer must be willing to send them to our aid, and that he can only do so if it is permitted under the rules fixed by the chief military officer, to which he had to conform and it was to him the surest proof of the sympathy felt for us, by Colonel McCleverty, Colonel Gold, and the officers and men themselves, that at once they were with us. It was with such feelings that he heard from an eyewitness that when the two Colonels met, Colonel McCleverty told his gallant brother officer, to use his men as he pleased, to do the most good at once, and that he would confirm it, that he need not wait for Brigade Office forms to be gone through. If he (Mr.R.) had failed to place before the meeting the conduct of the military generally on this recent occasion in the glowing terms it deserved; the fault was his. Ever may the gallant friends we have now so well tried deserve their country's thanks, and although their lot has been cast far away from the great scene of war, now enacting, still may prosperity ever follow them, and let them feel sure that in peace or war it will be our pride to hear of their success (cheers). He would now read the resolution; --

"That the Chairman be requested to write to Col. McCleverty, the Senior Military Officer of this Province, asking him to receive for himself and to communicate to Colonel Gold, the Officers and men of the 65th regiment, and the Officers of the Engineer and Ordnance Departments, stationed in Wellington, the thanks of this meeting for the sympathy shewn, and the great assistance rendered in the town since the Earthquake of 23rd January, 1855."

Mr. KING seconded the resolution, which was carried by acclamation.

MR. DUNCAN, in appropriate terms, proposed--

That this meeting is of opinion that the conduct of the Masters of vessels who so kindly afforded shelter and accommodation to the Inhabitants of this Town during the temporary alarm created by the shock of the Earthquake, on 23rd January last and their ready assistance and attention to such as were desirous to avail themselves of it, is deserving of grateful recognition, and this meeting requests the Chairman to convey to those gentlemen its cordial thanks.

Seconded by Mr. HUNTER, and carried unanimously.

The Chairman having vacated the chair, it was proposed that Mr. W. M. Bannatyne, should take it; when Mr. Raymond, seconded by Mr. St. Hill, proposed a vote of thanks to the Chairman, which was unanimously carried.

Source: New Zealand Spectator and Cook's Strait Guardian (also referred to as the *Spectator*) February 21 1855
Location: Wellington
Keywords: primary, response/recovery

Many issues of the *Spectator* had articles about the earthquakes. Each day's extracts are given their own source, location and effects keywords, so that the reader does not have to search some 30 pages to find one reference.

The *Canterbury Standard* in a short article, referring to the earthquake at Wellington, says,--
"We have extracted form the *Wellington Spectator* and account of the fearful visitation; but private accounts represent the mischief as more extensive than would be inferred from that account. *The panic appears to have been quite awful. The Bank was closed for four days and the whole town is stated to have been paralysed with terror for sometime.*"

We quote the above (the italics are our own) as an example of the mischievous exaggeration likely to be circulated with respect to the late visitation, and as conveying the most absurd and false impressions of what really took place. The Bank was closed four days, but not from any awful panic, which did not exist, neither was the whole town paralysed with terror. The feeling that prevailed at the time has we believe been correctly described in the *Spectator*; the damage that has been done is being fast repaired; and we certainly think the writer of the above account would be very much astonished and agreeably disappointed to see how very far short the reality fell of the gloomy picture which he has depicted.

Source: New Zealand Spectator and Cook's Strait Guardian (also referred to as the *Spectator*) February 24 1855
Location: Wellington, Canterbury, Nelson, Auckland, Hawke's Bay, Otago, Marlborough, Wairarapa, Taranaki, Christchurch, Lyttelton, Wairau Valley, at sea, Waiau
Keywords: primary, mainshock, uplift/subsidence, tsunami/seiche, building damage, biological effects

Each *Spectator* extract transcribed here is given its own source, location and effects keywords, so that the reader does not have to search some 30 pages to find one reference.

> We have great pleasure in laying before our readers the following interesting observations referring to the Earthquake, which have been obligingly communicated by Captain Drury, for the information of the public. Captain Drury's statement that no change had been made in Lambton Harbour beyond the elevation of the land to the extent of two feet, by which, as he justly remarks, the harbour has been rather improved than otherwise, must be most assuring and satisfactory, resting, as it does, on such a high authority, and being the result of careful examination. His promised report on the harbour will, we doubt not, prove a most valuable document, and will be of the greatest service in removing any ill founded apprehensions which may have been caused by this visitation: -
>
> To the Editor of the *New Zealand Spectator*.
> H. M. Surv. S. "Pandora"
> Wellington, Tuesday, Feb. 20, 1855
> Sir - In compliance with your request relating to the changes that have taken place in this harbour in connexion with the recent earthquake I shall be happy to afford such information as we have been able to collect.
>
> The result of our tidal observations, which have been carried out with much precision by day and night since we have been in port, do not indicate more material changes than the effects of N.W. or S.E. winds in the Strait would ordinarily produce.
>
> The rise and fall of the last springs was 4 ft.4in., which was as it should be. High water, full and change, at 4hr. 12m., and the neap tides were equally regular; nor has there been any change since these observations have been going on in consequence of the slight shocks, which appear to be wearing off entirely.
>
> I am inclined to believe that the upheaving which certainly did take place on the 23rd ult. was the work of that instant, and within the following 12 hours, when the sea was seen approaching and receding in such an extraordinary manner.
>
> This was not observed in 1848, because there was no change in the level.
>
> We find the extent of upheaving not to exceed two feet, and come to this conclusion upon the supposition that the ocean, where the convulsion is not felt, maintaining its level, must, when the local cause is removed, return everywhere to the same. Having discovered there is no tidal variation, but that the springs rise and fall as usual to the proper time, the difference between the height at mean tide now and formerly should give us the height this part of the land has risen. Our boats having sounded round that part of Port Nicholson - Lambton Harbour - we find, on comparing with the *Archeron's* chart, [a survey was carried out in 1849] no changes beyond the two feet mentioned, but on our return it will be more minutely examined, and a report of the same handed over to the Superintendent. It is well known that there is a flat extending around Lambton Harbour for a considerable distance beyond low water mark, and from which it suddenly shelves into deep water. And it is a matter of congratulation to the inhabitants that they have gained, or can easily redeem a large tract of building ground. I do not think there is any reason to apprehend its subsiding, for in viewing this country geologically we perceive there has been at intervals

similar upheavings, we find shells and marine deposits at various levels, and the present generation of oysters and other shells now left above the high water level will add another strata to the growing formation of this country. We have now received accounts from most parts of the country, and I have little hesitation in forwarding you the interesting remarks communicated to me by my intelligent friend, Mr. Hamilton, of Canterbury, which, although not written for publication, I feel sure he will have no objection in contributing information on the interesting subject.

It appears, then, from all accounts, that the centre of this convulsion must have been near the termination of the Rimutaka range (probably between that and Cape Campbell in the Middle Island), that from Cape Campbell south it decreased in intensity; was severely but not seriously felt at Christchurch, and less in Lyttelton (being on a rock foundation), and feebly at Otago. About Port Underwood and the Wairau probably worse than at Wellington. At Nelson, several chimneys were shaken down, but altogether far less severe than at Wellington. At Taranaki less again, and becoming feebler as it approached the north. (I may also mention that it was felt by a ship 150 miles west of Taranaki.) At Auckland it was only known to some. Again, on the East Coast, as we approach to the North, it began to decrease, for the accounts from Hawke's Bay represent it as comparatively mild there, whereas in the Wairarapa Valley, under the eastern boundary of the Rimutaka Range (as Wellington is on the west), the shocks were very severe.

It appears an established fact that the lower ground has been most disturbed, that the elevated houses on rock or solid bases, have had comparative exemption, but only comparative, as is proved by the lofty Rimutakas - as seen from Wellington - whose flanks, from the summits, are chequered with land slips.

It may be roughly estimated as extending its influence in a slight degree 300 miles from a common centre between Baring Head and Cape Campbell. The time it occurred is universally the same. We have every reason to hope nature is satisfied for years to come; there is no tradition to raise fears of a worse catastrophe and if buildings are accommodated to such occasions, it will only be remembered hereafter, that with the loss of a single life and of some property, which every individual shared, Providence granted us a large tract of land where it was extremely desirable - immeasurably exceeding in value the losses sustained, and by which the harbour has been rather improved than otherwise.

I am, Sir,
Your obedient Servant,
BYRON DRURY
Commander and Surveyor

Extract from a letter from J W Hamilton, Esq. to Captain Drury
As to the shock here, I can only call it a slight tremor. It was nothing more than what I had felt for a whole winter together, in 1849 and 1850, when the *Acheron* was lying off Wellington. We have had slight tremulous motions of earth for the last ten days, chiefly at night. At Lyttelton it was certainly much less felt than on the plains. Naturally enough, for of course this great mass of solid volcanic rock would not undulate like the great level plain, which is formed of very different material. At Lyttelton, clocks were stopped, those east and west, not.

The water in the Courtenay [the south branch of the Waimakariri] suddenly rose "six feet" - say, however, four. It fell again immediately. At the Heathcote ferry, a fresh wet mark was found up the sloping road, to about four or five feet from the water's edge. Now, in that case, the water would not have risen vertically above eight inches or twelve inches, so that I fancy the Courtenay rise is exaggerated. It is certain that each account from the northward shows that the shock was more severe, gradually diminishing in its progress downwards. The first and nearest damage we know of is Mr Lee's chimney knocked down at Wai-au-ua, near Wortley's, about eighty miles north of this. Rhode's stone house in Parau Bay, and the Church at Lyttelton, do not show the slightest symptom of disturbance. It would appear here, as at Wellington, that the level land is more easily disturbed (on its surface at least) than the hilly land. A gentleman who was in Valparaiso, during earthquakes that brought down buildings, said he was certain this one at the Courtenay would have brought down any brick or stone building; but still no chimneys have come down. He remarked that at first the motion was a dancing one, simply up and down, then undulating, in long heaves, and then rotary.

These facts may help in tracing the extent of the disturbance, and in finding the centre of it. Our times correspond; the shock here first felt came on at half past nine; weather fine; north-westerly and hot; blowing pretty fresh.

The first shock I did not feel at all; I was walking in Lyttelton. But on the plains, those who were outside were shaky on their legs.

Source: New Zealand Spectator and Cook's Strait Guardian (also referred to as the *Spectator*) February 28 1855 and May 2 1855
Location: Wellington
Keywords: primary, response/recovery, building damage, tsunami/ seiche, uplift/subsidence

Each *Spectator* extract transcribed here is given its own source, location and effects keywords, so that the reader does not have to search some 30 pages to find one reference.

February 28 1855

The *Taranaki Herald* (Feb. 14) after reprinting the account given in the *Spectator* of the Earthquake, adds the following observations: -

"These accounts are deficient in detail, no doubt occasioned by the difficulties and disturbance consequent on the calamity. Private letters, however, state that about forty homes (including the Bank, Baron Alzdorf's hotel, and Bethune & Hunter's warehouses) have been shaken to the ground, and that there is scarcely a chimney left standing. The damage is estimated at upwards of £70,000. The consternation of the inhabitants is so great, that many are living intents about the place fearful to trust themselves within the buildings. The sea rose at the time of the earthquake three feet high in the houses along the beach, but since then high water has never come within ten feet of low water mark; while in the stream where the vessels lie there is a depth of water six feet greater than before."

It is hardly necessary to observe that all these statements contained in the paragraph just quoted are entirely untrue, and we cannot but think that great indiscretion, to say the

least, has been shewn by the writer, in his desire to supply further details of an event which happened three hundred mile off, in hazarding such statements on some anonymous and, as is very plain untrustworthy authority. The sympathy here manifested and the anxiety to give such details savour somewhat of La Rochefocould's maxim "there is something in the misfortunes of our friends which is not displeasing to us."

May 2 1855

[Letter by Rev. Clarke which first appeared in the *Sydney Morning Herald* March 12 1855 (q.v.).]

OTAGO WITNESS (published in Dunedin)
Source: Otago Witness February 17 1855
Location: Otago
Keywords: primary, mainshock

Many of our readers will be surprised at being told that the earthquake which has proved so destructive at Wellington and the other settlements in the neighbourhood of Cook's Straits was felt in Otago, but so slightly as to be totally imperceptible to those inexperienced in such matters.

SYDNEY MORNING HERALD (Published in Sydney, Australia).
Source: Sydney Morning Herald, March 5 and 12 1855.
Location: Wellington, Auckland
Keywords: primary, mainshock, aftershocks, building damage, tsunami/seiche, ground damage, response/recovery, casualty, uplift/subsidence

March 5 1855

Description of the earthquake in Wellington.
The following account of the late visitation at this place, contained in a letter to a friend in Sydney, will be read with great interest. The statements may be relied upon as correct, the writer having been an eyewitness of that which he so graphically describes: -

Wellington Jan 27 1855
I arrived here on the 20th, after a very pleasant passage of thirteen days.... Monday was a beautiful day, but the regatta and rural sports were of the most wretched description: the following day it was blowing a hard gale from the N.W., with very heavy rain during part of the time; but I believe there was a good attendance at the races. The same evening I was sitting in the parlour of one of the inns, when suddenly we heard a rumbling sound, followed instantly by a most violent rocking of the house. We tried to rush to the door, but the tremulous motion was so great that we could scarcely keep on our feet, and when we did get outside, we had to hold on to one another to keep ourselves from falling. This took place at about quarter past nine and the shock lasted about two minutes, and has been succeeded by repeated shocks, although not so long nor so violent as the first, up to this present time. This, I hope, may be the last earthquake I may ever experience, for the sensation is truly frightful, and it has caused great consternation and a perfect stagnation of business in the town. The damage is so great that the place may now be described as a perfect ruin; everyone has suffered more or less; the new bank is so much shaken that it will have to be pulled down -the gaol nearly as bad; the Bonded Stores are partly down, and the

rest must be pulled down for safety; the Council Chamber is down, and the Government House is a complete wreck. The chief hotel has suffered so much that the walls are all bulging, and by the fall of one of the chimneys the landlord was killed; and several of the other inns are gutted. Indeed the publicans are great losers (for the smash among their bottles has been very great). Numerous other buildings are so much shattered that they must be pulled down, and at present it is impossible to estimate the amount of damage. Business, since the earthquake, has been at a stand – scarcely one of the merchants' offices have been open, and but few of the shops: and the Bank and Custom House still remain closed. Indeed, up to this present time the Thomas and entry had not been entered inwards. During the earthquake the tide rose so high that it came over the quay, and since then it has receded, and the tides are at least six feet lower since the first shock. So that it is evident there has been an uplifting in the land. From the damage done to the roads caused by the slips and falls of bridges, the communication, except on horseback or on foot is completely cut off with the country: the accounts from which are very bad, the earthquake having been felt very severely. The papers attempt to pass it over in a very slight manner, one of it speaking of it as a light shock, by which a few chimneys have been thrown down. It does not say much for the respectability of the press; and there is little use their attempting to disguise the truth, for everyone that I have spoken to says that the present earthquake is much more severe than the one that took place in 1848. The fine bridge across the Hutt is completely smashed, the land on each side having sunk and let it bodily down, and the road up the valley of the Hutt is rent into continued chasms. A person must witness to understand the damage that can be done in two minutes, which was about the duration of the first shock, and all the damage was done at that time. The only description I can give of this house during the shock was that of a pendulum of a clock going very fast, and it caused a sensation very similar.to sea sickness, when it is first coming on. I am glad to say the damage done to this house was but slight in comparison with others: it was a new wooden building with the chimneys outside, and they are fallen to the ground. There was a considerable smash in the bar and in the cellar and store room; everything was tossed upside down but without doing much damage. Fearful was the smash in the druggists' shops, and you can scent them some hundred yards away.

The accident that I mentioned before was the only loss of life, but I have heard of several very narrow escapes, and some were very much bruised.

Fatigue parties of soldiers are busy pulling down a number of the houses and stores in the principal street; and the more I see of the town, the greater the damage appears; and they will find that numbers of the houses which they at present suppose are capable of being repaired will have to be pulled down.

Confidence is completely gone, for who in future would go to the expense of erecting good buildings where at any moment they maybe subject to a like visitation.

The Provincial Government, having one of the papers in their pay, are trying to make it appear that it is only a very slight shock, but such a proceeding must defeat its own and – the truth must come out. Raymond's report of the damage done to the bank will alone be sufficient to convince any unprejudiced person to the contrary.

I trust this earthquake may not have been felt at Canterbury, for it came from the south.

I saw the captain this morning, and he says it will the middle of next week before he can be ready for sea.

This is certainly the most disagreeable place in New Zealand the climate is so uncertain. Yesterday was a most beautiful day; but do-day it is blowing a gale from the N.W., and the clouds of dust are most disgusting, and it is impossible to move out with any comfort. If the town had been subject to a six hours' bombardment from a Russian fleet, it could not have suffered to the extent it has done.

March 12 1855

New Zealand

Auckland 3rd March 1855

... You will, of course, and long ere this, have heard of the frightful earthquake which has a second time, thrown Wellington into ruins. All that was felt of it in Auckland, - and that not generally, - was a strong vibration. On the evening of the occurrence (23rd January) I was sitting writing. I was suffering from a bilious attack, and imagined that my head swam rather than that the table trembled. A friend entered at that moment and asked if I felt anything....

TARANAKI HERALD (Published in New Plymouth)
Source: Taranaki Herald January 24, February 28 and December 12 1855
Location: New Plymouth, at sea, Wellington, Wanganui, Nelson
Keywords: primary, mainshock, aftershocks, building damage, volcanic effects, ground damage

January 24 1855

On Tuesday night the neighbourhood of New Plymouth experienced a sharp shock of earthquake, which for a time created considerable alarm, but which fortunately was not attended with any consequences more serious than the damaging of a few chimneys. The principal shock took place about 9 o'clock, and continued with considerable severity for nearly 5 minutes; several other shocks were felt through the night and following day, but of no great severity, and we trust that there is now nothing to fear from this distressing visitation.

... Captain Canney [of the ' Josephine Willis', from Plymouth] informs us that at about half past 9 on Tuesday night last, being upwards of 150 miles from land, he experienced a shock of an earthquake - no doubt the same felt here.

February 28 1855

[Extracts from *Wellington Spectator* and other sources were printed on this day. They are not repeated here as they are found elsewhere in the database.]

WELLINGTON

... the force of the shock was principally spent on the town and the neighbourhood of Wellington. At Whanganui it was felt less severely, and at New Plymouth the damage done has been trifling. The comparative mildness of' the visitation is attested by the fact that the large stone Church of St. Mary's in Vivian-Street, though a lofty structure, remains entirely uninjured. It appears to have been felt with some severity in Nelson, but in a far less degree to Port Nicholson, while from the account given in the Lyttelton Times it may be presumed that it was much the same as in New Plymouth. Along the East coast it appears to have been generally felt, and with more

or less severity as the distance from Wellington is increased or diminished. 'In the dividing range of hills between Wairarapa and Wellington on the east side of the harbour,' says the Spectator, 'there have been heavy landslips ... from their summits, which are plainly visible from Wellington. The Earthquake appears to have exerted great force on this range.' In reprinting Captain Drury's account from the Nelson Examiner our contemporary, though admitting the correctness of the details given, observes that 'having been written at the time, it contains a very strong impression of the catastrophe.

December 12 1855

[Reprints from *Wellington Independent*, November 24,1855, and letter to Editor of the *New Zealand Spectator* by Alexander T.Allen]

KAIKOURAS

A report of a Volcano in the 'Kai Koras', 20 mi. s of C. Campbell. seen in eruption & did not exist before the eq. [earthquake] of 1855!

The fact that eq's now have a vent should 'remove any dread which may still remain'. Indept. says volcano 'seen by shepherds at Messrs. Clifford & Weld's station'.

Allen: "The Cone, in size, is inconsiderable, being surrounded by others of much greater altitude. It is apparently about two miles distant from the sea"

This account gives much circumstantial detail, and were it not for geological knowledge, would be completely credible.

THE NEW ZEALANDER (Published in Auckland)
Source: The New Zealander February 28 1855
Location: Wanganui, Auckland
Keywords: primary, mainshock, building damage

February 28 1855

WANGANUI

The shock was very severely felt at Wanganui. The Block Houses have been extensively injured. In the York Stockade, the arms and accoutrements of the soldiery were buried in the ruins, but subsequently dug out. The Guard and Cook houses were much injured, but happily no loss of life took place. The church opposite to the town of Wanganui was thrown down and with the shock the bell began to toll as if sounding its parting requiem.

AUCKLAND

Many experienced the ultimate vibration of that severe shock which, without inflicting the slightest injury, was as sensibly felt as the vibration of the great earthquake of Lisbon was felt in London.

THE TIMES (published in London)
Source: The Times May 26 1855
Location: Wellington, Hutt Valley
Keywords: secondary, mainshock, aftershocks, building damage

> "Private letters, via Sydney from Wellington, New Zealand, to the date of February 12th, give ample details of the earthquake on the evening of the 23rd of January, which seems to have visited the whole country, although to a less serious extent than at Wellington, At that settlement much damage was done; the first shock occurred at 9 p.m. on the 23rd, without any previous warning, and more or less injured every brick or stone building in the town, hardly leaving a single chimney standing in the whole place. The branch of the Union Bank of Australia, the gaol, and the Government House, being the most substantial buildings, suffered the most; while the lighter constructions of wood were generally uninjured. Although the alarm and destruction of property were great, only one life was lost. The shocks continued at intervals for several days, but none were so severe as the first. In the valley of the Hutt, near Wellington, much injury was sustained, the bridge being destroyed, and the road rendered impassable. The inhabitants of Wellington were already taking measures to repair the damage, and they speak in high praise of the conduct of the military, in helping to clear away the rubbish from the streets. It is presumed that no attempt will be made in future to build houses otherwise than of wood, and of one storey high, as these alone appeared to sustain the shock. The earthquake is stated to have been quite as severe as that of 1848, although it has not created quite so much alarm and disturbance in the general affairs of the colony."

WELLINGTON INDEPENDENT also referred to as the INDEPENDENT (published in Wellington)
Source: Wellington Independent. (Also referred to as the *Independent*) January 24 1855
Location: Wellington
Keywords: primary, mainshock, aftershocks, building damage, casualty

Each day's *Independent* extracts are given their own source, location and effects keywords, so that the reader does not have to search through all extracts.

> On Tuesday evening a little before ten o'clock, the community were alarmed by a smart shock of an earthquake, which lasted several seconds, and was succeeded at intervals by tremors of less violence. The first shock knocked down many chimneys; by the falling of one of which we regret to say, one old colonist, Baron Von Alsdorf, who was infirm and unable to get out of the way, was killed. At the hour of our going to press, there is every appearance of all commotion having ceased, and we trust that the partial damage above referred to will prove to us all, that we shall suffer. We have before cautioned our readers against the insufficient character of the brickwork of their chimneys and other erections and trust that for the future some better model will be adopted.

Source: Wellington Independent (also referred to as the *Independent*) February 10 1855
Location: Wellington
Keywords: primary, mainshock, building damage, response/recovery

Each day's *Independent* extracts are given their own source, location and effects keywords, so that the reader does not have to search through all extracts.

> The *Spectator* of Wednesday last, from motives of its own which will admit of easy explanation, professes to give an account of the recent Earthquake. The hodge-podge thus prepared for the public repast gathered with little discrimination from all quarters, with a less innocent object than to gratify a morbid appetite or to turn a ready penny, we should have left untouched and unnoticed did we not think it was calculated - we will not say intended - to do serious damage to this Province. A full and authentic account of the late calamity ought to be published; we do not therefore complain of our contemporary giving its version of the occurrence. What we complain of is that such an exaggerated and one sided account should have been published to the world, calculated to convey the most false impressions, without one editorial comment of remark calculated or designed to re-assure the public mind, or to restore public confidence. This omission of our contemporary we will endeavour to supply.
>
> On Tuesday night the 23rd January, being the day after the celebration of the Anniversary of the foundation of the Colony, the city of Wellington was visited about ten minutes past nine by the most severe shock of an earthquake that it has been the lot of its inhabitants to experience. Most of the chimneys and brick buildings, together with several constructed of wood, were by the first shock levelled with the ground. Considerable damage was also done to the Union Bank and Von Alzdorf's Hotel - the two finest buildings in the town - as well as to the Government House. The Provincial Government Offices, with the Council Chamber, were also at the same time destroyed; but this was rather owing to the inefficient manner in which they were constructed than to the violence of the shock. This did not last above a minute, but the damage it did, and the consternation it occasioned, were by no means inconsiderable. In short on the night in question Wellington, in common with most other parts of New Zealand, suffered from a most severe and most calamitous earthquake, which would have been more calamitous and felt more severely had there been more houses and more inhabitants. We remember that in January 1839 in England was visited by a most terrific hurricane....
>
> [There follows here a long discourse on calamities and earthquakes experienced elsewhere].
>
> What do we gather from these facts? This reassuring truism; - because New Zealand has been visited by an earthquake, that is no reason why she should continue to be visited by the same calamity. Lisbon, though destroyed a hundred years ago, is still the capital of Portugal, and for ought we know to the contrary, has never been visited by an earthquake since. Though Messina was partly destroyed, and had many thousands of her inhabitants killed in 1783, she still flourishes, notwithstanding the tyranny of her rulers. Though Chili is almost daily visited by earthquakes, her inhabitants are prosperous and happy; and that country furnishes a large supply of flour and grain, for which we were formerly, and for which to this day the inhabitants of Australia are indebted for at least a portion of their subsistence. Shall it be said that such places as Lisbon, Messina, and Valparaiso, can flourish, containing such inhabitants, and existing under such deadening tyrannies, and that New Zealand, possessing the finest climate, and the most free form of government under the sun,

saying nothing of the genus of its inhabitants, is not to go ahead? No, for this is contrary to the very nature of things. Earthquakes are the most terrific of all natural phenomena, this we admit, but certainly what the degenerate sons of Spain can disregard, and progress in spite of, Britons will never allow to helplessly overcome them; and this is proved by the truly praiseworthy and energetic manner in which the settlers of this Province have gone to work to repair the damages caused by the late visitation. As we by no means admit, there were any probability of this colony, and this province in particular, being likely to be again subjected to the calamity with which we have been recently visited, we should recommend that our buildings in future be erected with a view to guard against its effects. We must abandon our penchant for brick and stone houses and content ourselves with simple but substantial erections of wood. It is the duty of wise men to adapt themselves and their habitations to the circumstances in which they are placed. The food of the Greenlander and that of the inhabitant of the torrid zone, is as unlike as possible. They both consume that which is most conducive to their health, and most in accordance with those circumstances by which they are surrounded. The clothing and habitation of the Hindoo, are totally dissimilar to those of the people of Northern Europe, but they are both adapted to the wants of each. Should it be found that these islands are periodically subject to earthquakes, we must, as we have before repeated, so construct our dwellings as to guard, as far as possible, from the evils which would otherwise result from them. If any one will calmly reflect for a moment, he will discover that the mischief done by earthquakes, has been chiefly occasioned by the destruction of buildings. In other respects, they are not near so injurious as tornadoes, hurricanes, the yellow fever, or cholera, to which the inhabitants of all the world are liable, and from which we are more exempt than any other. There can be no doubt that most of the mischief the recent earthquake has occasioned arose from a disregard, or an ignorance of a few simple precautions, which we can now, all readily understand and appreciate. There can be as little doubt, that the mischief would have been much greater, had the greater part of the town been erected of bricks or stone. We can dispense in future with high massive buildings, and can make a very pretty and comfortable city of Wellington, even though our houses should be one storey high, and the material used in their construction, be nothing more substantial than painted boards. We wish to impress upon our readers one fact, not only that we have been visited by one of the most severe earthquakes, so severe, that in all probability, we shall not witness the like again, but that the destruction of property that it has occasioned, has been nearly altogether owing to our disregard in the construction of our dwellings, to those natural laws, on which our safety and well being in a country like this depend.

Source: Wellington Independent (also referred to as the *Independent*) February 28 1855
Location: Wellington, Wanganui, Manawatu
Keywords: primary, mainshock, building damage, tsunami/seiche, uplift/subsidence, ground damage, response/recovery

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By the overland mail we have received a copy of the *Taranaki Herald of* the 14th inst. It contains the *Spectator*'s account of the late earthquake, with the following additions: -

These accounts are deficient in detail, no doubt, occasioned by the difficulties and disturbance consequent on the calamity. Private letters, however, state that about forty houses (including the Bank, Baron Alsdorf's hotel, and Bethune and Hunter's warehouses) have been shaken to the ground, and that there is scarcely a chimney left standing. The damage is estimated at upwards of £70,000. The consternation of the inhabitants is so great, that many are living in tents about the place fearful to trust themselves within the buildings. The sea rose at the time of the earthquake three feet high in the houses along the beach, but since then high water has never come within ten feet of low water mark while in the stream where the vessels lie there is a depth of water six feet greater than before.

In the road between Whanganui and Wellington there were cracks eight feet wide rendering it impassable, and in other places where the ground had been quite dry the water was for miles two feet deep. Those who witnessed the convulsion of 1848 consider the present visitation far more severe.

The foregoing is indeed news to the Wellingtonians. We need hardly remark that is not true that forty houses (including the bank, Baron Alsdorf's hotel, and Bethune and Hunter's warehouses) have been shaken to the ground; that the sea rose three feet high in the houses along the beach, but since the high water has never come within ten feet of low watermark; while in the stream where the vessels lie there is a depth of water six feet greater than before; and that in the road between Wanganui and Wellington there were cracks eight feet wide, rendering it impassable. It is true that considerable injury has been done to the buildings mentioned; but not to the extent the *Herald* would lead its readers to infer. The bank has had a portico which was built of brick and stone, on a quagmire foundation, and fastened to the bank (which is a lath and plaster building) by iron rods, shaken to the ground; but the bank itself, although shaken, and torn about by the iron rods in question, still stands, and the banking business is being carried on in another part of the premises while the necessary repairs are being made, and the ruin of the portico cleared is away. Baron Alzdorf's hotel has had the upper portion of one of the ends, (which was built entirely of brick without any bonds to support it) thrown out, but the other portion of the building, we are informed, is very slightly injured. Bethune and Hunter's stores, although of course a little shaken, are still standing, and the necessary repairs having been made, goods are stored in them as usual.

We do not know who furnished the estimates of the damage done at £70,000, but if it is on a par with the other portion of the tale, no reliance must we place on it. This we do know, that in the bonded stores, where the greatest amount of damage was done in 1848, there has not been £5 worth destroyed by the recent earthquake. The water did rise unusually high, and ran into many of the houses situate on the lower part of the beach, but to say that the water was three feet high in the houses along the beach is not true; as we are well aware that the water never entered the majority of them. It is equally untrue to say that the high water has never come within ten feet of low water mark; and as to the statement that in the stream where the vessels lie there is a depth of water six feet greater than before, Captain Drury, of the *Pandora,* says that there is two feet less water. It also says that in the road between Wanganui and Wellington there are cracks eight feet wide rendering it impassable, and in other places where the ground had been quite dry ... water was ... for miles two feet deep. We have conversed with persons who travelled from Wellington to Wanganui and back again, immediately after the earthquake on the 23rd January, and who solemnly declare that

they never saw anything of the kind. The mail has always been received regularly, and we have never heard before of the road being impassable.

We regret that our contemporary should publish such incorrect statements, as they are calculated to injure the Province, and frighten our friends in England and elsewhere.

Source: Wellington Independent (also referred to as the *Independent*) March 14 1855
Location: Hutt Valley, Wairarapa
Keywords: primary, ground damage, response/recovery

Each day's *Independent* extracts are given their own source, location and effects keywords, so that the reader does not have to search through all extracts.

There are several road parties actively engaged in making and repairing the line of road between the Hutt and the Small Farm Settlements, and parties who have recently travelled in that direction have expressed themselves greatly satisfied with the progress that they were making, and the efficient manner in which the works were being completed. Mr. Nicholson's party, numbering 40, are engaged on this side of the Mangaroa. Mr. Hodder, with a party of 14, is progressing well with his contract, which comprises that portion of the line between his house and the foot of the Remutaka. Another party, numbering 9, under the superintendence of Mr. Heath, who are engaged on the Remutaka range, have made very great progress indeed, and have repaired all the damaged caused by the late earthquake. There is now an excellent cart road the whole of the distance from the Hutt to the summit of the Remutaka. Messrs. Webb and Hall, with a party of 14, who are engaged under contract, on that portion of the road between the summit of the Remutaka and Burling's station, are also rapidly proceeding with their work. We hear that his Honour the Superintendent has promised to furnish the necessary funds to cut a cart road to Greytown, so that by the time the cart road is completed to Burling's station, the whole line of road between here and Masterton will have been opened up for drays and carts. The population of the Small Farm settlements, Greytown and Masterton, is slowly but steadily increasing, there being, as we are informed, no less than 60 persons residing the former and 30 at the latter.

NICHOLLS, C.H.S. Rev.
Source: Nicholls, C.H.S. 1855. Journal 1853-59, MS-1716, Alexander Turnbull Library, NLNZ.
Location: Wanganui
Keywords: primary, mainshock

23 Jan the night of the great earthquake at 9½.

NICHOLSON, W.B. (ed.)
Source: Nicholson, W.B. ed. 1940. *Petone's First Hundred Years*. Published for the Petone Borough Council. L.T. Watkins Ltd, New Zealand.
Location: Hutt Valley
Keywords: secondary, uplift/subsidence

p46

After the great migration from Petone several severe earthquakes took place. One in particular [1855] raised the level of much of Petone by several feet, and in particular extended the eastern foreshore a further chain depth into the harbour. The western, or

Korokoro, end was not greatly affected. The raising of the level of the land was beneficial to Petone as land which had been swampy was now high and dry.

PAUL, Robert Bateman
Source: Paul, R.B. 1857. *Letters from Canterbury, New Zealand*, 1857. Rivingtons, Waterloo Place, London.
Location: Lyttelton, Canterbury
Keywords: primary, mainshock

p17

On the evening of the 23rd of January, 1855, a shock of earthquake, described by Mr Hamilton, collector of customs at Lyttelton, as 'a slight tremor', was felt throughout the province, but no damage whatever was done.

Such a publication was probably designed to encourage emigrants to New Zealand.

PILCHER, Thomas W.
Source: Pilcher, T. W. 1855. Letter, dated March 4 1855, from Thomas W. Pilcher to H.J. Pilcher, London. MS-Papers-0468 Alexander Turnbull Library, NLNZ.
Location: Wellington, Wairarapa, Auckland, Lyttelton, Otago
Keywords: primary, secondary, mainshock, aftershocks, building damage, casualty, tsunami/seiche uplift/subsidence, ground damage, response/recovery

Wellington 4 March 1855
My dear Harry, In my last letter to Mother dated the 19th Jany. aposted via Melbourne on the 20th I stated that the 22nd and 23rd was our grand days. The 23rd was a day which I shall remember to the end of my life. The day opened with drizzly rain ablowing pretty fresh from the N. W. however I went to see the races at Burnham Water which is a flat piece of land between Evan's and Lyalls Bay which any map of Wellington will show you at one time were joined, came home wet through and changed. At 20 minutes past nine in the evening as I was proposing a smoke and then to bed, the house had a slight motion. Uncle got up to prevent the glasses from falling out of the cupboard (in the back parlour). I got up to assist, then I thought the house was coming down such smashing and cracking which lasted about 50 seconds. The damage done in that time was dreadful; I will commence from the front parlour - books out of bookcase, bottles in Cupboard, 3 parts broke Chimney down; Aunt's bedroom - a few odd and ends broken chimney down to the ground; - my bedroom - Aunt not being very well was lying on my bed, and from a shelf which goes round the room fell everything, amongst other things was my working desk which hit aunt in the neck in its descent, a bottle of Sulphuric Acid fell and the stopper broke ??[Illegible], my books got a little damaged by water; back parlour – glasses, Mustard, Brandy, sugar, salt, pepper, broken bottles, etc. all mixed as if for a pie - the Clock fell from the mantel shelf and never broke not even the front glass, chimney down in its descent broke three rafters. In the bedroom where Mrs Smith slept, wash hand stand capsized and broke every thing in the room in a medly besides a friend on the bed who had just recovered from a fit. Kitchen - plate, glass bottles, Kettles, water and every thing that was on the dresser was on the ground, not being a brick chimney but Iron it stood but all the brick work round the stove is cracked. Washhouse - chimney down and other brickwork cracked. Bakehouse - both ovens down as well as the Chimney. Mill, terribly shook, one side out - it will take at least £200 to make it good, all done in 50 seconds.

I cannot describe my feelings that night - all the candles were knocked out - I went to the Kitchen to get a Lanthorn [lantern], stepped in some oil so I put on my sea boots and did not change for 2 days after the first shock. Me and Uncle went in and packed away the Clock (which was 1/4 of an inch from the edge of the front parlour sideboard) Looking glasses and anything else we thought would be likely to break, I should not have had courage to assist but for Uncle going and that gave me confidence for every five minutes shake went the house and you had to balance yourself as if you was on board ship. The shocks were vertical, rotary N to S and waving. The tide rose about 4 feet above high water mark and where the beach is low the water was 1 foot high in some of the shops and then receded and rose every 10 or 15 minutes. The tide was so low that I walked round Noah's Ark when at the lowest tide known there was three feet water. The land has risen about 3 feet. When there is a heavy shake I observed the road to wind like a snake ~~~~~ and the houses move from north to south. All the fresh water was milk white and here and there was fissures and slate coloured clay bubbling up - but only in places that are swampy. The bank had its stone and brick portico down, - it was built on swampy ground and tied to the building by Iron rods, the pillars snapped asunder like a carrot. The bank itself would not have received so much damage if the portico had not been tied to it. Baron Alsdorf's building, built of lath and plaster with brick chimneys and no bond to them trimming up in side, the poor Baron being an invalid was Sitting next to the fire place when the shock came and could not get out of the way - so he was killed and that thank God was the only accident that happened in Wellington. The north side is rather out of the straight and the building is twisted two or three degrees off the brick foundation - which every house upon brick foundations has more or less.

There were some very narrow escapes - a woman and her family were in bed upstairs (the houses are not more than one story) and the house fell in like a telescope and not one hurt - so did the Council Chamber and several other buildings but all that did do so was built for sale not for use. The shakes are very local and run in veins. One house will have a great many things broken and other not a thing - Mr Hurley's house had one empty bottle broke only -

At Wairarapa four Natives were killed by a house falling. Auckland, Nelson Lyttelton and Otago felt it but not so much as us. We are nearer the centre of action but we cannot tell where it is. We are having about 1/2 dozen shakes during the day, some heavy some light. I am getting quite used to them, they are preceded sometime with a rumble. They are not dangerous, I do not like the vertical ones -

Business was suspended the whole of that week but is going on as usual now. Chimneys being rebuilt and repairs going on as fast as they can. I have not heard of any one leaving on a/c of the shakes. Brick buildings will not do here, either Iron or wood and less top hamper the better. I have sent you papers with accounts of the shakes but you must take the medium. Uncle has 6 weeks leave of absence and gone to the Ahurri [Ahuriri]. Aunt is very nervous when a shake comes and sings out Tom, Tom, as if I could stop them. We had an increase in our family during the first fortnight. We numbered 16- if you want to get the sensation of a shock get on a rickety old bedstead and 4 strong fellows one at each post and let them shake away until they are tired. I wish I had 20 tons at the present moment of Sheet Iron for Chimneys - Patent Stoves that were at discount before were all sold 2 days after the shock.

I now close well and hearty and when Mr Smith arrives home he can explain the position of the places mentioned better than I can.
I remain
Wishing the shocks over
Yours etc. Thos . W. Pilcher

Some punctuation has been corrected or added in this extract so that it can be read more easily.

PLIMMER, John
Source: McKinnon, J. 1991. *John Plimmer and his family - 150 years - 1841-1991.* Privately published by the Plimmer Family Reunion Committee, Wellington. Extracts supplied by Amanda Plimmer.
Location: Wellington
Keywords: primary/reminiscence, secondary, mainshock, uplift/subsidence, building damage

p17

In February [sic] 1855 Wellington experienced its second major earthquake and the most severe known in its whole history It lifted the land all around the harbour and rendered impracticable the scheme to have a dock at the Basin Reserve with a canal linking it to the harbour along the line of Kent and Cambridge Terraces. John Plimmer's account ... of the earthquake is memorable:

There were three distinct heavy shocks, beginning on Monday. There was a continuous quivering between them, which, in a manner, linked them together. That on the Monday was the lightest of the three, and did not do much damage, but on Tuesday there was a much heavier shock, and many chimneys fell, and large brick stores were seriously damaged, especially those with heavy slate roofs, by breaking the bond of the brickwork and splitting the angles. This was the case with a large bonded store belonging to Captain Rhodes.... I was sent for to see if I could do anything to prevent it falling.... I had just climbed a long ladder, or rather two ladders lashed together, and had just reached the eaves of the building....; I had caught hold of the slates, and was in the act of leaning over to get a clearer view, when the third and most violent shake commenced.... With some difficulty I regained a firm footing on the ladder, when I saw it was certain death to go down. So I held fast to the slates on both sides of the ladder, and held on for my life. Sometimes the rocking building leaned over so far that I could scarcely hold the ladder to the wall. It was a horrid and perilous situation, but I did not lose my presence of mind, and held on till the shake slackened in force, for I thought I might have some chance if I went down with the building.

"... the most curious thing that attracted my attention was the way in which the Te Aro bog was moving. It was rolling like a heavy sea, but looked more like a field of waving corn in a high wind. I made an examination to see how the ladder on which I stood was secured from slipping sideways, and was astonished to discover that it had ground its sides through two thicknesses of slates to the wall plates of the building. I need merely add that I lost no time in descending to terra firma - although, at that particular time, it did not suggest the idea of firmness..

When I had descended to the ground ... a great revulsion of feeling came over me, but I was soon myself again. My first though was about my wife and children, and I set off at a great rate towards "Clay Point".... As soon as I could force my way though

the crowd, I hastened to my home to ascertain how my family had fared in the general overthrow. I was rejoiced to find them all safe and sound on "Clay Hill', and although all around me was in ruins, I did not seem to mind. In common with my neighbours, I looked upon the labour of years destroyed at once fell stroke. But we all breasted the waves of adversity with good courage, and, in an incredibly short time, the disastrous effects of the great earthquakes of 1855 began to disappear.

It is clear that Plimmer's account above describes the effects of the 1848 Marlborough earthquake rather than the 1855 event. However, the following (written by McKinnon) must refer to the 1855 earthquake as the "Ark" was not built until after 1848.

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The earthquake also damaged the Ark. The upheaval of the sea bottom had loosened the props and supports and the Ark was thrown over, with some hundreds of tons of goods dislodged onto the lower side, but otherwise, according to John Plimmer, not much damaged. After "much toil and expense", John Plimmer succeeded in righting the old ship, and had her replaced firmly and safely in her old position....

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As a result of the earthquake the depth of water at the end of the wharf was several feet less than it had been, so John Plimmer constructed a jetty extending about 190 ft from the shore. This provided the required depth for timber vessels to load. About a year later, at the instigation of the Wellington Provincial Government, John Plimmer extended the jetty by a further 112 ft into the harbour. He also built a timber breastwork retaining wall to the north of the Ark 136 ft long and filled in behind it with 3,601 cubic feet of soil taken from Clay Point. On this reclaimed land he built a warehouse or shed for the accommodation of assisted immigrants who disembarked at Plimmer's Wharf.

Source: Anon. 1906. Life of John Plimmer. *In: New Zealand Mail* May 09 1906.
Location: Wellington
Keywords: primary/reminiscence, mainshock, building damage

In the "Life of John Plimmer" (of Wellington), a private publication, that gentleman referred to his experiences on the two occasions when Wellington was most severely shaken – in 1848 and 1855. He says: -

After 1848, as people did not like to live in brick or clay houses, the real age of wooden houses commenced. After a while, however, merchants and shopkeepers began to build in brick, as a protection against fire, as insurance was very high on wooden buildings. Thus, when the second disastrous earthquake occurred in 1855, it did immense damage, as most of the buildings were either demolished or so much shaken as to be untenantable.

PORTER, F.

Source: Porter, F. 1989. *Born to New Zealand - a biography of Jane Maria Atkinson.* Allen & Unwin, Port Nicholson Press, New Zealand.

Location: Taranaki

Keywords: secondary, ground damage

> These explosions [i.e. the noises accompanying the earthquake] may have been caused by slips along one side of Mt Taranaki's cone. C W Richmond reported that many New Plymouth settlers thought the earthquake had altered the shape of the mountain.

REDWOOD, ARCHBISHOP

Source: Redwood, Archbishop. 1887. *Sketch of the work of the Catholic Church for the last half-century in the Archdiocese of Wellington, New Zealand.* Lyon & Blair, Wellington.

Location: Wellington

Keywords: secondary, mainshock, building damage

> About nine o'clock in the evening of 21st January [sic], 1855, occurred the great earthquake, and all the chimneys of Wellington-save one- were thrown down, those of the convent being amount the number. These were but two; as a preservative, however, against further falls, it was decided to rebuild only one – that belonging to the kitchen. The Bishop turned his fireplace into a cupboard. From the night of January 21st [sic] till the 8th of the following December, shocks of earthquake were frequent and severe, the hills at the back of the Convent undulating against the starlit sky – for the shocks were frequent alike by day and night. Numbers left Wellington in terror. The sisters and children fled from the two-storeyed buildings to the open air, or porches, directly the rumbling and trembling of the earth commenced, ad they were frequently joined by the Bishop, who would do his best to quiet their fears.

RENALL, A. W.

Source: McIntosh, J. 1986. *"The Renall years 1813-1986"*. W. J. Deed Printing Ltd, Waiuku, New Zealand.

Location: Wellington, Hutt Valley

Keywords: secondary, mainshock, building damage

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> On January 23rd 1855, that convulsion of nature, known as "the great earthquake" occurred. The Provincial Council was in session, but owing to the day being observed as a general holiday, in honour of the anniversary of the province, the council had adjourned. A race meeting was being held at Miramar, where most of the council was, otherwise they might have suffered a crashing defeat. The Provincial Council Chambers were originally a public house owned by Richard Barrett and when the earthquake erupted the upper floor and top of the building totally collapsed and fell, leaving the walls unsupported. A. W. [Renall] who had a flour mill driven by water at the Taita, was a bad sufferer in the earthquake. The earthquake tremor disturbed the foundations, dislodged the machinery out of gear, filled up the leads and left the place virtually a wreck. Equal to the emergency he obtained the help of a gang of Maories, restored the mill and the water races and after the expenditure of one hundred and seventy six pounds, had the machinery at work in a little over a month.

RICHARDSON, George

Source: Richardson, G. 1855 Letter, dated Feb 7 1855, from George to his sister Elisa Richardson in Surrey, England. *In:* Richardson Family papers 1840-1857. MS-Papers-1720, Alexander Turnbull Library, NLNZ.

Location: Wellington

Keywords: primary, mainshock, aftershocks, casualty, building damage, tsunami/seiche, response/recovery

> Mulgrave St, Wellington
> NEW ZEALAND
> February 7th, 1855
> My Dear Sister
> Lest you might hear some exaggerated accounts of our late unfortunate earthquake I hasten to let you hear of all our well being but terribly frightened we all were I assure you. It took place on the evening of the 23 January. I had intended starting that morning up the coast to where John and William were staying with the sheep. However, I was hindered.... It was very fortunate that he [George] came up in the evening and we were just having tea for we do not take supper here, when a tremulous motion was felt which quickly increased to a most terrific shaking. The piano came into the middle of the room and the crashing of earthenware and glass, the creaking and rocking of the house caused a most fearful and terrifying noise - this continued nearly two minutes. You could not stand without holding and the shock had passed before we could get Syd and Nell into the garden. George, Fred and Margaret were asleep. We got them out and set up a tent where we sat till daylight but continued to sleep and live out of doors for more than a week as the shocks continued and still continued tho' they are now very slight and we scarcely notice them. It is little short of a miracle that only one fatal accident occurred. The fall of (with but one or two exceptions) all the chimneys and many brick walls and partitions into the streets and houses and only one person killed, is indeed a more striking mark of the merciful care of our Almighty Father.... Our house was quite uninjured except the chimneys and we were obliged to make our fire in the garden. Many who had not a yard or garden did so in the street. George's house being partly brick built suffered a good deal but he is fast getting it to rights. I was as you may judge very anxious to hear from John and Wm the more so, as about 30? miles up the coast the sea suddenly rose and washed everything away, houses, boats and bales of wool waiting to be shipped but there again more miraculously no lives were lost. I have a letter from John, he was that night at a station near where the sheep are and is quite well and the sheep are alright. Indeed, I think they are the only description of property that is not very seriously depreciated but the old hands say 'Oh, it will soon be forgotten'. I seem to doubt this. The town the next morning presented most melancholy appearance. The building most injured was the Bank a very nice brick and stone one it cost between ? and 8000 pounds and was scarcely completed. It is now a perfect wreck plainly telling us that wooden houses are only proper to be erected here. I trust we may never witness the like tho they appear to come at intervals of 7 or 8 years, 1840, 48 & 55 have been the dates of them since the place has been colonized. It must much retard the progress of the place in spite of its beautiful climate...

The original was fairly readily interpreted but lacking in punctuation. Some punctuation has been added for ease of reading.

RICHMOND, Christopher William
Source: Richmond, C.W. 1855. Letter, dated 19 February 1855, to J. Chamberlain (London). *In:* Scholfield, G.H. 1960. *The Richmond-Atkinson Papers, Vol. 1.* R. E. Owen, Government Printer, Wellington, New Zealand.
Location: New Plymouth, Taranaki
Keywords: primary, mainshock, building damage

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> ... P.S. On the 23rd ulto. Wellington was visited by an earthquake of considerable severity which has occasioned great destruction of property and even some loss of life.... It was pretty smartly felt here, and brought down a few defective chimneys and broke some crockery....

RIDDIFORD FAMILY
Source: Hewitt (nee Riddiford), T. 1939. Life of Mrs Thomasina Hewett (daughter of Harriet and Daniel Riddiford, and last surviving member of that family). *In: New Zealand Free Lance*, July 26 1939.
Location: Wellington
Keywords: primary/reminiscence, mainshock, building damage

> "Orongorongo" [on the coast between Wellington and Palliser Bay] was purchased in 1845 but the earthquake of '55 decided Daniel Riddiford to seek a home nearer to civilisation and so he bought "Woburn" [from the Petre family]. Mrs Hewett remembers being carried out of the homestead and of the gaps made in the walls and other damages, and also her fear of the ground that trembled for many weeks....

When this article was written Mrs Hewett was in 93. She had been born at *Orongorongo*.

ROBERTS, Edward
Source: Roberts, E. 1855. Appendix F. *In:* Taylor, R. 1855. *Te Ika a Maui or New Zealand and its inhabitants*. Wertheim & Macintosh, London, England.
Location: Wellington, Wairarapa, Wairau Valley, Marlborough, Manawatu, at sea, Kapiti Coast, Hutt Valley
Keywords: primary, mainshock, uplift/subsidence, ground damage, faulting

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> MEM. ON THE EARTHQUAKE IN THE ISLANDS OF NEW ZEALAND, JANUARY 23, 1855.
>
> The shock was of the greatest violence in the narrowest part of Cook's Straits, a few miles to the S.E. of Port Nicholson; but it was felt over the whole of the islands and by ships at sea 150 miles away from the coast; the whole extent of the area over which the convulsion was felt must have been 360,000 square miles.
>
> Its effects were most violent in the immediate vicinity of Wellington, where a tract of land of 4,600 square miles in extent was elevated to a height varying from one to nine feet, the greatest elevation being a range of hills called the Rimutaka (a spur from the Tararua mountains), which terminates abruptly at the sea coast in Cook's Straits.
>
> This range, which appears to have been in the direct line of the subterranean action, was elevated nine feet, while the whole country as far as Wai-nui, about two miles

northward of the foot of the road leading down the Pari-pari [near Paekakariki], was elevated with it, though the elevation at the last named point was on the sea coast very slight. On the Eastern side of the range is the valley of the Wairarapa, the centre of which is occupied by a lake. This valley and plain remain on the same level as before, the range of hills having gone up alone, forming a perpendicular precipice of nine feet in height which has been traced to a distance of ninety miles inland.

The valley of the Wai-rau, on the middle island (which appears to have formed part of a continuous basin with the Wairarapa), together with parts of the adjoining coast, subsided, during the shock, about five feet; so that now the tide flows eight miles further into the Wai-rau river than it formerly did.

The harbour of Port Nicholson, together with the valley of the Hutt, is elevated from four to five feet, the greater elevation being on the eastern side of the harbour, and the lesser on the western.

A rock, known as the "Ballet Rock," a short distance from one of the points of Evans's Bay, which was formerly two feet under water at the lowest tides, and over which was placed a buoy to mark its position, is now nearly three feet above the surface at low water.

Very little tide now enters the Hutt river, in consequence of the elevation.

The Rimutaka range was very much shaken in its elevation, and a great many large slips occurred, laying bare the western side as well as on the eastern.

In the lower part of the valley of the Hutt, numerous hillocks of sand were thrown up, forming cones, varying from two to four feet in height, and in many parts of the valley large fissures were formed, with partial subsidences in many places. In the plains of the Manamatu [Manawatu] this was the case to a much greater degree.

In many places soft mud and slime were ejected, but this appeared more a mechanical effect than anything else, the liquid mud having pre-existed and been forced out at fissures formed during the vibration by superincumbent masses of more solid material.

Upon the whole of the province of Wellington will gain considerable advantage from the earthquake: -

1st. Large portions of land can be easily reclaimed from the harbour for the extension of the town.

2d. The main road to the Hutt and the interior formerly suffered occasionally from the action of the waves during high winds, and many parts had to be retained by a sea-wall; now it will escape the damage of the one and the expense of the other, and the whole of that valuable valley will be rendered, if possible, more healthy from greater facility of drainage arising from the elevation.

3d. A much better coast road to the eastward is already formed for the temporary use of the colonists and the driving of cattle.

EDM. [Edw.] ROBERTS, Royal Engineers.

Balley rock is situated off Point Jerningham, between Evans Bay and Lambton Harbour, Port Nicholson. It is now the site of a navigation light.

This account was the first, most informed and most informative, official memorandum concerning the geological effects of the earthquake. Edward Roberts was the principal informant to Sir Charles Lyell (q.v.) and provided much of the information in Lyell's accounts of the earthquake published in 1856 and 1868.

ROUT, William
Source: Millar, J. H. 1948. *Beyond the Marble Mountain.* R. Lucas & Son (*Nelson Mail*) Limited, Nelson, New Zealand.
Location: Takaka, Golden Bay
Keywords: primary, mainshock

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[Near Takaka?]
After eating some supper we turned in to rest, but almost immediately afterwards were alarmed with a very heavy earthquake, which seemed to heave the earth in waves like a boat rolling on the swell of the sea, and as a very large tree was close to us we were in fear it might fall and crush us, for we were too paralysed to move.

This was the heaviest earthquake that had been felt in the Nelson district since its settlement, and caused the most fright and damage. However, nothing damaged us, as we were camping on the ground in a lot of dry fern for a bed, and as soon as the quaking ceased we fell asleep.

ROY, John
Source: Roy, J. 1855. Report of Engineer of Roads. *In: NZ Government Gazette*, 1855.
Location: Wellington, Wairarapa
Keywords: primary, ground damage

Estimate of damage repairs after 1855 earthquake
Rimutaka Road £1,300
Wairarapa Road from Wellington -Rimutaka £350
Paripari Hill [Paekakiriki] £100
New bridge over the Hutt River £1000.

ROYAL ENGINEERS OFFICE
Source: Royal Engineers Office. 1855. Correspondence, dated March 9 1855, from the Royal Engineers Office, Auckland, to Colonel Wynyard, Officer Commanding the [New Zealand] Troops. *In:* C.O. 209/128, AJCP Reel No. 1256-1257, Micro-Z 475.Colonial Office, Series 209 Colonial Office: Original Correspondence, Australian Joint Copying Project National Archives of New Zealand, Head Office, Wellington, New Zealand.
Location: Wellington
Keywords: primary, building damage

... Acting under your Excellency's Authority I have to report that I have conditionally purchased and removed on board the same ship [Bonnie Doon] a galvanised and corrugated iron store, 50x25x10 feet with semi-cylindrical roof and skylight.

This building is intended to afford cover to the Ordinance Stores exposed to the weather by the recent damage done to the old Ordinance Store by the earthquake ... viz. £250.0.0 will have also to be provided to meet the purchase of this store in case it should be found to answer...

A further sum of £200 to meet the immediate expenses of putting up the iron store, as well as to effect the repairs to the Magazine Wall at Wellington, and the other Ordinance Services there is required.

Upon my arrival in Wellington I shall be better able to judge the approximate sum necessary to perform all barracks services in the Southern District absolutely and immediately necessary, but in the meantime I request that a further sum of £500 may be placed at my disposal to meet services.

SEWELL, Henry

Source: McIntyre, W. David (ed.) 1980. *The Journal of Henry Sewell 1853-7 Volume II.* Whitcoulls Publishers, Christchurch, New Zealand.

Location: Lyttelton, Kaiapoi, Wellington, Wairarapa, Nelson, Christchurch, Taranaki, Palliser Bay

Keywords: primary, secondary, mainshock, aftershocks, tsunami/seiche, building damage, uplift/subsidence, casualty, response/recovery, biological effects

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[At Lyttelton]

[Sunday] 28 January 1855. A week of Earthquakes; at least ever since Tuesday we have had visitations more or less. They began on Tuesday Evening about 9 o'clock. Elizabeth and I were sitting at our writing, when on a sudden the room began bodily to sway to and fro, not violently, but very perceptibly. The house is all wood and framed together, so it did nothing but creak and groan. The shock was not enough to do any damage, but quite enough to frighten and upset people. In truth an Earthquake is an awful thing. The Earth is seized with a fit, and you do not know to what height the convulsion may grow. The effect of it is I think quite peculiar. The solid earth, the very embodiment of the principle of stability, becoming unstable, destroys your confidence in every thing. You cannot run away from it, and you cannot sit still under it, for it is everywhere. No mischief has been done hereabouts, but I hear that it was felt more severely to the North, and possibly we may hear of mischief at Nelson or Wellington. A man who lives at Kaiapoi, on the banks of the Waimakariri, says the river rose in a few minutes 6 feet. I think that must be a mistake; the oscillation of the water in the river bed, probably washed the Banks to an unusual height. Since Tuesday we have had a continuance of tremors sufficient to keep us in a state of fidget. One Mr Thompson (a co-voyager of ours) who has lived in Italy and on the banks of the Mediterranean, says the shocks here are nothing to what they are in those parts. Be this as it may, they are disagreeable facts, and make me pause as to my preference for brick or stone over wooden Houses. There are a few buildings of brick here, none of which have suffered, but a little more shaking would I think have done them serious mischief.

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[Sunday 11 February].... On my return over the hill [from Christchurch] met passengers by a vessel just arrived [in Lyttelton] from Wellington, the *Thomas and Henry,* one of them Mr Paul, the Clergyman returned to make arrangements for his final resettlement

in Canterbury. From them heard particulars of the sad disasters at Wellington. I mentioned in my journal [January 28 entry] the shock of earthquake which was felt here; enough to make us uneasy, though it did no positive mischief. I also mentioned the fears which were entertained about Wellington. These were well-founded. The same shock was felt there in a much more intense degree, followed by a succession of others more or less violent; the whole lasting for several days. We in fact have felt the same only in a less degree. The Wellington papers give meagre account, evidently not wishing to draw public attention to it. It is beyond doubt a calamity to that place and I am afraid to New Zealand generally. The damage to Wellington is two-fold; loss of property and loss of good repute. The loss of property is considerable, buildings destroyed, and goods damaged. More than that: the whole place has undergone a depreciation of marketable value. I do not think I overestimate it at one half. Every £100 worth of lands, houses & c. has been reduced to half that value. The progress of improvement has stopped for who will lay out capital in costly buildings which may probably be shaken to pieces in 7 years' time. Seven years ago [in October 1848] there was a similar visitation. From all I hear there seems no doubt that this one has been more severe. A septennial calamity of this sort is of course utter condemnation to a place for residence. So it is that people are beginning to fly from it. Paul and his family return forewith to Canterbury. Bowler is come down to select a place for building here, instead of building at Wellington as he was on the point of doing. I hear that Clifford is going to Auckland. Every body in short not absolutely *adscriptus glebae* [attached to the soil] will seek a safer home. This terror will not effect Wellington alone. Nelson has suffered somewhat, though not so severely as the former place. Taranaki also. The violence of the shock abated as it travelled farther to the North and to the South. But people in England will not measure distances: indeed they understand so little about the topography that one place in New Zealand is the same as another. And in truth we dare not say here Canterbury that we are safe, out of reach of danger. If the shock has been more violent than it was 7 years ago, may we not fear a progressive intensity for the future? The best account of the Earthquake at Wellington is in Capt. Drury's Journal (for which see *Lyttelton Times*) [or *Spectator* Feb 7, 1855].

We have additional particulars from Paul and Bowler. It came suddenly, without the slightest premonitory sign, just as with us. Happily the hour was just when least mischief would be done. Business was over, and people had not yet gone to bed. The motion was like the rocking of a Ship and the effect the same. Before people could get out of their houses the chimneys fell. People could not keep their feet. The only life lost was that of poor Baron Alzdorf, whose Hotel (where we were staying), [on a previous visit to Wellington] is a ruin. He was standing by the chimney piece when the side of the wall fell in, carrying with it a looking glass, which broke, the pieces cutting him, dividing the femoral arteries. He died of exhaustion from bleeding. It is quite marvellous that there should have been no other life lost but his. They say that some Maories in the Wairarapa were killed by the fall of a home: and one poor girl in ill health was terrified to death. Government House is a wreck, so are the Government Offices. The Bank, the Gaol &c. The Ludlam's house in the Hutt and Clifford's house are all gone to pieces. Some of the low wooden buildings are uninjured, and Bowler's new brick Offices are quite sound. There is an end to building in brick and stone. Nobody will dream of any thing but wood. The level of Wellington Harbour is raised between four and five feet, so that wharves and jetties which stood out in deep water, now stand in shoal water. The damage to property from this cause is considerable. The solid bed of the Earth seems to have lifted up. Round the Coast towards Palliser Bay there is a passable road now to the Wairarapa where before was deep water. The bed of

the Wairarapa Lake has been raised several feet. In Cook's Straits great quantities of dead fish have been thrown up. One of the most remarkable phenomena is mentioned by Capt. Drury - viz. a total derangement of the tidal motion in Wellington Harbour. Every twenty minutes for 8 hours succeeding the first shock, the water rose above the level of high water mark, and receded below low water mark at Spring tides. I attribute this to the same cause as the oscillation of the water in the rivers here. The whole basin of Cook's Straits was up-tipped, no doubt sending a tremendous wave across from side to side. One house and woolshed on the Coast in Cook's Straits was swept away by the tidal wave.

The political effect of the Earthquake will I think be suspension at all events the removal of the seat of Government. There will be no Government House in Wellington, and nobody I think will propose building one there.

To return to my Diary. Tuesday [6 February], FitzGerald came into Lyttelton, all the talk about the news from Wellington. About midday the Steamer arrived, a day before her time. She brought Passengers, Bowler, his wife and daughter, Miss Paul and sundry others, from which we got further particulars about the Wellington disasters. (By the bye, do not publish what I say, or quote me as an authority. colonists look on it as a sort of petty treason to peach in such cases. They foolishly fancy that the truth can be suppressed, and those who give currency to anything detrimental are regarded as enemies).

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[Wednesday 4 April 1855].... News from Wellington. Earthquakes still going on a small scale, frightening people but not hurting them. Clifford came down by the Zingari. I can perceive from what he says that the Wellington people are nervous and anxious about losing their Title to the seat of government....

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[Saturday 14 July].... The Earthquakes are the great objection to Wellington [as the seat of government], but they seem to be over, and people have got rid of their alarms. Like the eels perhaps they are becoming used to it.

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At Wellington]
[Sunday 29 July] .... Wellington looked much as usual, though I observed a decided difference in the elevation of the land. The water on the beach was shallower - jetties which before stood out in deep water, now were dry at low water, and there was a palpable rise in the whole coast, the effect of the Earthquake. The shattered buildings had been mostly repaired though here and there heaps of bricks gave token of the smash. In truth from all accounts it was a fearful affair; but no sooner is the immediate cause of terror over, than people set to work as if secure from its recurrence, though even now the Earth is scarcely still for a week together. In another seven years probably a similar visitation will occur. Who shall measure its degree? Poor old Alzdorff's Hotel is still a ruin, and its hospitable doors were closed, so I was driven to a very so place called Barrett's Hotel for a bed.

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[At Wellington]
Thursday 27 September 1855. His [Clifford's] house [in Wellington] was shaken to pieces by the Earthquake and is in all the confusion of repair....

We felt a smart shock of Earthquake at Nelson about 4 o'clock on Saturday morning [22 September]. There were several shocks here [Wellington] the last day or two; but not sufficient to alarm or do mischief. I do not like Earthquakes. It is a very objectionable habit for a place to get into. Your attention is arrested by some creaking of Timbers, to rattling of crockery, and you look startled, expecting something to happen. I believe in fact they are not so very terrible at all events if you are in a wooden house properly constructed. The people here try to make light of them, but they are a serious draw-back to the place.

Rev. Robert Bateman Paul (q.v.), referred to in the above, was Archdeacon of Waimea, Nelson, 1853; William Bowler was a merchant and shipping agent.

SMITH, William
Source: Smith, W. 1855. Journal 1852-1855. MS-Papers-2152, Alexander Turnbull Library, NLNZ.
Location: Lyttelton, Wellington
Keywords: primary, mainshock, aftershocks, building damage, uplift/subsidence, tsunami/seiche, ground damage

p37-38

[At Lyttelton] ... when suddenly the timbers of the house creaked, the pictures swung from the walls, the floor heaved up beneath us, the bells rang, the cries of a frightened woman were heard and in wild consternation. We rushed out of the front door in time to see the sea, which all day had laid in molten stillness, arise in one almighty wave and break with a sudden roar against the wall not many yards from where we were standing. Our cottage was partly built on a projecting rock overhanging the bay and in an agony of apprehension, I ran up the path to where, to my great relief I met the inmates, who at the first shock of the earthquake had snatched the children from their beds, and wild with terror were rushing down to the hotel.

There were no more violent shocks, but until daybreak the earth was never still. We went back to our house, and to bed being anxious to get a little rest as we were to go on board at ten o'clock, but with the creaking and straining of our wooden tenement, the ringing of bells, and the jingling of crockery, sleep was out of the question.

... In twenty-four hours (24 January) from the time we left Port Lyttelton we were entering Wellington Harbour. As we approached the town, we remarked that not a wreath of smoke was visible, and by the aid of a glass, we could see an aperture in the roof of every building, but no chimney. What astonished us more, was that a number of vessels lay canted over on their sides in shallow water and some smaller ones had been left high and dry on the beach. The explanation was that the earthquake that had so alarmed us had been much more severely felt in the North Island. The wooden houses had borne the shock, but all the chimneys being built of brick had been shaken down. Though, as with us there was not a breath of wind, the sea had arisen three times in a huge wave and dashed over the sea wall and up to the houses along the strand, finally receding to several feet below its original level. This statement may sound incredible,

but I have no doubt Captain Drury of H.M.S Pandora, then lying in the harbour, has record in his log that will testify to its truth.

We stayed in Wellington a week ... rode to the far-famed valley of the Hutt.

A tolerably good and level road made at the foot of the mountain, in some places almost blocked with land slips caused by the earthquake, brought us to the bridge at the entrance of the valley now broken down by the same fearful agency.

SPEEDY, Graham
Source: Speedy G. 1855. *In:* Family papers 1855-1880. MS-Papers-1908, Alexander Turnbull Library, NLNZ.
Location: Wellington, Wairarapa, Palliser Bay
Keywords: primary, mainshock, building damage, background

On the 23rd January, 1855, Graham Speedy and another man were driving stock along the coast from Wellington to the Wairarapa. They were at Pencarrow Lighthouse having a meal with the lighthouse keeper when the earthquake occurred. Barrels of flour and oil rolled in front of the door of the lighthouse making their exit difficult.

It is uncertain whether this is a primary or secondary account. It is disappointing that no mention is made of the obvious coastal uplift as the stock were driven to the Wairarapa on the day after the earthquake. Graham Speedy and partner were probably the first to drive sheep around the coast without having the problem of getting around the Mukamuka rocks!

According to Furkett (1953), "The first lighthouse erected in New Zealand is that on Pencarrow Head at the eastern side of the entrance into Wellington Harbour. (There had been a beacon since 1842.) In 1849 a shed with a window on the south side sheltered a lantern which helped to guide ships into the harbour but naturally it was not visible from very far out.... The lantern in the shed was a bit rough, the keeper, G. W. Bennett wrote: "The house is neither wind nor water proof. The stove is of little use and I have been four days without being able to boil a kettle either inside or outside. Water is fully a quarter of a mile away and wood from two to three miles." In 1852 plans were prepared for a powerful light, housed in a cast iron tower. Edw. Roberts of the Royal Engineers was responsible.... By 1857 Roberts' plans were approved and the light ordered."

Furkett, F.W. 1953. *Early New Zealand Engineers.* A.H. & A.W. Reed, New Zealand.

ST HILL, Henry, Manager Colonial Bank of Issue, Wellington
Source: St Hill, H. 1855. Letter to the Colonial Secretary dated February 9 1855. IA 1, 1855/685, Internal Affairs, Series 1, Inwards Correspondence. National Archives of New Zealand, Wellington, New Zealand.
Location: Wellington
Keywords: primary, building damage

I have the honour to report for the information of his Excellency the Officer Administering the Government that the office of this Department as well as the Strong Room in which are deposited the ? and Notes have been greatly damaged by the late Earthquakes, - and the Fittings and Furniture much injured.

As the business of the Bank cannot be carried on until these injuries have been made good I have to request authority for that necessary expenditure - which I trust will not exceed the Sum of Thirty Pounds.

Source: St Hill, H. 1855. Letter to Colonial Secretary, dated Julne 25 1855. IA 1, 1855/2072, Internal Affairs, Series 1, Inwards Correspondence, National Archives of New Zealand, Wellington, New Zealand.
Location: Wellington
Keywords: primary, building damage

Adverting to my letter of the 9th February last reporting the damage by the Earthquakes to the Strong Room and Offices of this Department, and requesting authority to expend an amount which I trusted would no exceed the sum of Thirty Pounds (£30) I have now the honour to transmit accounts from the Individual named in the margin for the works executed by him in reinstating the damage referred to.

This amount has exceeded the Sum I had calculated would have been the limit of the expenditure from the circumstance that on the opening of the Strong Room to the Chest it was found that the whole of the Masonry and Brickwork was so entirely fractured that it was necessary to rebuild the vault in toto. Added to this the two double chimneys between the offices of the late Postmaster General and this Bank had also to be rebuilt.

I have used every effort to keep down the expenses arising from these works, - and I have been constrained to make advances from my private purse, to obtain the execution of them with as little delay as possible.

ST HILL, Henry. As Sheriff of Wellington
Source: St Hill, H. 1855. Letter to Colonial Secretary, dated June 25 1855. IA1, 1855/2074, Internal Affairs, Series 1, Inwards Correspondence. National Archives of New Zealand, Wellington, New Zealand.
Location: Wellington
Keywords: primary, building damage

I have the honour to forward herewith account for work executed in reinstating the damages occasioned by the Earthquakes in January last to the Supreme Court and Offices, at Wellington.

In my letter of the 25th April last I expressed as my opinion that the cost of such reinstatement would not exceed the Sum of Seventy five (£75) pounds, and I am happy to find that amount has been within that limit.

I found it impracticable to obtain any other report upon the state of the Building than that forwarded to you in February last made by Mr Roberts the Clerk of the Works attached to the Ordnance Department at this place, but having some knowledge of Building matters myself, I have been careful in directing the execution of such Works only as were essential.

[John Minifie's account] Wellington, June 26th 1855 Hill, Esqre (for work done at Govt. Offices)
Dr to John Minifie [Plumber]

		£	s	d
41 Panes Glass	@ 2⁰/-	4	4	0
61ft 6in Zinc Gutter	@1/2	3	11	9
11ft Zinc and flashen? - chimneys and repairing flashen round skylights		1	5	0
15 Panes Glass in skylights, stopping and painting the same		1	10	0
5 Panes and Back Sashes			5	0
New Ceilings to 2 Rooms and Canvassing Walls and Papering the same, and repg and Whiting Ceiling Judges Chambers and Passage		15	0	0
		£25	15	9

[Charles Mills' account] Wellington June 1855

The Colonial Government of New Zealand Dr to Charles Mills for the undermentioned work to the Supreme Court, Judges Chambers, & Registrars offices, etc., at Wellington.

		£	s	d
26 days 4 hours @11/- making good carcase framing and rough lining to Registrars office, repairing external framing of safe next d° [ditto] and weather boarding d° making and fixing skylights over passage and preparing and fixing bearer through d° to support rafters, repairing shingles, putting on lean to roof at end of building boarding and shingling d° laying rough floor over ceiling of offices casing chimneys, preparing and fixing broad wether board to front doors & lining inside d°, taking up Gutter throughout back offices, passing out Rafters, laying bearers and Gutter boards making good shingling after d° making an fixing water tank, & sundry Jobs.	@	14	11	6
203 feet scantling 4x3	@ 2.5/-	2	10	9
896 ft supr 3/4 board	@ 31/4[d]	12	2	9
6ft 3 Supr /8in/ in Totara	@ 9		4	8
8ft Supr 2in totara	@ 8 [d]		5	4
600 Heart totara shingles	@ 3/6 [per 100]	1	1	4
19 lbs assorted Nails	@ 7		11	0*
2 1/2 lbs shingle Nails	@1/1		2	0*
Cartage			15	0*
Bricklayer and Labourer 5 days E	@ 12/-/day			
Registrars office, etc taking down chimneys, cleaning Bricks and rebuilding d°		4	17	0*

12 Bushels Lime and Cartage	@ 2/6	1	10	0*
1 Chimney Bar			8	0*
6 days at 11/- Lining Judges Bench, making, fitting on and covering blind frames to skylights, easing doors, repairing locks, Props & fixing step to door etc etc		3	6	0*
20 yards fine Green Baise	@ 4/-	4	0	0*
2 1/2 yds green glazd Cambric	@ 1/-		2	0*
1 M Tack 2/-, 2 ? Locks & knobs	@ 6/6			
Thread etc d°			9	0*
		£46	16	0*
John Minifies account		£25	15	0*
Total		£72	12	0*

*The pence column (d) could not be read.

STACK, James West

Source: Reed, A. H. (ed.) 1936. *More Maoriland adventures of J. W. Stack.* A. H. & A. W. Reed, Dunedin and Wellington, New Zealand

Location: Waikato, Wellington, Marlborough

Keywords: primary/reminiscence, mainshock, building damage, tsunami/seiching

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> Earthquakes, though not so often felt as in the centre of the island, were generally severe when they did occur. I remember one in particular, which happened just as I was embarking one moonlight night for a canoe trip up the Waikato. The school children were standing round me at the landing place [probably at the mission station at Maratai, Waikato Heads] seeing me off, and chattering away to one another, when a sudden silence fell upon us all. I thought I was going to have a fit. The earth seemed reeling all round me, and I nearly fell down. The silence was broken by the cry from many lips: Ru! Ru! (An earthquake! An earthquake!) Several shocks followed in quick succession, and then the stillness of the night was broken by the noise of the waves caused by the oscillation of the earth breaking against the banks of the river, all down its course. Our houses being of wood or thatch did not suffer, but the chimneys were all cracked. The severest shocks, we afterwards discovered, were felt in Wellington and in the South Island. The Wellington the earth opened at the top of Willis Street, and hot mud flowed down the road. The sea-coast of Cook Strait was raised several inches, and hardly a chimney was left standing in the town. In the South Island a broad rent was formed from near the Kaikouras, across the country towards the West Coast. The centre of the disturbance was thought to be a submarine volcano in Cook Strait. If so, its effects extended for hundreds of miles, for Waikato, where I felt the earthquake, was three hundred miles from Wellington[2].

[2] [Reed's footnote to above text] Canon Stack's reminiscences are not necessarily set down in all cases in exact chronological order, and it would seem probable that the earthquake referred to is that which occurred in January, 1855....

STOCK, Rev. Arthur

Source: Stock, A. 1855. Extract from letter of the Rev. A. Stock. *In:* Church Missionary Gleaner, *1855.* London. Seeley, Jackson, and Halliday, London, England. Fildes Collection Victoria University of Wellington, Wellington, New Zealand.

Location: Otaki, Kapiti Coast

Keywords: primary, mainshock, aftershocks, building damage, ground damage

1855 January 23-25

At a quarter past nine, p.m., I was thrown out of my chair into the middle of the room, and the house began to heave fearfully. My chimney came into my room and that of the boys, not touching any one... After the chimney was down, the only danger was lest the heavy beams over our heads should fall, so we stood at the door, ready to run at the first warning. The first shock lasted in its violence four or five minutes. It was impossible to stand without holding. The motions of the earth did not cease for half-an-hour, and from then up till now - eight o'clock [24 Jan.] - we have had at least 250 shocks, some very sharp. At one time of the night, as soon as one had ceased, we could hear the warning rumble of another. The earthquakes are still going on, and we may have another as violent any moment. I never wish to pass such another night....

The shocks came from north-west by west, but at two o'clock they seemed to be right under our feet, and to change the direct movement for a twisting one. In this house one tall chimney is down, and another has two deep cracks. The chimney of the oven and the oven are down. The chimneys of my house, Mr Hadfields, Martyn's and Tamahana's, are down; and I think £300 will not cover our loss. It is most marvellous, but I have lost nothing. One tumbler alone fell, but did not break. The room is full of dust and bricks, &c., but that is nothing. The school chimneys have fallen, and filled both the rooms, but no one has been hurt, and for that we cannot be too thankful.... The ground is rent in every direction.... It made me and many others feel very sick....

Jan. 25 - Slight earthquakes are still going on: we have about 100 in the twenty- four hours. To-day I have been all over the country, it is fearfully torn.... Many of our drains are choked up. In one place the cracks reached to water, which seems then to have boiled up. Our beautiful church is unhurt.... One teacher after service told me that our river's bed had opened, and for some time the river was dried up; but I do not quite believe this, as the Maoris almost always exaggerate.... Last night I counted nine shocks, from nine to ten o'clock: each begins with a dull booming noise, like a gun fired at sea.

Rev. Arthur Stock was a missionary at Otaki and was active in the 1860's and 1870's in many areas of scientific interest, notably in astronomy and the determination of Wellington's longitude.

SUTHERLAND, Alexander
Source: Sutherland, A. 1947. *Sutherlands of Ngaipu.* A.H. & A.W. Reed, Wellington.
Location: Wellington
Keywords: primary/reminiscence, secondary, mainshock, building damage, ground damage, uplift/subsidence, tsunami/seiche, biological effects

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Earthquakes were frequently felt in Wellington, and early in 1855 a very big one occurred. A letter written from Wellington at this time by the Rev. J. Moir (q.v.) is of interest.

"The earthquakes to which this part of the country is subjected form a serious drawback. We have them sometimes twice a week and they give us no alarm as they do not hurt. You hear them approaching like the sound of a distant railway train and then the house suddenly shakes for a second or two. This does no harm but there are sometimes fearful concussions which you would think are about to ruin everything. We had them in January last and they continued for two months. The first shock, however, was the worst and did all the mischief that happened. Most of our houses are made of wood and it does them no harm to shake them, the chimneys, which are made of brick were thrown down, bottles broken, etc. Nevertheless, several houses were thrown down, and so were our bridges and in fact a great loss was inflicted in our province."

The main building of Sutherland's homestead at Lyall's Bay was of wood, but the large kitchen at the back was built of clay. With the first shock (which was the worst) the clay walls collapsed, some of the daughters, who were in the kitchen, barely escaping, Elizabeth, the third eldest, being the last to escape. Frequent successive shocks followed throughout the night, keeping the household in a state of terror....

Next day it was seen that the shake had been accompanied by an exceptionally high tide which left thousands of fish on the sandhills between Evans Bay and Lyall's Bay. During an earthquake in 1848 or 1855 (the latter year, I think) the waters of the two bays met.

The morning after the earthquake, William, the eldest son, aged 12 years, was sent on horseback to ascertain how the Doughertys at the Pilot Station had fared. To avoid the dangerous tides, he took the route over the hills between Ludlams Gully and the little lagoon above the foothills. He found the family well but the home broken up. Mrs. Dougherty and the children were immediately removed to Lyall's Bay, where they were guests of the Sutherlands until their house was repaired....

Riding around to Houghton Bay, William and Elizabeth found an enormous quantity of fish caught high and dry in a very simple manner. The phenomenal tide rose over a field of rushes which acted as a strainer to hold the fish as the waters receded.

Quite a large horizontal crack appeared above the Sutherland home. This appeared some years ago as only a slight depression in the ground.

p119-125 [Oral reminiscences of Elizabeth Ferguson, one of the daughters of the Sutherland family.]

> Elizabeth was very definite about the following incident: - At the time of the earthquake in 1855 a small island appeared for a short time in the middle of Lyall Bay between the two outward points. She remembered that Robina Dougherty once rowed out and inspected it....
>
> Reference was made to caves that formerly existed near the top of the hill near the outward point of the Bay. These were subjects of interest to the girls, who never ascertained how far they penetrated into the hill. They were closed up by the earthquake in 1855.

The author was the grandson of the pioneers. The house was situated on the western side of the Rongotai isthmus inland from Lyall Bay near Sutherland Road. According to Gerzon (1974):

> In the fifties, the Sutherlands' house at Lyall Bay was a fairly large home, built of clay and timber with a woolshed and cattle yards....

Gerzon, R. 1974. Sutherland pioneers had their problems. *In: Eastern Suburbs Sentinel*, August 18, 1974.

TAINE, James John
Source: Taine, J. J. 1855 diary. Original in possession of G. J. Taine, Napier.
Location: Wellington
Keywords: primary, mainshock, aftershocks, building damage, uplift/subsidence, tsunami/seiche

Although this is said to be a contemporary diary, parts seem to have been written in retrospect, presumably based on diaries (which apparently date from the early 1840's-1917), but also possibly on other subsequently published material or discussion.

> January 23 1855
> At nine o'clock in the evening of this day Wellington experienced its heaviest shock of earthquake. At this time we were living in a two-storied waether boarded house, with garden in front, situated near the Pipitea Pa and at the bottom of Pipitea Street, on part of town acre 544, belonging to Baron Charles von Alzdorf, with the sea beach as a frontage. When the first shock came my good wife and I were sitting reading on either side of our fire-place, the children being upstairs in bed and fast asleep. We were just about thinking of retiring ourselves when the whole house was violently shaken, everything being thrown down, every pane of glass in the house broken, some of the window sashes being thrown bodily to the ground. Our chimneys were all demolished and the one belonging to the room in which at the time we were pleasantly passing the evening, collapsed on the floo of the room, the bricks and mortar being thrown into the space that separated our respective seats; fortunately both of us escaped unharmed. Our first thoughts were for our children and on rushing upstairs we found that notwithstanding the clatter and roar the shake made, they were all still fast asleep, though the sash to their window had been wrenched bodily from its frame and cast into the garden below. Our eldest daughter Suse, who was sleeping in a room to herself, was for a time imprisoned through the capsizing of a heavy chest of drawers which had been thrown against the bedroom door and prevented it from being opened for some little while. When this however was accomplished we decided at once to remove to the higher ground at the back of the house where St Paul's Cathedral now stands. It was a beautiful moonlight night, heavy rain having

ceased at 7 pm, and my wife and I with the assistance of our maid soon had the younger members transferred from our partially wrecked home, the elder ones with a little assistance and encouragement being able to help themselves. After remaining there some little time we were offered the hospitality of a neighbouring house in Mulgrave Street, which we were only too glad to accept, but rest and sleep were out of the question.

During the whole of the night and morning, the sea gently ebbed and flowed every quarter of an hour, flowing completely over our front garden, several times advancing as far as the sill of the front door and retreating to such a distance as to leave the piles of the five jetties near by, erected by Baron Alzdorf and Mr Charles Brown, so free of water that one could walk around the outermost of them dry shod, the water being some fifty feet away; while the vessels moored close to the shore lay on their sides high out of the water. At this time two of our daughters, Nina and Jessie, were boarders at Mrs Spink's school for young ladies in Dixon Street, and in the morning I made my way there to find they had suffered no harm. My brick store, recently built, had been strongly constructed and having taken heed of the shake of 1848, was further strengthened with iron braces and it stood this and succeeding shocks well. It walls, however, were cracked in several places and the contents of the building thrown pell–mell, entire packages being overthrown. Our home, however, was so badly wrenched and damaged that we could not re-occupy it, and for a few weeks had to be content occupying a small cottage on Wellington Terrace just above Captain Holliday's subsequent residence, until we removed to the late residence of Mr (Sir) R. D. Hanson situated in Bowen Street near the Wellington Terrace corner.

Apart from my own experiences, the most descriptive report of this catastrophe was furnished by Commander Drury of H.M.sloop. 'Pandora': a beautiful specimen of a brigantine which at the time was at anchor in Wellington Harbour. He related that on his vessel there was suddenly felt an uncommon and disagreeable grinding as if the ship were grating over a rough sea bottom. It continued severely for more than a minute, the ship slewing broadside to the wind. Knowing that he was in more than six fathoms of water, there was little doubt in his mind but that the uncommon occurrence was an earthquake. On shore lights were observed running to and fro in all parts of the town and evidences of consternation there were carried out to him accompanied by loud crashes as buildings, walls and chimneys were thrown down. A boat was immediately manned and the Commander accompanied by Lieutenant Morton-Jones proceeded to the shore where they effected a landing with difficulty as the tide was ebbing and flowing in the remarkable manner I have described. [This officer is a water-colour artist of considerable merit and produced a large number of views of all parts of New Zealand.]

The first scene on landing in the dark met with was of the Government offices entirely destroyed, the upper story having been thrown to the ground; this was the old Barrett's Hotel. The adjoining chemist's shop, Medical Hall, whose samples and compounds admixing, had a decided bias to peppermint, while the doorway of the public house was also a confusion of broken bottles. The most substantial two-storied house in the township, Baron Alzdorf's Wellington Hotel, built of lath and plaster, had collapsed burying its owner in the ruins. Government House, had it been occupied must have been destroyed, the incoming Governor, Colonel Gore-Brown, not having yet arrived. In it every room was a pile of brickwork, the chandeliers entirely destroyed, with windows broken and thrown out of position. The guard had a wonderful escape from the demolished guard-room and the signal-gun on Flagstaff

Hill was thrown over. The elegant and substantial new building of the Union Bank was in its front a perfect ruin and the damage within not much less. Opposite to this building at the corner of Willis and Manners Street a considerable opening in the road emitted slimy mud inundating the main street. The most substantially built wooden houses of one storey stood the shake with the exception of the chimneys, while those of less substantial build were in a state of collapse. There was a universal destruction of crockery, bottles, glass, etc. and a pitiful loss of valuable ornaments and other household possessions. Several stores were unapproachable until neighbouring dangers were removed.

Amidst the general wreck of property but one life had been lost and not more than four other persons seriously injured. In the Wairarapa four natives were killed in a collapsed building. This would appear astonishing to a person viewing the wreck of houses, the masses of brick work from the fallen chimneys, the dislodgement of furniture the entire destruction of some tenements, the collapse of others, the universal sacrifice of property, the extraordinary rise of the tide. The natural terror and despair amongst the inhabitants, all tended to make this a far greater personal and the natural terror and despair among the inhabitants, all tending to far greater personal disaster than fortunately [need] be related. The hour was favourable to the escape of adults, who not having retired to rest were able to remove their families from the tottering residences before they ultimately collapsed; few of the residents, if any, had been rash enough to build their homes in brick since the convulsion seven years previously.

The principal shock was at eleven minutes past nine pm and it was by far the most severe. During the night scarcely half an hour elapsed without a lesser shock, more or less violent, accompanied by deep hollow sounds, but all the subsequent ones were of lesser duration. For eight hours subsequent to the first great shock, the tide approached and receded from the shore three times in every sixty minutes, rising eight to ten feet and falling lower than at spring tides. One ship at anchor some distance from the shore was aground four times. The ordinary tide seemed quite at a discount for the following day it scarcely rose at all. On the 24th the shocks continued at greater intervals but all the time the tremulous motion of the earth was distinctly felt.

The scenes in the streets were novel, some people standing at their thresholds, others were grouped on mats clear of their houses, or living in tents in their gardens. Those who suffered less than their neighbours were assiduous in offering assistance. What a different scene would have occurred in a thickly populated part of the homeland with shops exposed and every temptation to plunder. Here there seemed to be neither fear nor thought of robbery, but a generous feeling to ease each others burdens pervaded all classes from the Superintendent to the lowest mechanic, from the Colonel to every soldier of the 65th Regiment. Nor should it be forgotten to mention the ready asylum afforded by the merchant vessels in the harbour to the homeless and more nervous inhabitants.

At five minutes to one am on the 25th there was a very sharp but comparatively short shock. In crossing Cook's Strait the crew of the Pandora experienced a shock at noon while in twenty-six fathoms off Sinclair Head and a slighter shock in thirty fathoms when entering Queen Charlotte Sound.

In these events there was much to be thankful for that they were not accompanied by

fire, for had it been winter time the universal falling of chimneys would assuredly have been the means of firing the wooden houses, while a greater loss of life would have eventuated had the catastrophe overtaken the residents at a later hour when all would have been in bed. I have stated that only one life was lost at this time, the victim being a most estimable resident, Baron Charles von Alzdorf, who was one of my companions from England in the ship "Adelaide". At the time of the upheaval he was laid aside with illness in his hotel and store, situated near where is now Messrs. Scoular & Chisholm's warehouse, and was quite helpless, while his wife was unfortunately afflicted with blindness. In those days she could often be seen led about by her acquaintances amongst whom were my young daughters. He had been an energetic pioneer settler and owned the Wellington Hotel associated with his store....

Now while this severe convulsion did such considerable damage to the town and entailed disastrous loss to many of the inhabitants, when order was restored out of the chaos, it could be seen that the land about the harbour had been considerably improved and added a value to the Settlement far exceeding the losses sustained. It was one of those mighty forces of nature which had been at work for centuries gradually raising these islands from beneath the ocean. The earliest record of any earthquake in New Zealand is that recorded by Captain Cook when on his first voyage, he was at Ships Cove repairing his vessel. But the natives have traditions of many such [events] occurring long prior to that, and so far as the Wellington district is concerned, their ancestors have handed down to them that at one time the isthmus of the Mirimar [Miramar] peninsular was below water, but that a tremendous convulsion joined what was an island, Mirimar [Miramar], to the mainland.

The raising of the land about Wellington was done to a varying extent. About the shores of the harbour it was estimated to have been three or four feet, and nowhere was it more noticeable than in the vicinity of Oriental Bay, where what had been submerged rocky beach was thrown up and exposed as a highway along that part of the harbour. Te Aro Flat, the greater part of which was a swamp and during the quakes a quivering bog, was raised to such an extent that it naturally drained into the harbour. About Wellington, several fissures occurred, one at the corner of Willis and Manners Streets extended to the harbour where it was necessary to lay planks so that passage way could be obtained; while the deep hole nearby exuding mud was afterwards filled by throwing into it barrels containing rocks and shingle. Another fissure occurred beyond Pipitea Point and went up into Tinakori Road, and later disappeared altogether being filled with debris and harbour siltings.

The present site of the Hutt Race Course was practically a swamp but in common with other land it was raised several feet, so that in the course of a year or two it was drained and showed a solid surface. Portions of Palliser Bay were stated to have been elevated as much as nine feet, while the western side of the island, at Porirua or thereabouts, a depression occurred, as also happened on the south side of Cook's Strait. On the other side of Wellington Harbour it could be seen that in many places the steep sides of the high mountains had fallen down, exposing bare views of what had before been densely wooded slopes.

It was considered that the centre of the convulsion must have been near the termination of the Rimutaka Range, probably between there and Cape Campbell across the Strait, for from that point it decreased in intensity. It was strongly but not severely felt in Christchurch and less at Lyttelton which is on a rocky foundation, and it was only feebly felt in Otago. At Port Underwood and the Wairau it was probably

more severely felt than at Wellington, whilst at Nelson it was far less severe. At Taranaki it was slightly felt, while a ship one hundred and fifty miles off the coast to the west distinctly experienced it. At Auckland it was only known to some, and accounts received from Hawke's Bay represent as having been felt in comparatively mild form. At the Wairarapa the shocks were very severe, particularly at the eastern boundary of the Rimutaka Range.

Some of the above (edited and paraphrased) has been published by J. J. Taine's great-grandson, Geoffrey J. Taine (reference given below).
Taine, G. 1997: James John Taine Pioneer 1817-1914 (compiled from his diaries). Duplex Design, Puketapu, New Zealand.

TAYLOR, Rev. Richard
Source: Taylor, R 1855. *Te Ika A Maui or New Zealand and its inhabitants. 1st edition.* Wertheim & Macintosh, London, England. The text of the second edition was essentially the same as that in the 1st edition, which was published in November 1855. Newspaper extracts included in the 1st edition were omitted
Location: Wanganui, Wellington, Rangitikei,
Keywords: secondary, mainshock, building damage, ground damage, uplift/subsidence

p228

On the 23rd of January 1855, the south-western part of New Zealand was again visited with the most severe earthquakes which have occurred since it has been known to us. The native church at Wanganui was thrown down, as well as the chimneys of the Mission-house. In various parts the ground opened, so that some places appeared as though they had been ploughed up in furrows. Large quantities of gas and water were ejected from many circular apertures, around which mounds, several yards high, were formed; the ground was so intersected with deep ravines as actually to stop all travelling for a time. At Wellington, the harbour is stated to have been raised full four feet and a half, and similar changes to have taken place in every part of the district.

p454 of second edition (1870) is the same but without extracts from contemporary newspapers.

Source: Taylor, R. 1856. Papers. Vol. 7, Journal extracts & family register. MS-Papers-0985-007, Alexander Turnbull Library, NLNZ.
Location: Wanganui, Rangitikei
Keywords: primary, secondary, ground damage, uplift/subsidence

Oct 10 1856.
I was much surprised to find how the features of the country were changed since the great earthquake. Many of the lakes being quite dried up so we could ride over them, that of Waitata Pa [?Waituta] is now a cornfield. At Turakina a native said that he was fishing for eels at one of the lakes when the earthquake commenced and the water was violently agitated at the sides and then rushed to the centre of the lake where it was forced up to a great height like a huge pillar of water. At Rangatikei I noticed several deep fissures still remaining. It is the general impression that the land in this part has been raised fully three feet.

Rev. Taylor left Wanganui for England on January 4 1855 and returned to Wanganui September 1856.

THOMSON, Arthur S

Source: Thomson, A. S. 1859. *The story of New Zealand. Past and present - savage and civilized. Vol. II.* John Murray, London, England.

Location: Wellington, Marlborough, Auckland, Bay of Plenty, Hawke's Bay, Nelson, Otago, Canterbury, at sea, Wairau Valley, Palliser Bay, New Plymouth, Taupo, Rotorua, Bay of Islands, North Auckland, Wanganui

Keywords: secondary, mainshock, building damage, casualty, ground damage, tsunami/seiche, uplift/subsidence, biological effects

p231-233

On the 23rd of January 1855, at eleven minutes past nine P.M. the first shock, which lasted a minute and a half, occurred. It was accompanied by a rumbling noise sufficiently loud to prevent people hearing their chimneys fall, and not unlike a *feu de joie* under ground. The sailors on board the ships in the harbour thought their anchors were running out, many buildings were thrown down, Baron von Alzdorf was killed, and three persons dangerously wounded. In the midst of this convulsion, the sentinel of the 65th Regiment, guarding the ruins of Government House, shouted "All's well!" As the earth shook during the whole night, people were panic-stricken. Many expected to be engulfed; men who had sojourned in South America lay on long poles, lest a fissure in the earth should open; women and children were stretched on beds in the streets in agonies of sweat; and ducks, hens, and pigs cried piteously. The beach was swept by a tidal wave; and for eight hours subsequent to the first and greatest shock the tide receded from the shore every twenty minutes, rising two feet higher, and falling four feet lower, than at spring tides; next day there was no ordinary tide in the harbour *. When daylight came it was found that 53 per cent of the brick chimneys were down and 39 much injured **, that 16,000l. worth of property was destroyed, that the country around Wellington was elevated two feet, that the Hutt River bridge was swept away, that several fissures had opened in the earth, that the air stunk with the immense quantity of dead fish cast on shore, and that the low-water mark had become the limit of high water.

The earth's motion was from north-west to east, and for fourteen hours the town trembled like a shaken jelly. In the Wairau Valley in the Middle Island the earthquake was more severe than at Wellington; there several fissures in the earth, four feet deep, and sufficient to admit a man, yawned, and tidal waves swept both sides of Cook Strait. At Nelson brick buildings were injured, and some were thrown down; at Wanganui several substantial buildings were levelled with the ground; at New Plymouth a few chimneys were destroyed. In Hawkes Bay and the Bay of Plenty the shock was severe; one of Taupo geysers dried up, part of the lip of the Tongariro crater fell in, another cone called Ketetahi burst forth ***, and at one time Lake Roto-iti appeared, to the natives living on its banks, as if it were sinking into the earth. At Auckland the earthquake was felt by some persons and not by others, at the Bay of Islands it was not felt, at Canterbury the earthquake set bells ringing, and at Otago it was felt by some persons and not by others. The captain of a ship 150 miles out at sea, westward of Cook's Strait, felt the shock. The motion of the earth was greater on the plains than on the hills.

Like the earthquake of 1848, this one was chiefly felt between Banks's Peninsula and White Island. Had Wellington been a stone-built town, hundreds of its inhabitants would have perished, and the farmers in the valley of the Hutt now saw in what peril they reaped their luxuriant harvests. This second severe convulsion rendered the

Cook's Strait settlers very miserable, and many would have left Wellington next day, if they had not been chained to the soil by their circumstances.
* Captain Drury's Report, Government Gazette.
**Captain Chesney's Official Report, MSS. Royal Engineer Office.
***Dr Hochstetter [q.v.], Geological Report. Government Gazette, July 1859.

Captain Drury's Report was the same as that in the *Spectator,* Feb 7 1855. Captain Chesney's Offical Report has not been located.

TIFFIN, Frederick John
Source: Tiffen, F.J. ca. 1911. Diary of station work. Otamatata (Homewood) & Waitukai July 1853 - October 1855. Journal of Frederick John Tiffen 1845 to 1911. MS-COPY-MICRO-570, Alexander Turnbull Library, NLNZ.
Location: Wairarapa
Keywords: primary/reminiscence, mainshock, uplift/subsidence, background

The following seem to be part extracts from a station diary and part reminiscence using the diary as a guide to events.

> The route around the coast from Wellington to Wairarapa Lake afforded obstacles which the earthquakes of 1848 [sic] removed through the general upheaval of the land in the neighbourhood. Rocky points which could be got round only at low water and with smooth or moderate sea became passable at all tides even at the Muka Muka rocks where it used to be a ticklish job to negotiate at all times....
>
> Memo. To negotiate the Muka Muka Rocks half the sheep were left behind at the last camp, and we were at the obstacles with the other half before daylight, piled up stones at one point so that the sheep might scale the point and at another point it had been tunnelled and was known as "Coles Hole" named after Rev. Cole who used to visit the country occasionally. Riders had to go into the sea a bit to get round these points but even then the tide had to be well out. If a swell was on nobody attempted to pass. This was as the Muka Muka was. It became safe travelling after the earthquake even at high tide. It was great relief getting quit of the coast but it was not all coast as a long stretch of hills, known as Rhodes Hills had to be travelled between Okiwi (Brown Acorn House) and Wainui-o-mata near Orongorongo (Riddifords).
>
> 1848 January 20
> Self and Charles Nairn left Te Ahiaruhi at daylight, reached Blue Rock camp. January 21 arrived in Wellington via Rimutaka mountains on foot. From Morrisons run the track ran through Morrisons bush which most of the year was little better than a bog of mud and tree roots. Thence across the trackless Tauherenikau plain of more stones than soil to Burlings accommodation house. Thence across the bush hills where the Government are making a road thence past Hodder Collins, Mangaroa Bucks (Taitai) Burchams (Hutt)....
>
> Charles Nairn accompanied me from Ahiruhi ... to Swainsons party near Blue Rock where we stopped for the night. Thence climbed the hill and descended to Frank Nairns party at Mangaroa roadmen.... This was a very long walk from about halfway up the eastern side of Rimutakas into Wellington.

1855 January 23
Severe earthquake 9pm worse than that of 1848 [at Ahiaruhi or at Waitukai??].

TORLESSE, Charles
Source: Torlesse, C. 1855. Diary. Canterbury Museum, Christchurch, New Zealand.
Location: Christchurch, Canterbury
Keywords: primary, mainshock

[Jan 23 1855] Great earthquake [at Christchurch?]

Charles Torlesse was a surveyor in the Canterbury region.

TROLOVE, Frederick W.
Source: Trolove, F.W. 1855. Diary of F.W. Trolove 1855-1857. MS-2161, Alexander Turnbull Library, NLNZ.
Location: Marlborough, Kekerengu, Awatere valley, Wairau Valley, Wellington
Keywords: primary, secondary, mainshock, aftershocks, building damage, ground damage, tsunami/seiche, casualty

[1855] [At Kekerengu]
Tuesday, 23rd. Jan. Wind from the W.; the sky looking very curious at sun set. Jurdon's cows came up from "Woodbank". About ½ past 9 o'clock p.m. or 10 p.m. a very severe shock of an earthquake took place. So sudden and severe was it that in running out of the house we had great difficulty in keeping our balance. We staggered like drunken men. The shocks continued lighter, and the earth constantly in motion either in little convulsive starts or oscillating like a pendulum until, I should say, the middle of the night, when a most awful shock the imagination could conceive forced us once more out of the house in the greatest confusion and alarm. It is impossible to describe one's feelings in such a moment - the earth trembling beneath your feet - everything in the house tossed to and fro, books shelves and books falling, rafters and roof creaking, chimneys falling, walls rent and split all in a few seconds. For the rest of the night I thought it safer to sleep in the Wool Shed, so we took our mattresses and blankets there and slept as well as we could until morning, being continually rocked with the earth's motion.

Wednesday, 24th. Jan. All day today the earth has not ceased shaking for 10 minutes. The shocks were lighter towards the afternoon and we heard more of the rumbling before each shock than we did yesterday.

Thursday, 25th.Jan. We have had a fearful night indeed and we have had 3 heavier shocks than any before. During the whole of the night until daybreak we have been in (I may almost say) perpetual motion. The shocks were always preceded by a hollow rumbling - something like the last part of a clap of thunder when heard in the distance; but, I think, more unearthly. I positively thought that N.Z. could not stand the racket until morning. The direction of the shocks seems to me, as near as I can judge, to be about S.E. and N.W. or probably a little more to the S. As I lay in the woolshed I could see the poor old house, which I put up with my own hands, tottering with every shock, and now and then part of a chimney or wall would drop to the ground. I felt that what I had done in N.Z. was doomed to be undone in one night. So indeed was it too true.

Friday 26th., Sat 27th, Sun.28th., Mon.29th. Thursday [25 January] night 11 or 12 o'clock p.m. we had the heaviest shock of any. About an hour after there was another very severe shake. Jurdon and Cate came just after the shock. They saw the ground rise before them like a sea and the horses they were riding staggered as though a bullet had been driven through their brains - sleeping in the hut on Madcap's Flat - Friday morning at the earliest dawn I peeped out of the hut to see if the house was still standing there, or whether the hill had slipped any more during the night. What a change it presented. In the grey morn a few days, nay a few hours past, you might have seen one of the neatest N.Z. cottages (Station cottages) with a healthy garden before it full of vegetables. Its destruction is now complete. Its ruin is not to be repaired and like thousands more I fear, will remain a melancholy memorial of the earthquakes of Jan.1855. I rode down to Jordan's along the beach (my shepherd) thinking that the house he was living in would not be all harmed by the shocks. It was the first house I built on the run and made of toi-toi and posts in the ground three feet with a clay chimney. I came up to the spot and Woodbank was no more!! Jurdon, whom I had taught to write completed my surprise and consternation by these words written in pencil and put on the top of a pole which was supported in a rent made by the earthquake, "i have goin to the Big river pint i do note like the grunde at the wood Bank i shulle Come Back to morror Trolove".

There were 2 or 3 sharp shocks today (Friday) which came from the northward. The overhanging hills along the beach are now as bare of vegetation as can be well imagined owing to the slips. The sea has been inland many feet above high water mark. Indeed in some places the sea occupies what used to be green bushes and grass.

Friday [26 January] night - slept in the Big river hut - the chimney is down. The shakes have not been so constant tonight, but sharper than during the day.

Saturday [27 January] morning. We have no meat, very little tea, sugar and flour. We are living on eels, young sea-gulls, woodhens, potatoes and fish. This morning took across the river two cows and a filly belonging to the natives at Waipapa [5 miles S of Clarence River].

Today I should think we have had shocks about every two hours but not severe if you compare them to what we had had. Sleep in the hut. The night is close and cloudy. Had a sharp shock about the middle of the night.

Sunday [28 January] morning thick and misty with a little rain. Light shocks every hour or so. Sunday night we felt a sharp quick shock or two. How one feels the want of religious consolation in such times.

Monday [29 January] morning, very misty. Beginning to put the hut into living order. Came from the Big river to Kekerengu. How very, very desolate everything appears as you pass along. How many sanguine people in England, if they had felt these earthquakes, would say, "this is the country for England's surplus population:". Shocks as usual.

Monday night slept in the tent [maybe hut?]. Went eeling; no luck. Fine but cloudy night. Reading "Bleak House". Shocks as usual.

Tuesday, 30th.Jan. Morning fine. Wind from N.W.... Rode up to the Flags. The hills are very much shaken and split. My boat at the Flags was taken away 20 yards in land by the roll which came in from seaward and left high and dry on the green sward. Edwin [Mr. Trolove's brother] brought news from Flaxbourne that 16 houses (all new, having been built this Summer and last) are either flat to the ground or so shattered that they are beyond repair. The houses built immediately under large hills have suffered the least. Those on the flat ground are levelled with it. Whilst writing this there has been one very decided, sharp, quick shock 7 o'clock p.m.

Thursday 1st.Feb. Went up to Flaxbourne. It is quite miserable to see Flaxbourne, and the owners and manager seem quite cut up. Felt a shock or two there. The Flaxbourne house which is built of wood rocks and creaks like a basket (in a shock). Mr. W[eld] thought that the shocks came from the W and S. No further news.

Friday 2nd .Feb. At Flaxbourne. Very windy and warm. Now and then felt shocks. About 2 o'clock p.m. saw the "Shepherdess" pass Flaxbourne going to take my wool from the Flags. Ate a mouthful of bread and cheese. Went to the Flags. Mr. Weld and Harris rode with me to the White Rocks. Felt a shock as we were going round them, which brought down some stones. ... made a large fire on the beach opposite the place for the schooner to anchor. "Shepherdess" anchored about 11 o'clock p.m. Slept in a goat's house.

Saturday 3rd February. I was awake all night. Could not get to sleep. Got up at day dawn, went down to the beach. Wind from the W. Myself, Duckworth, and a Maori went off to the "Sheperdess". Took two bales of wool. The boat leaked a good deal. The same trip we landed 10 rams belonging to Flaxbourne, a little boy, and letters. The boat was very near sinking before we could pull her on shore. A beautiful day for loading the schooner, smooth and not much wind. 12 o'clock midday, blowing strong from the N.W. Hauled the boat up for a while until the wind lulled a little. The Captn (Jackson) is assisting with his boat and two men. Got on board about 20 bales. Sent for a case of brandy to give the men a glass. We were working like horses. The schooner lies about 1 to 2 miles off shore. Sent young "Jack" off to Flaxbourne with letters and the news on "Sly boots". At 4 o'clock p.m. the wind shifted to the S.E. Afraid the schooner will weigh anchor and be off, certainly if it blows harder. All hands working like the devil to get the wool on board as quick as possible. Gave the boatmen (and wool rollers) as much grog as they could work on and no more. Saw a heavy shock out at sea. It made the sea appear on the horizon like a hilly and undulating country; it also caused a swell on the beach for about an hour after. 8 o'clock p.m., the last load of wool is gone off in my boat with a hurrah! from all hands. The schooner's sails are being set, and they are taking up the anchor. She is under weigh, and we are pulling like one o'clock to get hold of a rope which has been hove from the schooner for us. We get the rope after a hard struggle, put the wool on board, and come on shore. Mr. Harris and Knight came from Flaxbourne, just in time to send their letters. I wrote a letter on the beach to Levin & Co., telling them about the wool. I also sent over for Levin to post 4 English letters. My feet are all blistered and the skin is off my knees and legs, holding on to the boat in the surf.

News of Earthquakes. Baron "Alsdorf" is killed. He kept "the" hotel in Wellington. Several have got their legs and arms broken. Clifford's house is shaken except two rooms. All the chimneys and a great number of wooden houses are shaken to the ground. The sea has been up 20 feet higher than it was ever known before.

Feb 4th-Feb 10th
Monday night. Came home from the Flags. Everything looking as desolate as ruin and destruction can alone make a home appear. Shell fish and potatoes for supper. Sleep in the tent. Now and then feel slight shocks.... Friday got the got the beds from out of the ruins, mended them and put them up in the Wool Shed where I have made a little room and lined it with wool bales and sods. 9 o'clock p.m. felt a sharpish shock - it brought down some stones from the hill back of the house. Two or three shocks during the night.... The springs at Waipapa (5 miles to the S of my S boundary & on the other side of the Waiautoa or Clarence River or Big River) is gone dry. In the history of man it was never known before.... Shocks come sometimes in the middle of a job, when you are thinking nothing about them. In fact when you hope and believe they are all over. I have many times sat down for a few minutes to consider whether or not I should go on with what I was doing or cut and run away from everything and NZ.

Monday Feb 12th-Thurs 22nd
Mon -Tues. Left Flaxbourne about 12 o'clock rode to Redwoods Station in Awatere - there I saw Mr Mowat and felt a slight shock or two before going to bed - Redwoods people have deserted their house and are living in the woolshed -.... We'd Rode over the hills to Dashwood's Station (Mr Paisley overseer).... Gave Mrs Budge an order.... Thurs. Left Dashwoods rode over to Marshalls ...
Friday Feb 16th. Marshalls place is shaken down with the earthquakes but I am confident they have not been so severe in the Awatere and Wairau as at Flaxbourne and Woodbank.
February 18th ... Felt and earthquake in the night made all made all shake again: one about day break.
February 20th ... Felt a sharp shock at Woodbank.
March 1st ... 2 shocks afternoon.
March 8th. ... A slight shock this morning.
March 9th. ... A smart shock about 11 AM.
March 14th. ... Shocks are still constantly felt in the Awatere.
March 18th. ... Felt two shocks in the night. I consider it almost presumption [sic] to attempt to build again but it must be done you cannot do without.
March 21st. ... A sharp shock we felt this morning.
March 23rd ... An earthquake about 4 o'clock P.M. it would have been considered heavy if we had not had some much heavier.
March 25th ... A shock 10 A.M.
April 1st ... Felt several shocks last week. We have not done with them yet. One at breakfast this morning.
April 10th ... Felt 2 sharpish shocks in the night.
April 17th ... A sharp earthquake just after we had done dinner 7 P.M. felt two or three more before going to sleep.
May 3rd. ... We have only now and then a remembrance of the earthquake by a subterraneous low rumble a quick ... motion and all is at rest again for several hours and sometimes for 2 or 3 days.
May 8th. ... This morning we felt 2 sharp but short shocks.

May 13-14th.
Tue 15 ... We have had two or three sharp shocks within the last day or two.
May 21st ... A slight shake 6 P.M.
May 28th. ... On Monday night there were two sharp shocks.

August 2nd ... A shock on Thursday night.
Friday 10th [August] ... Shock last night 9 o'clock

August 23rd -September 15th
We have felt 3 or 4 sharp shocks during the time we have been staying at Woodbank... The "old house" [damaged in January] altho' 10 feet out of the perpendicular and the floor cracked diagonally 3 feet wide by 3 deep served us for kitchen and dining room.
December 21st - Sun 23rd ... Lechner felt a shock of an earthquake on Friday night at Woodbank.
March 1856 ... Earthquakes as usual.

The majority of above extracts from Trolove's diary accompanied a letter to Dr C. E. Adams, Dominion Observatory, Wellington, from E. W. Buckeridge of Te Papatapu, Moerangi, Kawhia, dated July 26, 1925. Only those extracts that refer to earthquakes have been included here.

Trolove's hut is described by Sherrard (1966):

> Until the squatter and his men had time to build a better shelter they made do with a tent for their home. Trolove's first hut on Woodbank typified an early kind of homestead which could be thrown together in a matter of a day or two. Having chopped posts to a set length, he had them dragged to the chosen site where they were set upright with butts three feet in the ground, rough cross-beams and a ridge pole were hoisted into place, and a lattice work of light branches run between the uprights. The walls were then completed by lacing on bundles of toi-toi stalks and leaves, the same material also serving as the thatching for the roof. A wide clay chimney built across one end of the rectangular hut allowed the occupants to cook indoors without setting fire to the inflammable walls. Where toi-toi was unprocurable, raupo or snowgrass made a good substitute. Such constructions kept men and equipment dry through the generous ventilation inspired their inhabitants to blasphemy rather than praise. If sizable trees grew close to the homestead site a slab hut could be built. Rough-sawn planks lined up vertically formed the walls while shingle made a waterproof roof. Larger gaps between planks were plugged with dried moss and clay and, if the hut was to be permanently occupied, the interior was smoothly plastered with the latter material. A third type of shelter in common use was the mud whare. The pudding of chopped tussock and clay to the required consistency and the setting of the mixture layer by layer, each drying out before the application of the next, took longer than the construction of a raupo or grass hut, but the draught-proof walls insulated residents from excesses of heat and cold. Such cob huts, as well as houses of sun-dried bricks of the same materials, made excellent homes in the dry and sparsely-wooded Clarence Valley where the Quail Flat and Bluff Station homesteads, with corrugated iron replacing the former snowgrass roofs, have resisted a century's weathering.
>
> First of the squatters in the district to build a permanent weather-board house was Sir W. Congreve who had a cargo of pre-cut timber, bricks, window-frames, doors and other fittings shipped from Wellington to Waipapa early in 1853.

Sherrard, J. M. 1966. *Kaikoura: a history of the district.* Kaikoura County Council, Kaikoura, New Zealand.

TROTTER, William
Source: Trotter, W. 1855. Gardening Diary 1855. MS-COPY-MICRO-0229, Alexander Turnbull Library, NLNZ.
Location: Hutt Valley
Keywords: primary, mainshock, aftershocks

January 23 … One of the dreadfulest Earthquakes ever felt in this place - exception one man we have heard of no lives being lost
January 29 … We are still having sharp shocks
February 1 … We are still having shocks of Earthquakes but thanks be to our God not very heavy
February 3 … The Earthquakes still keep on
February 4] … Still having slight shocks
February 7 … We had a heavy shock last night followed by slight ones.
February 12 … Still having slight shocks
February 20 … Slight shocks continue
February 21 … an earthquake 8pm
February 22 … an earthquake 3pm]
February 25 … the Earthquakes still continue
April 10 … an Earthquake 2pm
April 18 … Shocks
April 20 … a smart shock of an Earthquake 11pm
May 6 … an earthquake
May 7 … an Earthquake 10pm
May 10 … an Earthquake 10am
May 11 … an Earthquake 12 am sharp
May 13 … an Earthquake 9pm
May 16 … an Earthquake 3pm
May 31 … Slight shock of Earthquakes
June 13 … an Earthquake 6pm
June 14 … an Earthquake 5am
June 16 … Earthquake 3pm
June 17 … an Earthquake 7pm
July 2 … an Earthquake 5pm
July 8 … an Earthquake 6am
July 13 … an Earthquake 5am
July 25 … an Earthquake 6am & 10pm
August 12 … an Earthquake 5am/1pm
August 22 … 2 Slights Earthquakes 6pm
August 25 … an Earthquake 8pm
August 26 … an Earthquake 10pm
September 15 … 2 Earthquakes 1pm
September 16 … an Earthquake 6am
September 18 … an Earthquake 9pm
September 20 … an Earthquake 4am
September 21 … a smart shock of an Earthquake 5am
September 25 … an Earthquake 9pm

September 26 ... 2 Earthquakes 11am
September 30 ... a smart Earthquake 9pm
October 6 ... an Earthquake 11am
October 10 ... Smart Earthquake 5am
October 17 ... an Earthquake 6pm
October 30 ... an Earthquake 3pm
November 10 ... an Earthquake 9am
November 19 ... an Earthquake 2am
November 21 ... an Earthquake 7pm
November 29 ... an Earthquake 10pm
December 8 ... an Earthquake 4am
December 9 ... an Earthquake 6pm
December 16 ... an Earthquake very hot
December 21 ... an Earthquake 6am

TURNBULL, T.

Source: Turnbull, T. 1888. On earthquakes and architecture. Proceedings of the Wellington Philosophical Society 3 October 1888. *Transactions and Proceedings of the New Zealand Institute 21:* 498-502.

Location: Wellington

Keywords: secondary, building damage, uplift/subsidence, faulting

The Proceedings abstracts Turnbull's paper, which was presented orally to the 3 October meeting of the Wellington Philosophical Society, and records the ensuing discussion. Turnbull's paper was presented in reply to Maskell's (q.v.) paper given at the previous meeting, in which he criticised the earthquake resistance of many Wellington buildings. Turnbull makes frequent reference to statements made by Maskell.

> With respect to the shock of 1855, he [the author] had been assured that no brick buildings were totally wrecked, though some few were injured – in fact, buildings erected before that time were standing yet. Since Mr Maskell had read his paper the author had visited them, and found them in good order, and answering the purposes for which they were erected....
>
> [In his paper] Mr Maskell expressed his belief that, if the recent shock experienced in Canterbury had occurred here, one-half the large buildings of brick and stone would have been very much injured, if they had not fallen down. Further, as a proof that men of eminence did not think the earthquake of 1848 a light matter, and considered great precautions necessary for the future, he quoted from a letter written in 1888 to the Institute of British Architects by Mr E. Roberts, who was attached to the Royal Engineers in Wellington in 1848 [*]. Mr Roberts after that built a new goal on Mount Cook, and took the precaution of constructing it with especially large bricks built in a perfect cage of iron bars placed 5ft. apart, and running up from the foundation to the roof....

*The reference here to a letter to the Institute of British Architects could have provided a new source of information from Edward Roberts (q.v.), the engineer who was an eyewitness to the uplift of the southern North Island and of fault rupture at the coast. However, no letter can be found in the appropriate archives at the British Architectural Library.

UNION BANK OF AUSTRALIA
Source: Union Bank of Australia Reports. 1855. Acc. no. 337. ANZ Archives, Wellington, New Zealand.
Location: Wellington
Keywords: primary, mainshock, building damage

3 March 1855
New Zealand. This Country has again been visited by a severe Shock of Earthquake felt more or less throughout the various Settlements. Wellington and Nelson are the places most affected, particularly the former and I regret to say that the New Bank Building – just completed has been much damaged – more particularly the Portico which has sunk down and partly detached itself from the Main Building – unfortunately this portion was too substantially built – and partly rested on made ground which has given way. The Dwelling House is but little injured. The manager has lost no time in having the building surveyed with the view of its being repaired without delay.

April 1855
... It would appear that the building covers an extensive Area and the site being uneven, the foundation under the portico was on made ground consequently this portion has suffered much, no further serious shocks of Earthquake had been felt up to last advices.

VENNELL, S.
Source: Letter from Mr. S. Vennell, Tauherenikau, Wairarapa. *In:* Hector, J.1891. Report of the Committee appointed to investigate and report upon seismological phenomena in Australasia. *Australasian Association for the Advancement of Science 3:* 505-532.
Location: Wairarapa, Wellington
Keywords: primary/reminiscence, mainshock, building damage, ground damage, casualty, faulting

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Seeing the accounts of severe earthquakes in other countries has set me thinking of them in this country. I am an old settler. I came here in the early part of 1841, so have had some experience of their terrible power. I do not wish to alarm people, but facts must be faced, and, as there are some thousands of colonists who have arrived here since 1855, the year we felt the heaviest earthquake, I should like to caution them against the insane building with bricks....

I will try and tell you what I know to be facts regarding the terrible power of our earthquakes. In the most forcible one - that of 1855 - the mountain near Masterton was literally rent in twain, and remains to be seen this day. The Maroa [Moroa] Plain, near Greytown, was rent for several miles, one part subsiding about two feet; and the whole of the country was upheaved many feet. If an earthquake can rend a solid mountain asunder, how will bricks and mortar fare? I myself saw the earth open twice three or four feet wide, right across a paddock and the road, and shut again with a fearful snap. The road, being made ground, sank nearly three feet where the earth opened, leaving one part so much higher than the other. There was hardly a sound chimney to be seen; they were either down or shaken to their foundations. Many people may imagine, because we have had no heavy shakes since 1855, that they have ceased, or that we shall only have very slight ones. I certainly should be very thankful if they had, but I cannot believe in anything so pleasant. Nature's laws

will have their course. The Natives tell us they have always had earthquakes - some very heavy, and many slight ones, but seldom dangerous with proper precautions. My advice is, build good strong, well-braced wood and iron houses, not too high, and there is, perhaps, very little to fear. When you feel a shake, keep away from the chimneys, and also the marble mantelpieces and any heavy piece of furniture. Do not run outside the house (unless it is built of bricks), but keep in the middle of the room, or in the passage. The only person killed in 1855 perished from the mantelpiece falling across him and nearly cutting him in two; he died from loss of blood in about five minutes.

... The last - the most fearful of all - was in January, 1855, lasting nearly a minute....

WARD, Joseph
Source: Ward, J. 1855. Diary 1854 - 55. MS-Papers-5373, Alexander Turnbull Library, NLNZ.
Location: Nelson, Wairau Valley, Marlborough
Keywords: primary, mainshock

January 23 ... [At Nelson] quarter after 9 in the evening happened a severe shock of earthquake.

January 31 ... On again reaching home [from Nelson to near Omaka, Wairau] found all pretty well, much better than I expected in consequence of these earthquakes, which commenced on Tuesday 23rd ¼ after nine.

WARD, Louis E.
Source: Ward, L.E. 1928. *Early Wellington*. Whitcombe & Tombs Ltd, Wellington, New Zealand.
Location: Hutt Valley, Wellington
Keywords: primary, mainshock, aftershocks, building damage, ground damage, casualty, response/recovery, uplift/subsidence, tsunami/seiche

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Earthquake, 1855
On the 23rd of February [sic], 1855, at 11 minutes past 9 p.m. a very severe earthquake was felt on both sides of Cook Strait, but especially in Wellington. Extracts from the most reliable report supplied by Commander Drury of H.M. Sloop "Pandora" are here given: - [These are given elsewhere in this database (see *Spectator* Feb 7 1855)]

Mr. J.C. Monro, of Palmerston North, recently forwarded a letter written by Mr. Alfred Ludlam [q.v.], Neury, Hutt, to the late Sir David Monro, relating his thrilling experiences at the Hutt at this period. The letter is dated 8th March, 1855, and refers to the Earthquake of 1855. He expresses his appreciation of Sir David's kindness in inviting him to Nelson when his house was destroyed.

"We have indeed had an awful visitation," he writes, *"and now it is all over, we can look calmly on its effects; to some they have done no damage, to others, very great.*

Unfortunately, I have to place myself amongst the latter, for it completely destroyed my house and a great deal that was in it.

But upon going round Wellington and comparing the damage of 1848 with the present damage, I should say the amount was very much less than in 1848.

This may easily be accounted for from the fact that there were not nearly so many brick houses, and those that were are all strongly bonded with wood and iron....

The shocks seem to have been much more fatal in their effects on any land that joins the spurs of the Tararua Range. I believe that we suffered as much in the Hutt from the fact that the shocks took along that Range. The effects over here are ten times worse than in 1848. You will remember that my house was nearly finished (1848) - all the chimneys and brick work were up-except the ornamental tops, the only damage done to it then was a slight crack on the top of the unfinished chimney.

The destruction of my house was momentary; the first shock, the vertical one, threw it in the air and shook it; the movement was very perceptible. The second, in a moment, shook all the chimneys off their foundations and brought them into the rooms.

I was sitting close to the fire, my wife opposite, and Messrs. Hutton and Bidwill, who were with us, next. They, being near the door, got away, and tried to carry off my wife, but she broke away and came to me.

I was jambed by a table, in the act of pushing myself back in an easy chair. I dare not go forward for fear of being buried, and there were we - in the dark.

I thought nothing could save us from being buried in the ruins when I saw the chimney, 15 feet high, coming down in a mass. A picture which had been hung on the chimney not more than a week, jumped about at first, and the shock threw it over my knees, resting on the arm of the chair.

My last view of the whole affair, just as the last flicker of the lamp lying on the floor went out, was the chimney in a mass falling in on us and while in the act of falling, a shock seemed to double it up. My legs received the fall of half, but owing to them being covered up by the picture, although very severely bruised, they were not further injured.

Had it not been for the frame, they must have been smashed. We were both very much bruised about the face and body by falling bricks. Nothing can describe our feelings, while we remained quiet for an opportunity to get out.

It was perfectly dark, the house was rolling and rocking heavily - the noise of glass breaking was the most appalling thing I ever encountered - The feeling of being covered up to my waist in the ruins, and not daring to move until all was over, was most fearful.

I wriggled myself out of the brick work, and escaped into the hall with my wife, where we found Messrs Hutton and Bidwill holding open the door for us to escape.

They said they thought we were buried. As soon as we got out outside we went to see about the servants, who, we found, just escaped out of the windows. They, too, had a narrow escape.

There were four distinct shocks, although it appeared as one. We remained in front of the house for an hour; the earth was heaving up the whole time, and when a fresh shock came, the house appeared almost to bend to the ground.

We left it, and went to Bell's - found that Mrs. Bell had had a very narrow escape. The road all along was riven in strips and sunk, in some places a foot.

The bridge, which you will remember, is destroyed; the first shock struck it, it bounded high in the air, and then fell into the river. The shocks were incessant until daylight. The first one did all the damage....

You ask what the Wellingtonians will do, whether they will move?

They are repairing the bank, which got dreadfully shaken, and the Baron's (Alzdorf's) new brick hotel - poor fellow, he little thought he was building his death trap, he used to say; Look at my house, that is the way to build against earthquakes; no shock will destroy that.

I am quite of opinion, after what I have seen, that the stronger and heavier the building is the worse is its destruction whilst under the operation of being upheaved.

New Zealand will have periodical visits of earthquakes and upheavals, and if Auckland were so visited, what an awful effect it would have upon a place built on caverns. I would rather take my chance here," he continues, "Where the land is solid. I saw a letter in which it stated that the Auckland folks were much terrified, very sick and disgusted at having had a visit, which they never expected, and are keeping it a secret. It appears to me that the papers in the different provinces are anxious to keep the affair quiet. Our papers, particularly the Independent mentioned it in a few lines; just as if we had a shock that knocked a chimney or two down."

[A fuller version of this letter is located under Ludlam.]

An article on Earthquakes also appeared in the "New Zealand Spectator" of the 2nd May, 1855. [q.v.] Another article, published in the "Dominion," of 16th January, 1926, entitled "In Tremulous '55," contains extracts from the personal diary of one F.W. Trolove, [q.v.] farmer, who was residing in Marlborough at the time. The extracts are dated from the 23rd January to the 30th. 1855, during one of the most awesome times ever experienced in this country.

The diary states:-"Baron Alzdorf is killed. He kept the hotel (now the Commercial) in Wellington. Several have got their arms and legs broken. Clifford's house is shaken, with the exception of two rooms. All the chimneys and a great number of wooden houses are shaken to the ground. The sea has been up to 20 feet higher then ever before.

It is interesting to note that a survivor of the earthquake of 1855 is still living in the Wairarapa district. This is Mrs. Harrison, who lives just outside Martinborough. The following paragraph, taken from the "Dominion," of 25th October, 1917, refers to Mrs Harrison: -"She is 95 years of age, and came out to New Zealand on the "London" with her parents and five other children, in 1842, when she was ten years of age. Her mother died on the voyage and was buried at sea. On arriving in Wellington

she and her brother accompanied her father to Happy Valley, where farming operations commenced. Her father built a two-roomed whare of stone and clay, with a lean-to, and the ruins of that house are still to be seen beyond Brooklyn."

Mr. A. B. Fitchett, of Brooklyn, who is 84 years of age, very kindly forwarded to the writer for reproduction this letter from Mrs Harrison:-

"The Pines, Martinborough,
Nov. 30th, 1927.
Mr Fitchett; Dear Sir, I received your letter dated 30th October. Mrs Jane Harrison came out in the London's second trip with the Stockbridges, Shorts, and your parents. My father bought the 100 acres off Mr. Reid, it was then called Ohiro. Captain Smith, the surveyor, called it Happy Valley because he liked the place. When Mr Reid had the section he had the stone house built; then Mr. Reid went home to Scotland and died shortly after, then we went to live in the stone house - and the second (1855) shake brought all the house down. I was sleeping on a large feather bed when it came down on me, but I was not hurt very much, only one hand slightly hurt. Mrs. Tutchen was living in Happy Valley at the time. After our house was destroyed we went to live in a calf house belonging to Mr. Tutchen, and in another afterwards on a 40 acre section adjoining the 100 acres. I am now 95 years of age on 5th March next. If you should come up to Martinborough at any time I would be very pleased to see you.
Yours faithfully,
JANE HARRISON, per H.H."

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In 1855 the earthquake referred to elsewhere disintegrated the swamp [Te Aro swamp] and small islands of flax and toi-toi were floating about the harbour and interfering with the passage of small coasters in the vicinity. At the same time the whole area was raised.

WASHBOURN, Enga
Source: Washbourn, E. 1970. *Courage and Camp Ovens. Five Generations at Golden Bay.* A.H. & A.W. Reed Ltd, New Zealand.
Location: Onekaka, Golden Bay, Motueka
Keywords: secondary, mainshock, aftershocks

p80

In January 1855 the big earthquake described by my [Clara Caldwell] grandfather at Motueka, was also quite severe at Onekaka.

"... Resting one evening in my usual place, with my baby on my knee, I found my chair rocking slowly backwards and forwards while I made no motion. On looking at Uncle ... who was also sitting by the fire, I was startled to see his complexion become a pale green, an awful hue - ... the motion though frequent was not violent enough to be apparent but our sensations were not agreeable, for one never knows whether the earth may not open and swallow us all up. All during the night the heavings continued at intervals, so we did not remain to watch but all retired to sleep as usual. This continued for three days and nights - our whare rocked like a ship at sea - thus showing the value of native erection - for brick or stone house might have been shaken to pieces. The Maories all round the Bay were terrified at the long continued

quakes. They did not remember any similar ones though they were familiar with slight shocks."

p29

Little damage was done at Motueka ... My grandfather [William Washbourn] recollected a sudden great rushing and roaring and the earth started shaking violently. All the furniture began gliding about as in a ship during a storm, thus adding to the noise and confusion.

WASHBOURN, H. P.

Source: Washbourn, H. P. ca. 1936. *Further reminiscences of early days.* Facsimile edition published 1996 Kiwi Publishers, Christchurch, New Zealand.

Location: Motueka

Keywords: primary/reminiscence, mainshock, aftershocks, volcanic effects

p23

During the last eighty years there have been a number of small earthquakes and several large ones. People are acquainted with the more recent ones, but not with the earlier ones. The first in my experience was in 1855, caused by an uplift fault in Wellington, but being so long ago, few will remember it.

By the time the European women were getting over the fear of their children being eaten by the natives, a new terror was sprung on them in the shape of one of the heaviest earthquakes since New Zealand was settled. On the evening of a calm day in January, 1855, suddenly there was a great rushing and roaring, and the earth started shaking violently. All the furniture began gliding about as in a ship during a storm, thus adding to the noise and confusion. The shocks were repeated at intervals during the night, preceded by the noise of the approaching shock. These continued for days afterwards, always with a longer period between and each less severe.

The public were greatly agitated and various rumours were current of volcanoes having broken out in the Waimea, Wairoa and other places, but they usually turned out to be grass or bush fires.

See also Washbourn, Enga.

WELCH, WILLIAM PHILIP

Source: Welch, William Philip 1855. 1855 Diary. Canterbury Museum, Christchurch, New Zealand.

Location: Kaiapoi, Canterbury

Keywords: primary, mainshock, aftershocks

[January 23] Tuesday evening had a sharp shock of eq.
[January 24] Had another shock this morning, had one in the night.
[January 25] More eq last night and two this morning.
[January 31] Another shock of eq.

WELD, Everard Aloysius

Source: Weld, E.A. 1949. Extract from a letter to Mr E. Roberts, Jan 07 1949. MS-Papers-3521 Alexander Turnbull Library, NLNZ.

Location: Marlborough, Flaxbourne

Keywords: secondary, uplift/subsidence, background

> ...your question in respect of the Flaxbourne River. You are correct in your understanding that when Flaxbourne was first taken up by the late Sir Charles Clifford and my father (Sir Frederick Weld) in 1847 the river was deep enough for small craft to come up as far as the old boiling-down plant, and that was the reason that the original homestead was established a short distance further up the river.
>
> The big earthquake [?1855] of which you speak in your letter was responsible for the alteration. [i.e. shallowing of the river.] The cutter which was used for trading with Wellington used the river which in those days acted as a harbour.

E. A. Weld managed Flaxbourne from 1890-1905 (Kennington 1978). He was the son of Sir Frederick Weld, who was one of the founders of Flaxbourne and one of the three "eye witnesses" to whom Lyell (q.v.) talked in London in 1856. As far as is known the E. Roberts who wrote the letter to E. A. Weld is unrelated to the Edward Roberts [q.v.] who was also one of the Lyell's informants.

That the area was uplifted in 1855 seems to have become a family story and has been accepted by Kennington (p34, 1978) on the basis of this letter. Kennington also quotes extracts from F. A. Weld's papers describing Flaxbourne, Flaxbourne River and the boats that were owned (given below). The sequence of events suggests possibly that the harbour was no longer used because of the size of the boats rather than a decrease in the depth of the river. A vessel of 28 tons, the schooner *Henry*, would not only have a greater draught but increased length, and negotiation of the harbour described would certainly present difficulties.

According to Kennington (1978, reference given below):
p24-25

> Late in September 1846 Fredrick Weld and Tom Caverhill were taken over the Straits [Cook Strait] by Wade in a little six ton cutter...
>
> *"... until about ten miles from Cape Campbell we came to the mouth of a little river which is marked by a conical peak and one or two hills white with limestone. A reef of rock juts out into the sea from two very large white rocks ... we edged between two of the rocks of the reef ... Mr Wade landed in the dinghy to be able the better to judge the possibility of entering into a river basin which lay before us or even entering the mouth of the river.... We entered the little estuary where there was six or seven feet of water at low tide and then ... we entered the river itself, no dock could be imagined more adapted for a small craft like ours."* [Quoted from F. A. Weld's 1846 journal]

p28

> *[I] am getting a house built ... to be taken to pieces and put up again at Flaxbourne, our new place, and also a decker boat [Petrel] of 8 to 10 tons. Her harbour will be a little cove, quite land locked, three quarters of a mile from our new house ...* [quoted from F. A. Weld's papers]

p32

> During this same month, January 1849, the little *Petrel* was sold and the schooner *Henry* bought to take her place. The *Henry* was of 28 tons....

p34

> ... land uplift of nearly 2m (5 to 6 feet) which accompanied the earthquake in that locality, reduced the depth of the water in the tidal part of the Flaxbourne River by that amount, and meant the end of their little harbour.

Kennington, A.L. 1978. *The Awatere - a district and its people.* Published by the Marlborough County Council. Printed by The Express Printing Works, Blenheim, New Zealand.

WILLIAMS, Jane

Source: Williams, J. 1855. Letter, dated March 3 1855, from Jane Williams to Kate Heathcote. *In:* MS-Papers-0069-020, Alexander Turnbull Library, NLNZ.

Location: Gisborne

Keywords: primary, mainshock, aftershocks

> We have had some rather severe shocks of earthquakes this summer: one on the 23rd Jany which lasted several minutes and really alarmed us; happily our buildings are neither brick nor stone and no damage was done. Within the next 30 hours we had three slight shocks. The following week we had two more very slight and sometime after midnight on the 12th Feby we were all awoken out of our sleep by another rather sharp [shock] and attended by a loudish noise. The poor children were much frightened and so were the native girls who were congregated in our dining room where they passed the remainder of the night. The first had quite the effect of being on board ship in a rough sea.

The first sheet of this letter is missing but undoubtedly it was written at Turanga (near Gisborne), where Jane and William Williams were missionaries. A second letter written on the same day mentions the missing sheet being enclosed in a letter to another friend.

WITHERS, Edward

Source: Withers, E. 1901? From a copy of a history 'Old New Zealand', written in 1901 by the daughter of Captain Withers. Supplied with permission to publish by P. Sviatko, Wellington.

Location: Wellington

Keywords: secondary, mainshock, aftershocks, building damage, ground damage, tsunami/seiche, biological effects

p30

> In or about the year 1847, Quartermaster Edward Withers (as he was then titled), was living in Wellington in a large house with a beautiful orchard at the foot or on the lower slopes of Mt Victoria. About 5 years later occurred the heaviest earthquakes that Wellington had hitherto experienced. Captain Withers (as he was now) was reading aloud to the boys and girls assembled in the evening from one of Dickens works ("Martin Chuzzlewit", I think) when with a roar and convulsion that sent the tall brass candlesticks waltzing around the table, upsetting and extinguishing them all, came the first shock speedily followed by others of greater force and duration. For 3 weeks the earth was never silent - as one earthquake rolled away into the distance on your left the approaching roar on your right announced the close proximity of another.

All business was suspended, some took rugs and slept or rather did not sleep in the Wesleyan Chapel, Manners Street. Men obliged to talk in the streets had to halt to hang on to fences - before long not a chimney was left standing and people were noted to walk out through the apertures instead of through the doors which in many cases (through the houses having been partially screwed around) had jammed - windows also were in (similar) condition. The various spurs and a crest of Mt Victoria were seen to roll like the waves of the sea. Then came an immense tidal wave, rushing up to the then one sided street of Lambton Quay, and washing things out of the shops. A box of toilet soaps washed out of the only chemist (Mr Barraud), was picked up by my husband, then a lad. When it retreated the whole bay was left high and dry so to speak, as far as the Man of War anchorage for about 15 minutes - thousands of dead fish were piled up from Oriental Bay right round to Petone, but a lesser tidal wave swept them away and relieved the townspeople's fear of pestilence.

The few sailing ships in harbour were rushed by panic stricken people, before this and fabulous sums offered for a passage from what was considered a doomed settlement. One vessel arrived in Sydney and reported Wellington swallowed up. Another caught by the tidal wave was thrown ashore at the heads, the passengers having to walk back over wild country to Wellington. Wells went dry, a brick building, barrack thing, collapsed burying a sergeant and his 2 boys and some men, my husband heard the groans of the poor creatures from which they could not be rescued in time. * Immense chasms opened up, some partially closing afterwards, one remains in a gully crossed by a suspension bridge now with a stream at the bottom and sides covered in ferns, etc.. Mr Henry Sanson (an old and respected settler of the Hutt) told me that a woman living near him rushed out at the first shock of the earthquake, but stopped at her door, remembering her baby in a back room, when she ran back with it, there was a chasm of some 50 or 60 feet at her doorstep, which partially closed up, and would have no doubt swallowed her if she had not stopped where she did.

* At least some of this section confuses events in the 1848 earthquake with those of 1855.

Edward Withers, a quartermaster of the 65th Regiment, was stationed in Wellington at the time of the earthquake.

WOODHOUSE, A. E.
Source: Woodhouse, A.E. (ed.) 1940. *Tales of Pioneer Women. Collected by New Zealand Women's Institutes.* Whitcombe & Tombes Ltd, New Zealand.
Location: Masterton, Wairarapa
Keywords: primary/reminiscence, mainshock

p117

1855 January 23
The first wedding in Masterton took place in 1855, and after the ceremony, the couple, Adams by name, rode out to their home which was across the river.

On the night of the wedding the most severe earthquake that has ever been felt in the district took place. The settlers gathered together in a house that stood where Lincoln Road is to-day, and when all had been brought in, they looked at one another and said, with a deep feeling of thankfulness, We are all here together, whatever happens. They had quite forgotten the honeymooners.

When Mrs Adams felt the 'quake, she had the same desire for the company of neighbours as did the rest of the community, and cried to her husband, 'Get up, get up, we must get up'. He sat up in bed and swung his legs out, then swung them back again. We can't get up, the floor's gone.

Mrs Adams thought, for a few minutes; then her practical mind asserted itself. 'The bed's here, the floor can't be gone. Get up and find it.

Her husband made another attempt to discover terra firma. Sure enough the floor was there, and that important fact being verified they lost no time in getting to the settlement, though it was a difficult journey in the darkness through the bush and across the river.

In the house where the settlers had gathered there was no thought of rest. They had never felt an earthquake before, and their nerves were on edge. A knock sounded on the door. What new horror was this?

"What can it be? We are all here in one room together."

Again came the knocking. Mr Masters, Mrs Iorns's father, went to the door and threw it open.

"Good Heavens, he exclaimed. "It's Adam and Eve, thrown out of Eden."

WYNYARD, Colonel Robert Henry
Source: Wynyard, R.H. 1855a. Government Record, No 22 Miscellaneous. National Archives of New Zealand, Wellington, New Zealand.
Location: Wellington
Keywords: secondary, mainshock, aftershocks, building damage, casualty, tsunami/seiche, uplift/subsidence, response/recovery

Government House,
Auckland, New Zealand,
21st February, 1855.
Two mails having arrived from the Southern Settlement without any official indications from the civil authorities of a serious earthquake that took place on the 23rd January, which was perceptibly felt as far north even as Auckland....

1. The right to communicate without further delay such particulars of this event, as have been made known to me through the medium of the officer commanding the troops at Wellington.

2. It appears that on the night in question "viz. the 23rd January" at about 1/4 past 9 o'clock a severe shock of an earthquake preceded by no noise, was experienced in Wellington, and its neighbourhood, succeeded at certain intervals by several others, but unaccompanied by so much destruction as the first.

3. One life only was lost at Wellington, "a civilian" but, with few exceptions, the chimneys were thrown down, brick houses were severely damaged, those built of wood having generally escaped excepting their brickwork.

4. The barracks at upper Mount Cook were uninjured except in their chimneys, two of which are down and the others so shaken as to have made it advisable to take them down - the outer wall of the Magazine was slightly cracked.

5. In lower Mount Cook the chimneys were all down, the fall of one of them broke through the floor of one of the Hospital wards.

6. The men of the main guard and prisoners in the cells were removed, as the buildings occupied by them were much damaged in their brickwork.

7. The lath and plaster of the Ordinance Store was almost completely stripped off and the vault of the Military chest was cracked and displaced throughout.

8. At Thorndon Flat Barracks, all the brickwork was down but neither the troops, nor the buildings attached, suffered to any great extent.

9. The first shock was far more severe than any of those experienced in October 1848 - the sea rose at least 10 feet, and an idea was prevalent that the shores of the harbour and coast had been upraised 3 feet judging from the past and present high water mark.

10. At Government House the chimneys were thrown down, and the roof injured, the older potion of the building is so dilapidated, as to be uninhabitable, except at an expense which its general state would not warrant. The plastering and brickwork of the new building have been much shaken and destroyed.

11. The Guard House at the entrance of Government grounds has been injured to such an extent as to necessitate the removal of the men to a place of safety, until the building is propped up: the chimneys having been thrown into the interior of the room and the foundation much shaken at one end.

12. Notwithstanding such disastrous results from the serious calamity, I am happy to find from a report in a Provincial paper of the 27th (only a few days after the event) that in many parts of the town, preparations were being made to repair the damage that had been done, and that the effect of the earthquakes would be to call forth to increased activity the energies of the settlers, and a steady determination on their part to overcome their present difficulties.

13. The above embraces all the information I have received on this subject as yet, but so soon as further particulars come to hand, I shall not fail to keep you daily informed.

At this time, Wynyard was acting Governor of New Zealand, holding, the most senior military post in the Colony as well. The appointment of Thomas Gore Browne as the new Governor was announced in February 1855, but Gore did not arrive in New Zealand until September.

Source: Wynyard, R.H. 1855b. Despatch to Secretary of State for the Colonies, 1855. G 25/6, Governor, Ordinary Outwards Despatches to the Secretary of State. National Archives of New Zealand, Head Office, Wellington, New Zealand.
Location: Wellington
Keywords: secondary, uplift/subsidence

p142

Shores of the Harbour (Wellington) and coast had been upheaved by 3 feet judging from the past and present high water mark.

ZILLWOOD, Thomas

Source: Zillwood, T. 1923. Early Wellington, Recollections of a pioneer, Mr Thomas Zillwood. *In: Dominion* September 25 1923.

Location: Wairarapa, Hutt Valley

Keywords: primary/reminiscence, mainshock, aftershocks, building damage, aftershocks, uplift/subsidence

> As soon as the five years were up I left Judd, and engaged with Mr Peter Hume for 8s a week. Mr and Mrs Hume and two children lived at Tauhenui, in the Lower [Wairarapa] Valley. We milked 48 cows. At that time cattle were brought by boat to Wellington, and thence driven to Wairarapa around the coast. Before the earthquake small ships could come quite a long way up the Waiwetu River. In fact I have seen them tied up farther up the river than where the Wainui Road crosses it.
>
> We drove the cattle round the coast. Mr Hume on horseback and myself on foot, but Mr Hume gave me a lift over the rivers. The first night we stopped at Okawhai [Okiwi] Brown's, the second we got as far as Orongorongo, the station of Mr Riddiford, and the third night we were at Russell's at Whangamoana [Whangaimoana], and on the fourth day we reached Hume's. The first mob we took through I drove over the bar between the lake and the sea. The tramping of the hoofs, broke up the sand, and shortly after we got across the lake broke through the bar, and rushed to the sea. I was with Mr Hume during the earthquakes in 1855. The first 'quake left nothing of the house standing, so we moved into the dairy. The next night so terrified Mrs Hume that we went to live with the Maoris, upon whose whares the earthquake had no effect. A few days later they took Mrs Hume to Wellington. The earthquakes lasted for something like four weeks.

According to reports in the *Spectator,* four Maori were killed in the lower part of the Wairarapa Valley when their whare collapsed on them. Zillwood clearly does not recall this.