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Fluted basalt boulders at Stony Batter, Waiheke Island

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Membership of the GSNZ Historical Studies Group is open to anyone interested in the history of Geoscience in New Zealand. We publish two issues of the journal each year and aim to sponsor or assist with meetings related to the history of New Zealand earth science

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Editorial

This is my last editorial because unreliable eyesight and a series of illnesses last year suggested that the Historical Studies Group might be suddenly left without an editor. I am truly sorry about going because I have enjoyed this job and it kept me in touch with you proper geologists. However, Rodney Grapes will be a great editor and a great improvement on me and with excellent new ideas for this journal. It will be more convenient to have both convenor and editor based in Wellington with easy access to GNS, and the museums and libraries. At first I was very anxious about doing everything correctly without upsetting anyone, but since then I have enjoyed my time as editor because I'm a bit isolated from the geology world up here – even more so now that I must restrict my driving. I have some unfinished projects that need to be completed – like tracing the evolution of ideas about the New Zealand Tertiary from 1865 onwards. MacKay seems to have described all Tertiary rocks as 'Miocene' and was always a faithful supporter of Hector's 'Cretaceo-Tertiary system', while F W Hutton fiercely opposed it. All of that needs a good critical eye.

Today's cover photograph was taken about 1952 on Stony Batter, Waiheke Island, to show some of the handsome fluted basalt boulders occupying the highest hill on the island. The painted decorations were applied by young K-force soldiers who were occupied while awaiting their flights to Korea in demolishing the army buildings associated with the gun emplacements nearby.

Those were the brave old days when we students had no field companion, no cell phone and no safety helmet. The local farmers all ran halfbreds, earning a 'pound a pound' for their fleeces during the Korean War. Much later, the four or five farms around Thumb Point were aggregated and purchased by a millionaire who, with his manager, blocked off public access to the gun emplacements by the island's hoi polloi and visitors (some of whom had some very creative theories on how Rangitoto coughed up the boulders and aimed them precisely onto Stony Batter.) It is said that keeping out the locals was set off by rustlers who caused many stock losses; however, the owner also began breaking up the boulders for road metal. Several decades of local warfare followed until 2001 when 50 acres containing the three gun emplacements and boulders were taken over by DOC.. The surrounding property is now occupied by grape vines instead of sheep and cattle. Most public interest is in the gun emplacements rather than the rocks so the credit for making Stony Batter safe for boulders goes to the late Les Kermode and to Bruce Hayward.

The Early Days of New Zealand Marine Geology. Part 2 The Pantin Years

*

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Six year olds know that the sea moves sandcastles. Grandmas reminisce about beach fronts that disappeared, although such things never cease to be a source of fiend amazement to greedy "developers" and councils. Perhaps few of those at the beach stop to wonder what happens to sand beyond where the crabs can nibbles their toes.

Long ago, mariners found sand and even pebbles stuck to their tallowed sounding leads when they pulled them up from deep water, where usually there was only mud. Did these deep-water water sands and pebbles move about like the ones on beaches? Did the storm waves and currents that swept their ships affect the deep sea-bed, or was Davy Jones's Locker a haven of permanent tranquillity. The question probably didn't keep many awake at night, but to the Victorian engineers entrusted with routing the first submarine cables, it was crucial. If they had been aware of its significance, it would probably have kept their financial backers restless on their goosedown mattresses.

Within a couple of decades of the first submarine telegraph cable from Dover to Calais in 1839, the fledgling colony of New Zealand was attempting to link its two main islands with telegraph (Airey 2005). It was the "high-speed broadband" of its day. A copper cable was laid from Wellington's Lyall Bay to Whites Bay north of Blenheim, in 1866 . After a few ministerial communiqués in Morse code, it failed, but then operated intermittently for several decades. Its unreliability meant that when the first Trans-Tasman cable was laid in 1876, it went directly to the then more populous and economically important South Island at Cable Bay near Nelson.

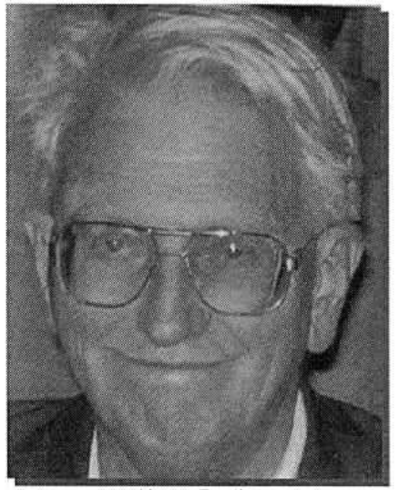
By the early 1950s, the question of what was happening on the seabed beneath Cook Straits was again worrying the government and its engineers. They were backing a bold and very expensive plan to route some of the huge amounts of electrical power generated by the hydro-electric schemes of South Island to the burgeoning populations of North Island. The scheme called for two cables, each much thicker, less flexible and infinitely more expensive than any telephone cable, across the seabed of Cook Strait, preferably near its narrowest point. Electricity and salt water are not a good combination. In the amounts envisaged here, they were a nightmare.

Beautifully engraved British Admiralty Charts showed depths of 200 fathoms along the north-south strait between Marlborough Sounds and the Wellington Peninsula. The charts noted the presence of course sand and even pebbles near the deeper parts of the favoured route, and of tidal currents capable of sweeping powerful ocean-going ships back and forth like rubber duckies, particularly when spring tides were combined with surges of water, piled up at one end or the other end by storms. How deep did these flows go? There was a suspicion that the soft jute and gutta percha (coagulated latex) covering of telephone cables had been sandblasted in mid strait. Cables were typically armoured through the turbulent surf zone within a few hundred yards of the shore, but armouring added hugely to the cost of thick electrical transmission cables. Was it necessary to armour many miles of cable or even find a new route? The difference might be worth a tidy proportion of the annual wool clip. Jim Brodie, Superintendent of the recently established New Zealand Oceanographic Institute was asked but, despite his geological background and his collation of existing data from Cook Strait, he could not give a definitive answer. His administrative load prevented him from researching it further. The problem was waiting for New Zealand's first full-time marine geologist when he stepped down the gang-plank soon afterwards.

At the celebratory 50th Conference of the GSNZ in 2005, Henry Pantin was introduced as "The Father of New Zealand Marine Geology". The perfect foil for Jim Brodie's meticulous approach, there is an implication that those of us who followed may have inherited some of his enthusiastic flair and originality.

Henry was, still is, many people's idea of an eccentric scientist. The son of Cambridge's most eminent Professor of Zoology, Carl Pantin, his early boyhood memories are of afternoon teas on the lawn with atom-splitting Nobel Prize winners from the nearby Cavendish Laboratory.

"Chadwick and Cockcroft were regulars and, I think, Walton, the Irishman, although I might have seen him later. 'Though my father was pretty much the world authority on marine invertebrates, rather than nuclear physics, they would talk about



Henry Pantin

science and how it might help the coming war effort. I don't really remember Rutherford. He died in 1937. He was an imposing figure apparently, still with traces of his New Zealand accent, but he could relate to children, I think by offering them his cream bun."

Henry's golden days ended when, in the early days of wartime deprivations, he was sent to one of Britain's famous "public" (perversely meaning private) boarding schools – perhaps not the ideal place for a sensitive, academic, and slightly uncoordinated child.

"It was just a training ground for the next generation of army bullies and bored vicars. I was hopeless at sport, all sport. Couldn't see a thing without my glasses. They even thought boxing would toughen me up. It was just hell."

His enthusiasms were much wider than the playing field. Scholarships to University, BSc and PhD in Geology were ticked off with relative ease. Then came a post-doc as assistant lecturer ("*the lowest form of animal life*" according to Henry), at the depressed and depressing University of Glasgow, where he, like many others before him, laboured with highland metamorphics and looked for a real job.

"Then, in July 1955, I got this letter from the New Zealand Oceanographic Institute offering me a job. It was brilliant – really exciting – totally new territory in every way. Also, much as I loved and admired my father, he was quite a figure in British science." "Distinguished parents can be a very hard act to follow. They can get you into places, but nobody takes you seriously." It was a chance to be something other than Carl Pantin's son.

Jim Brodie had been talking to the new professor of geology at Victoria University, Bob Clark about acquiring a magnetic separator, which he thought might be a necessary part of a sedimentology lab. Bob had seen one on his recent sabbatical at Edinburgh, where he said that a keen young lecturer from Glasgow was the only person who could get it to work. (*"That's because I was doing a really easy separation of hornblende and garnet from quartz and feldspar"*). The letter was *"like being in a prison camp and a ladder appearing over the wall"*. He was living in a *"grotty tenement in Glasgow"* with a baby and a wife who understandably hated it, although as it turned out relocating never did improve things for her.

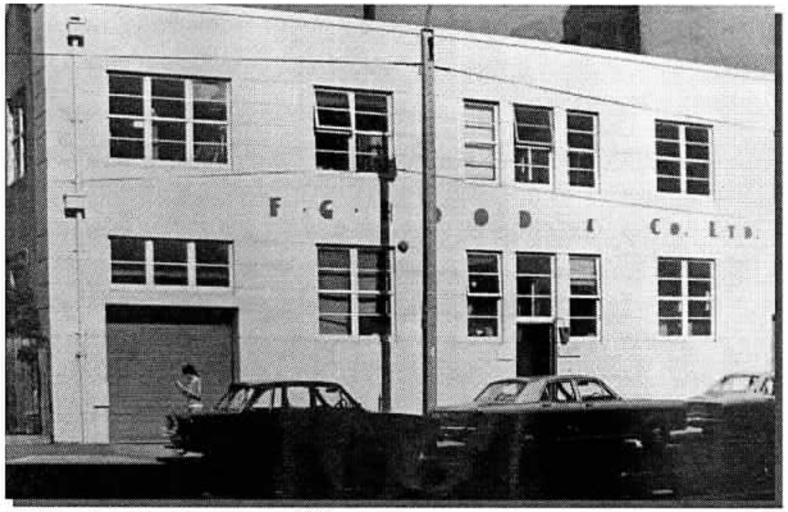
From the day Henry stepped off the crowded immigrant ship in December 1955, he was a celebrity - in his own right. Ideas bubbled forth, many with refreshing new insights, some perhaps not. Some of us launched our careers by expanding on the good ones. His eccentricity was considered a delight. The Brodies found his family a home. Technicians built gear for what they thought were unlikely experiments. Secretaries rolled their eyes when he flirted with them, and then bought him "plimsoles" that weren't worn through to his socks; it wasn't that he couldn't afford them, although money was probably tight, he just wasn't interested.

Henry had barely reached the top of the worn wooden stairs of 190 Lambton Quay, the sounds of the coffee (chicory essence) shop and trams below, when "the Cook Strait Cable problem" was laid before him. The decrepit, ammunition-dumping, fleet auxiliary trawler *Isa Lei* was waiting with a grab borrowed from the Dominion Museum. The grab brought up coarse sand, pebbles and cobbles from the deep middle of the strait; the cobbles and larger pebbles had marine growth that suggested they were immobile, whereas the smaller pebbles and course sand were polished smooth suggesting they were rolling about. It wasn't conclusive enough for the engineers

"The answer was obvious. We needed to put some put some readily identifiable course sand down there and see if it dispersed." *"We needed something very distinctive, something that could be picked out in very small quantities"*. The Americans were using radioactive tracer minerals but in deep water the quantities required would be prohibitively expensive – environmental issues aside, which they usually were then. Henry considered fluorescent blue glass as few minerals were blue and fluorescence made them very easy to pick out of even large samples, but cost again looked like being prohibitive - even assuming that Wellington retirement homes could supply enough Milk of Magnesia and Bombay Gin bottles. Time was getting critical. Planning was already well advanced.

Jim Brodie then suggested using magnetic black "ironsand" (titanomagnetite) as a possible tracer, but it occurs naturally in Cook Strait Narrows so it was useless in its raw state. Henry figured out how to make it work. The departmental truck was sent to Patea, where one and half tons of iridescent black sand, over 80% titano-magnetite, was scraped from the high tide line and shovelled into sacks. It was delivered to Horokiwi Quarry rock crushing plant and collected a few days later as a fine grey powered. The Institute's bemused technician then made black concrete cow pats with the powder outside their new premises at 177 Thorndon Quay, above Hood's Toffee Factory (*"the dentist's friend because of the ease with which their toffees plucked out fillings"*). The hardened cowpats were thrown on a truck, and back at Horokiwi they were crushed, sieved and the course sand fraction shovelled into sacks. Two tons of the sacks were lifted aboard the ageing mine-sweeper corvette HNZFA *Tui* (on loan from the Defence Research Establishment) and deposited at one spot in mid strait. Five days later the navy vessel was available again. They sailed with a box dredge to search for "magnetic concrete".

Samples were scrapped from the deep, N-S axis of the strait up to 5 nautical miles (8km) in each direction from the dump site. Back on shore, these were washed through a homemade magnetic separator, and magnetic grains were further



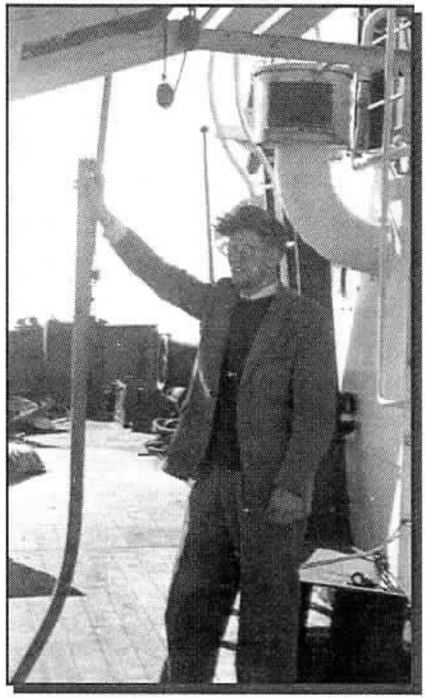
Hood's Toffee Factory at 177 Thorndon Quay. NZOI's home from 1956 to 1980 concentrated from the mass of heavy minerals adhering to the electromagnets with a horseshoe magnet from the ironmongers. These were examined under a binocular microscope. Grains of magnetic concrete were obvious amongst the mass of naturally occurring magnetic minerals. There was magnetic concrete in every one of the 18 samples. Course sand could slosh back and forth with the tides and finish up at least 8 km from where it had started five days earlier (Pantin, 1961).

It was bad news, but it was too late to look for a new route in quieter water to the north. Engineering work had already started at each end. Massive armouring of the cables ensured that the cables lasted a couple of decades before the layers of steel, jute and rubber were eroded through.

To his peers, it was a bit of a kiwi classic. His mana couldn't have been higher if he'd done it all with No8 fencing wire. It was a great start but not why he had been brought out.

The navy's HMNZS *Lachlan* had been surveying off eastern North Island. Jim Brodie had seen the echo soundings and realised they showed some shallow layers beneath the continental shelf, and a complex continental slope with features reminiscent of those just being described from off California. Henry accepted the challenge of trying to decipher the sedimentary processes and structure of the margin. It looked like being a lifetime job but you have to start somewhere. What to do and what with? There was little precedence in marine sedimentology, and except for some borrowed museum pieces, there was no equipment. Data collection was from "*vessels of inconvenience*".

"*We had read about the new technique of piston coring, so Jim Brodie said "Let's buy one off the shelf" and he managed to get head office to send an order off to a firm in America. They made two sizes, one a 12 foot one and the other a 75 foot one. When we assembled it in Hawke Bay, what we had was 12 foot corer with a huge 75 foot release mechanism. The engineer hacksawed the release arm in half and we did get a short core. That was in '56. When we went back later in the year, we had a new corer made by Bob Willis in the NZOI workshop* [under Henry and Jim's supervision] *but the one and half inch water pipe kept bending. Not strong enough. We had the American barrel but it wasn't a standard size and each join needed 12 Allen screws. Very unhandy with cold hands on a wet, rolling deck. Bob Willis's new corer was ready for '57. It was made with 12 foot lengths of 2 inch steam pipe, pretty strong stuff, with a redesigned trip mechanism, rapid-fit bayonet joins and*



Henry with bent corer barrel c.1956

square weights that didn't roll around on deck. I made the catchers by cutting and bending leaves out of brass shim. We loaded the core on Tui *in Wellington and sailed up the east coast and into Napier for supplies.*

We sailed out of Napier on July 25th and within 20 minutes we were aground on Pania Reef. Very famous spot. There's a statue of Pania sitting on her reef on Napier foreshore. I was on deck preparing equipment. There was a sort of grinding noise. Then a lot of shouting. I have never before or since seen a naval captain relieving himself over the side of a flying bridge. I believe the first lieutenant, John Harrison had given the order "starboard thirty" that set Tui *towards Pania. Because I had been on the flying bridge when he did this, - hoping to discuss the sampling program for the day, - both Aylward* [captain] *and Harrison later attempted to blame me for distracting them and thereby causing the disaster.*

But there were two things that were fortunate. First of all, Pania Reef is made of something soft, we didn't know what then. Secondly, we did it at low tide so that we could back off at the next high tide. So HMNZFA Tui *crawled sheepishly back to Napier, where a diver said "End of Cruise", and we unloaded everything. Jim Brodie's parents, who lived in Napier, took us home as ship wreaked sailors."*

"Anyway, they managed to get Tui back slowly and carefully to Auckland. Jim Brodie went up there and talked his way into the Naval Dockyard. He said the bottom of Tui was like waves of the sea with panels pushed in - like a minor motor accident. When no one was looking, he gouged out a sample of limestone from between the buckled plates of Tui and put it in a cigarette packet. This was the only sample we ever took with the ship itself. It is B14 something [B152] *in the register."*

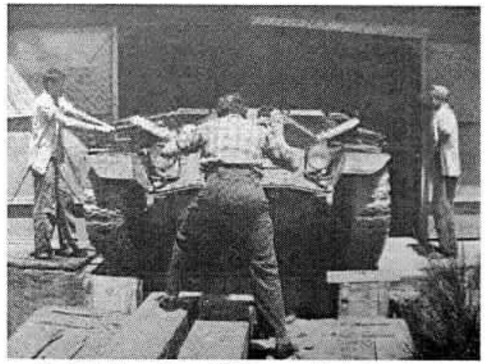
"*We finally got the work done later the same year. We got the Isa Lei to stop off in Hawkes Bay for a few days on its way to Wellington. We got a good series of cores that formed the basis of the report* [on the sedimentary processes of Hawkes Bay (Pantin 1966)]. *We sample the bald patch* [where the Lachlan reflector intersected the seabed]. *It was about 8,000 years old as I remember". We had no liners for the barrels but had to extrude the cores on deck, which compressed the cores by up to a third from the original length from the smear on the barrel".* In marine geology, just getting a sample was, and often still is, an adventure, and a frustration, all its own.

There was another adventure soon after when Henry joined Jim Brodie and physical oceanographer Ron Burling aboard the frigate *HMNZS Pukaki*, first escorting the Duke of Edinburgh and Royal Yacht *Britannia* past Chatham Island en route to South America and then escorting Ed Hillary's trans-Antarctic Expedition, aboard the old wooden HMNZS *Endeavour* down to the edge of the pack ice. "*We did bomb soundings all the way. An officer threw a hand grenade over the side of the bridge. We switched on the sounder. We got one almighty peak and then many seconds later another blip, which was the bottom 3000 fathoms or so down. We got soundings where nobody had before. We tried to get a sample from a rock pillar in the middle of nowhere called Scott Island. Had its own tiny icecap. Absolutely vertical sides. We got into the ship's boat and the first lieutenant was in the bows with a huge sledge hammer. He tried to knock a piece off and hope that it would fall back in the boat. Hopeless! There was a huge swell running - maybe 10m amplitude. Very dodgy!"*

"Next up to Fiji trying to get oriented cores for magnetic susceptibility [an idea well before its time] *but the special corer got knocked off on a seamount. It was in Suva that Bob Willis, the workshop technician, got his PhD. A sailor reported that, in a house of ill repute, a hairy arm came out of the bunk above him flicking off cigarette ash "And do you know, it was Doctor Willis". Bob was awarded an honorary Doctorate in Philandering.*

It was also on this cruise that they learned the hard way about streaming new wire behind the ship when underway. A new tapered wire costing most of the year's equipment budget, and reeled onto the ship using the winch of the Institute's very own Valentine tank (you could buy such things at Army Surplus Stores then), was

used to attempt the first coring in abyssal depths, and came back as a "bird's nest". Streaming the new cable first behind the ship prevented this.


Bob Willis guiding NZOI's own Valentine tank

Henry's work in New Zealand was wide-ranging, always imaginative and always involved understanding processes. His knowledge of chemistry helped his interpretation of the colours of muddy sediments and their possible relationship to slope failure (Pantin 1969). Some fluid dynamics was necessary for his interpretations of pebbly mudstones in shelf sediments (Pantin 1967). Both came in useful in understanding the internal structures that he found in cores (Pantin 1972). He recognised that mid water scattering layers in the Bay of Plenty were evidence of submarine hydrothermal activity (Duncan & Pantin 1969), an interpretation confirmed by Cousteau's diving module *Calypso* many years later. He recognised cold-water faunas in concretions from off Cape Campbell, an interpretation confirmed by early radio-carbon dates of about 18,000BP (Pantin 1957). Surprisingly the dates for the matrix appeared to be older than the shells, which was later suggested as evidence of methane-rich seepage. His interpretation of the submarine morphology east of North Island, its canyons and coast parallel ridges (Pantin 1963), paved the way for later plate tectonic interpretations. And he taught sedimentology and marine geology at Victoria University, where he inspiring student, Jim Kennett to take up the study of marine geology; Jim acknowledges this in his classic text-book on the subject (Kennett 1982).

Meanwhile, all was not well on the home front. With 4 young children, wife Jean had found it difficult to settled in New Zealand and make friends. Everything seemed brighter in her memories of "home". With only an interview but no job to return to, Henry reluctantly left with his family eleven years after he arrived in 1957. He got the job with the British Geological Survey - on prescribed surveys of shelf sediments in the Irish Sea but was never again allowed to use the flair that had been so valued in New Zealand. Back "home", Henry's wife remembered only the good life in New Zealand. The marriage ended soon after. Happiness came much later with a good Yorkshire woman, who had trained for her new role as the kindly matron to the Brigade of Gurkhas.

Henry continued to work and publish on New Zealand projects in his own time. He returned here five times, taking part in several cruises, even retiring early to join one in the Bay of Plenty. In retirement, he returned to his theme of sand moving underwater, developing mathematical models of the extraordinary nature of the turbidity currents - why sometimes they will flow for huge distances, His flume experiments, amongst young post-graduate students in the basement of the University of Leeds, giving weight to his mathematical model of "autosuspension". As always, his work says not just what happens, but how and why it happens. How avalanches of sand that begin in the canyons of Cook Strait and Kaikoura could metamorphose into his autosuspension turbidity currents capable of travelling 2000km and building a channel the whole way (Lewis & Pantin 2002; Pantin & Franklin 2009). A sand-grain, and a story, that begins on the beach can finish up on the abyssal ocean floor far, far away.

The grain may one days be recycled to form new land at a plate boundary. But that's yet another story.

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Ko Kingma versus the NZ Geological 'Establishment', understanding Northern Hemisphere PhDs and pre-War ideas of the Earth's structure

☆

Graeme Stevens

In the decades immediately after World War II many of the staff members of the New Zealand universities were either of UK origin or, if they were Kiwis, had received advanced training in the UK. Notable exceptions were CA Cotton and JA Bartrum – both being completely 'home-grown' (although influenced by the overseas literature). Although Geological Survey staff were perhaps more 'home-grown' than the universities, nonetheless there was a significant and often influential UK component.

As students moved through 'the system' they were naturally heavily influenced by their university teachers and also by Geological Survey staff, because during the long vacation it was usual to find employment with the Survey's field parties. So therefore the UK influence was passed on, almost by osmosis, to the next generation. The UK influence was also reinforced by the fact that virtually all of the scholarships on offer at that time for advanced study (because at the time programmes leading to a Ph.D. were not available in New Zealand) were tenable only in the UK. Furthermore, in the 1950s for example, a First-Class New Zealand M.Sc. was recognized as a fully acceptable qualification for entry to the research programme of any UK university including Oxford and Cambridge. So, therefore, the NZ student coming to the UK was able to begin a full-time Ph.D. research project without having to sit any further examinations.

The Fulbright Scholarships were available for the USA but at the time short-term study projects tended to be favoured rather than full-scale Ph.D. programmes.

A complicating factor was that the American Ph.D. had a substantial component of course work, extending over 2 years, to be passed satisfactorily before acceptance into the research programme. A foreign language test also had to be passed – translating scientific papers in one or two other languages, at the time mainly French or German. In

geology the course work entailed getting to grips with a lot of the detail of American geology – a daunting task for a New Zealand student, raised on a diet of NZ geology!! As a consequence, only a very few brave souls embarked on an American Ph.D. [Ian Speden and Peter Andrews gained American Ph.D.'s in the 1970s]

European Ph.Ds were also placed in the 'too hard basket'. This was because, judging from conversations I had with students from Europe, many universities (e.g. in Germany and Holland) at the time had a very different system of study. The UK universities had a structured course – 3 years (minimum) of research on a chosen topic, followed by submission of a thesis, and if the thesis is accepted, a concluding oral examination, usually carried out in the supervisor's room in the department (and if successful accompanied by a glass or two of sherry or champagne). The German and Dutch universities at the time had a routine described in colloquial terms as the aspirant Ph.D. student 'sitting at the foot of the Professor until they were judged to be of an acceptable standard to proceed to a Ph.D.' If you happen to be out of luck, this process could take an interminable amount of time. As all of the New Zealand scholarships were for a finite length of time (usually 3 years, non- renewable) most students couldn't run the risk of facing up to over-runs of time (with their money fast running out) just because the Professor thought that you 'were not yet ready'. Additional hurdles were: (i) a foreign language had to be mastered; (ii) the thesis must be submitted in a printed and published form; (iii) the thesis defence takes place in a hall, in front of the assembled Professorial Board and anyone else who would like to attend.

After reading the above, the reader may probably appreciate the reasons why in the period late 1940-1960 New Zealand students wishing to proceed to a higher degree tended to gravitate towards the UK. Therefore, as time progressed and students returned from the UK with newly minted degrees, so that new staff appointments made in the universities and the Geological Survey, were predominantly from the UK, a 'Geological Establishment" was built up, with an overwhelming UK background. As Pip Black observed (Black 1999 a, p.55), the NZ geological scene became rather inbred.

During my early years as a geologist the NewZealand geologists that I knew all had either NZ degrees (D.Sc. or M.Sc.) or degrees from the UK. Only two people I knew had other non-UK degree: Arnold Lillie and Ko Kingma. Arnold had carried out doctoral studies with Leon Collet at the University of Geneva (Black 1999 a, b) and introduced to New Zealand the French/Swiss style of structural geology (Lillie 1980). However, he had a significant UK component in his background because his basic training had been at Cambridge University.

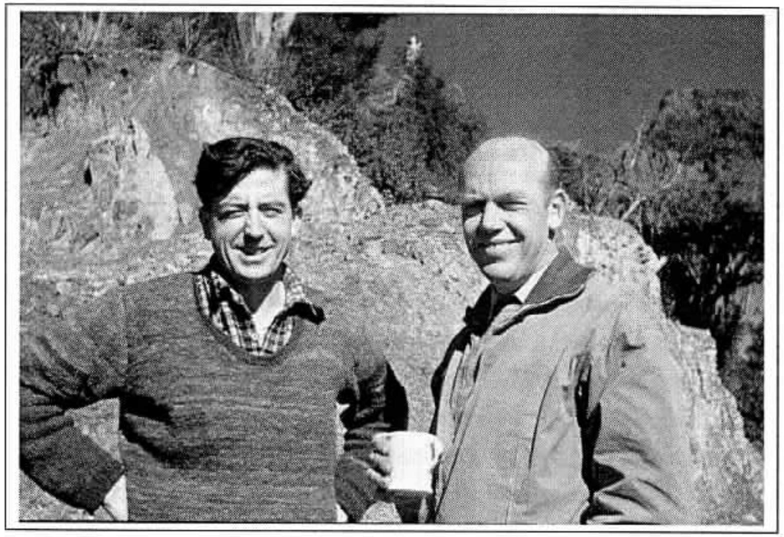
Ko Kingma arrived in New Zealand in 1949 and was appointed to the Napier office of the Geological Survey. Previously Ko had been on the staff of the Java Geological Survey but had been interned in a Prisoner of War camp during the Japanese occupation. He had received his geological education, culminating with the award of a Ph.D. at the University of Utrecht. During his studies he was greatly influenced by the leading exponents of the Dutch School of Structural Geology, then at its zenith. RW van Bemmelen renowed for this work in Indonesia (e.g. van Bemmelen 1949), and also interned in the same POW camp as Ko, was Ko's 'promotor' (i.e. supervisor). Other notable Dutch geologists at the time of Ko's studies were JHF Umbgrove (e.g. 1947, 1949, 1950), GAF Molengraaf, LMR Rutten, FA Vening Meinesz, LU de Sitter and BG Escher. Ph.H Kuenen was then developing his ground-breaking research on turbidity currents. The geological departments at Utrecht, Delft and Leiden were the focus of the Dutch School.

During his time in Hawkes Bay Ko accomplished a phenomenal amount of work. His publications commence in 1955 with a series of papers on miscellaneous topics of Hawkes Bay geology. Then in 1959 Ko prepared the Hawkes Bay entries for the NZ edition of the Stratigraphic Lexicon. Also in 1959 Ko published his ideas on the structural history of New Zealand (Kingma 1959 a, b). A major series of 1:250 000 maps were published as part of the Geological Survey's 4-Mile project : Sheet 11 Dannevirke (1962), Sheet 9 Gisborne (1965), Sheet 6 East Cape (1966), Sheet 12 Wellington (1967) – a truly remarkable accomplishment and a unique record within the Survey. The 4-Mile maps were followed in 1970 by 1:63360 mapping of the regions around Napier, Hastings, Waipawa, Waimarama and Waipukurau. Ko's detailed work in Hawkes Bay was published in the Te Aute Bulletin (Kingma 1971).

As an adjunct to the Geological Survey's 4-Mile programme, a major synthesis of NZ geology was undertaken, incorporating the results of the programme together with previous work. The preparation of contributions to *The Geology of New Zealand* (Suggate et al. 1978) was well underway at the time of the Survey's Centenary (1965) and by 1968 a large MS was ready for fine-tuning.

I was an Associate Editor for *The Geology of New Zealand* and had the task of overseeing the parts of the MS relating to the Mesozoic and The Fossil Record and

Palaeogeography. I therefore had no first-hand knowledge of the remaining parts of the MS. However, I understand that Ko Kingma had a major objection to the way differences of opinion were being resolved. He thought the 'committee approach' being employed was inappropriate given the circumstances – that strongly held opinions were being run over rough shod, just for the sake of a smoothly running text. As a result, Ko decided to have very minor involvement with the project. Thus the sections dealing with the Tertiary and Quaternary of Eastern North Island (Suggate et al. 1978 pp. 471-482 and 563-566), which were very much Ko's forté, were instead authored by Pat Suggate. The Cretaceous of the Eastern North Island (pp. 368-375) was authored by Ko and Ian Speden.



Ko Kingma (right) with Larry Harrington Photo courtesy GNS
(Larry is wearing a well prepared hand-spun, hand-knit natural fleece jersey: Ed.)

Adding to Ko's dissatisfaction was that as originally conceived *The Geology of New Zealand* had concluding sections dealing with the Structural History and Tectonics of NZ. Ko was probably looking forward in anticipation that he would be an active contributor to these sections. However, as time went on the entire milleu of structural geology and tectonics changed dramatically in response to the discoveries in marine geology with the deployment of oceanographic ships like *Glomar Challenger* and *Vema* (Scripps Institution of Oceanography). These discoveries, coming quickly one after another led up to the formulation of Plate Tectonics and the accompanying revolution in geological thought. These discoveries, spanning the years 1961-1969 (Marvin 1973), coincided with the major period of writing for *The Geology of New Zealand*.Because of these events it was considered that any material written on New Zealand's structural and tectonic history would become rapidly out of date. This realization led to the decision to not have concluding sections providing an overview of NZ's structural history,tectonics and overall geological development – much to Ko's disappointment.

During the years of intensive activity in Hawkes Bay, Ko developed his own concepts on the structural geology and tectonics of New Zealand, influenced by his association with the 'Dutch School' at Utrecht, Leiden and Delft. These concepts were originally published in outline in 1959 (Kingma 1959 a, b). In summary, the concepts tended to be influenced by the Undation Theory of van Bemmelen, which considered tectonics to be the result of wave-like up and down movements of the earth's crust. New Zealand was postulated to be a median geanticline that had developed within a large geosyncline (van Bemmelen 1933, 1935, 1978; Kingma 1974 p.14). However, Ko's ideas were not favourably received by most of the Geological 'Establishment' in New Zealand, firmly ensconced in the framework of UK-derived methods, theories and interpretation (e.g. Macpherson 1946, Wellman 1956, cf van der Lingen 1975).

Ko was obviously very hurt by the negative reception of his ideas. Possibly to ease his sense of disappointment, he spent the entire year of 1959 in the USA as a US National Science Foundation Fellow. This time was used to prepare a manuscript for his book *The Geological Structure of New Zealand* that allowed Ko free rein to expand and adequately document the way he viewed the subject. Unfortunately, production of the book was subject to a number of delays and it was not published until 1974 (Kingma 1974), the first copies reaching New Zealand a week before Ko died (van der Lingen 1975). Similar production delays also plagued *The Geology of New Zealand* and it was not published until 1978.

Two passages in Ko's book convey the depth of his feelings of rejection by New Zealand geologists and are worth quotation in full. They also sum up in a truly admirable manner the practicalities of conducting research in many segments of the geological sciences. I personally well remember the frustration of lawyers and judges in court and tribunal cases, when I refused to provide a cut and dried answer to a geological question – because I knew there were differing opinions on the interpretation of the relevant data.

"It is the prerogative of the geologist to balance and to compare the aspects of geological features to his own satisfaction, and, if he so wishes, to assign more value to one particular set of presumably firm data than to another. Also, there are the aspects of geology that are difficult to estimate, the quality of which only the geologist working on a particular problem or field can fully assess. It is the appraisement, perhaps the art of evaluation of these imponderables, that make conclusions, on one and the same geological subject, often so quite different from author to author." (Kingma 1974 p.x).

"It is admitted that facts have sometimes been stressed in somewhat different ways than other geologists would perhaps have permitted, or would have felt inclined to. It should, however, be remembered that geology is a science in which the imponderable aspects of the earth's crust are open to speculation. The interpretation of these aspects tends to depend not only on the school of thought to which that particular geologist belongs, but also on his conviction, based on experience gathered both in the field as well as in the laboratory. Then there is the important, often forgotten aspect whether his reconstruction of events is imaginative and sensible within the framework of the available data." (Kingma 1974 p. 1).

Unfortunately for Kingma the scenario that prompted the dropping of sections dealing with structural history and tectonics from Kingma's *The Geology of New Zealand* turned out to be correct. When Ko was writing his book in 1959 sea-floor spreading was just starting to gain recognition as a viable concept (in 1961-1963) while plate tectonics was still some 8 or 9 years away from being formulated (early 1970s). At that time, in the late 1950s, many geologists in New Zealand, aware that a revolution was dawning in the Earth Sciences, were uncertain just where NZ fitted into the overall picture. Some people doubted that NZ had ever been part of Gondwanaland and perhaps had been a mini-continent on its own. It was left to the lone voice of John Bradley, a long time protagonist of Continental Drift (Stevens 1998, 2005), to assert that NZ's original place was on the southeastern flank of the super-continent.

It was only in the early 1970s that some clarity began to emerge. Early studies included, for example, those of Christoffel and Falconer (1972, 1973 a, b) and other contributors to the NZ UNESCO Oceanographic Symposium in 1972 (Fraser 1973). A new dimension was added by information gained from the operations of the deep sea drilling ship *Glomar Challenger* in the South West Pacific, during which a number of holes were drilled around New Zealand in 1971-1972 and in 1972-1973 in the region of the Ross Sea and to the south of Australia. It was very sad that by 1974 when Ko's magnum opus was published it had already been upstaged by the major shift that occurred in geological thought in the wake of the formulation and acceptance of sea floor spreading and plate tectonics. Ko's text was heavily dependent on geosynclinal theory and modelling – concepts that became redundant very quickly as the new ideas gained momentum. By contrast, *The Geology of New Zealand*, consisting of a factual, comprehensive and detailed documentation of the NZ stratigraphic record, has remained as a major reference book. Ko Kingma's book stands as a personal record of his ability to carry out large-scale interpretation and synthesis in the tradition of van Bemmelen, Umbgrove and the Dutch School of Structural History & Tectonics. After Ko's death the Kingma family kindly endowed the Kingma Award for Science Technicians, awarded annually by the Geological Society of New Zealand.

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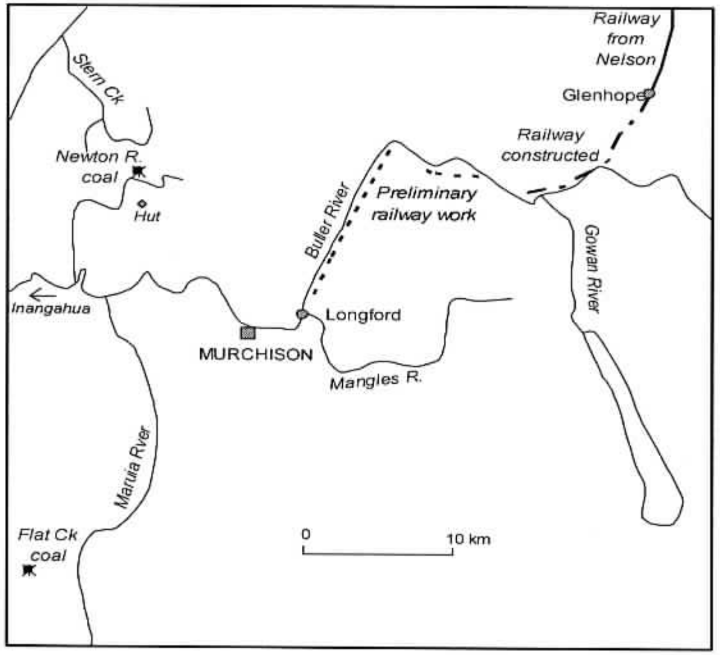
The railway that faded away

Pat Suggate

The railway southwest from Nelson reached Glenhope in 1912. It was heading slowly westwards towards Inangahua so as to link with the main line from Christchurch. By the time work was halted by the Depression of the 30s, work trains had taken the line to Gowan River, and some preparatory work had been carried out between there and Longford only 4 km from Murchison. The war inevitably prevented further work, but in 1947 resumption of construction was being urged, with Nelson interests particularly keen to end the orphan status of their railway.



Potential routes as far west as White Creek 12 km west of Murchison had been surveyed both before and after the 1929 earthquake during which the White Creek Fault ruptured, but the really difficult stretch lay further west, down the Buller Gorge. So the first objective was to reach Murchison, needing a section that would be fairly easy to construct. The suggestion was made that this would enable the development of important coal mines; coal seams had been reported in many places in the district, and a few small mines were operating. Two of the most promising reports were of coal in Flat Creek in the lower Maruia valley 18 km southwest of Murchison, and in Newton River 12 km northwest of Murchison. The Mines Department decided on an investigation of these.

I had joined the New Zealand Geological Survey from England in April 1947 to work on West Coast coalfields from Greymouth, where, over 10 years, close collaboration had been established between the Survey and the Mines Department. In the middle of the year, after just enough time for me to get a grasp of the relevant West Coast–Nelson geology, I and a veteran Mines Department coal prospector Algie Davies made a mid-winter reconnaissance survey of the Flat Creek area. We had to drive through a ford, and consequently each following morning we had to get pails of hot water from the hotel we stayed at in Murchison to unfreeze the brakes! The Flat Creek seam was several metres thick along a small length of outcrop but appeared to thin rapidly away from there, and only thin seams were found elsewhere. But the coal was of excellent quality, and access would not be too difficult.

In October 1947, the more inaccessible Newton River coal was investigated. Local knowledge was desirable, and Robert O'Rourke from the lower Maruia valley joined a team led by Tom Dale of the Mines Department, including Algie Davies and myself. Using a pack horse to carry our supplies, we went north on the old cattle track that extended from Fern Flat to the Matiri Tops, a limestone plateau potentially surrounded by coal measures. We used an old hut about 5 km north of Fern Flat as a base, and from there first examined the coal, up to four metres thick, that had attracted most attention Then the group split up to seek more coal to the east and west. There were no credible maps and no air photographs, so that precision on the location of the creeks and geological observations was not possible. Nevertheless, I was able to adequately draw the topography and creeks, using a compass and pacing distances. Away from the main outcrops only thin seams or no coal at all were found in the coal measures. The furthest I went was to the southern Matiri Tops with Robert, camping the night in the headwaters of what I was later to name as Stern Creek. Next day, following this creek where it left the limestone plateau, there was no coal where it might have been expected, and when we found that the creek was heading north to the Mokihinui River rather than south to the Buller River, we hastily followed a side creek to the south towards the base camp. When the party discussed what had been found, it was clear that the results of the reconnaissance were disappointing. Further, the coal proved to be very high in sulphur, and, with access being difficult, prospects for mining were not good.

My report on the Flat Creek and Newton River areas could not be encouraging, and it did not include reference to many other coal occurrences in the district that were known locally. A public meeting was held in Murchison, with many speakers reporting these other seams; one man asserted that he had been told many years previously that the granite Mt Newton, a few kilometres east of the Newton River coal, was sitting on coal! Actually, regional geological mapping in the late 1920s by Horace Fyfe (1968) had recorded many of these scattered coal occurrences. The *Nelson Evening Mail* reported the meeting fully, including comments critical of the geologist for having so little New Zealand experience. As a response to the meeting, in the summer of 1947-48 I made further investigations, using an old Ministry of Works hut in the lower Maruia valley as a base and was glad to be accompanied by my wife Daphne. I failed to identify any important coals and at a further meeting was, I think, able to reassure those who came along about our investigations.

In the summer of 1948-49, David Kear, Jim Schofield, Ernie Annear and I examined many parts of the Murchison district to have a further look at coal occurrences in the context of the overall stratigraphy. In those days, provided we kept up our geological liason work with Mines Department, we could follow our other geological interests. David and I were accompanied by our wives, Daphne Suggate and Joan Kear and we first had a very pleasant cottage in the Mangles valley as a base, and then an abandoned rat-infested farmhouse in the upper Maruia valley. Then and later I got to know many local people, and for many years maintained an interest in mapping the fascinating geology of the Murchison district.

A small amount of excellent coal has been mined at Flat Creek. The Newton River coal remains untouched. The Nelson railway did not reach even Murchison, although considerations other than a lack of major coal deposits no doubt contributed to the decision to cease work on it. The railway from Nelson to Glenhope closed in 1955.

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Postscript: A number of Nelson women led by Ruth Page and including Sonja Davies protested against the closure of the Nelson to Glenhope railway. They passed the time sitting on the hard steel lines with their family knitting

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Notes on the moa from 1866

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Phillip Andrews

Science-Gossip An Illustrated Medium of Interchange and gossip for Students and lovers of nature was a London monthly publication begun in 1865, continuing into the early 20th century. It was the scientific equivalent of *Notes and Queries* for literary studies. In my hardback collected edition of the 1866 numbers (published in 1867) appear a couple of items relating to New Zealand.

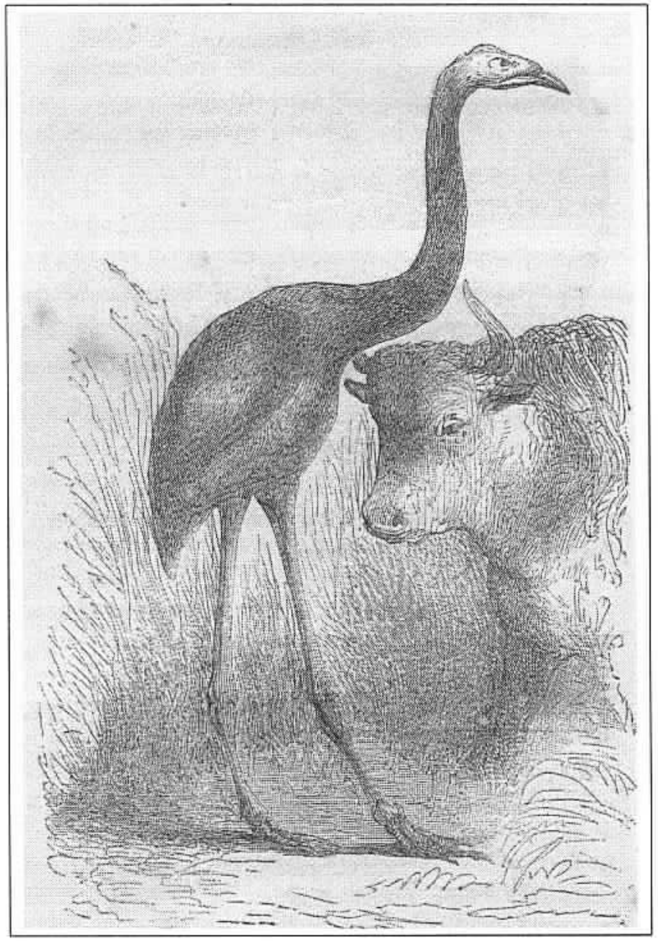
The first is headed 'The Moa of New Zealand': "A very interesting volume, entitled, "The World before the Deluge" by Louis Figuier, has recently been translated into English, in a very satisfactory manner, and published in this country [*England*]. From this work, which is profusely illustrated, we have borrowed a woodcut representing *Dinornis*, restored to what is believed to have been its natural appearance. Writing of the post-pliocene period, the author remarks" "Two gigantic birds seem to have lived in New Zealand during this epoch. The *Dinornis*, which, if we may judge from the *tibia*, which is upwards of three feet long, and from its eggs, which are much larger than those of the ostrich, must have been of most extraordinary size for a bird." The accompanying illustration, however, gives no idea of the solidity of the leg bones, nor the massiveness of the body.

The article continues: "At the meeting of the Zoological Society, held on the 12th of December, Mr H.W. Flower communicated some notes from Dr Hector, Director of the Geological Survey, New Zealand, upon the bones of various species of *Dinornis*, which had been exhibited in the New Zealand Exhibition, recently held at Dunedin."

In a later issue it is reported that among the recipients of a special silver medal struck by the organisers of the New Zealand exhibition was Richard Owen, "for the valuable services rendered to the natural history of New Zealand by his works on comparative anatomy, especially on the anatomy of the moa."

The report concludes with mention of a moa egg that had been put up for auction in England. The highest bid was 120 pounds, but since that did not reach the

reserve, the egg was to be repacked and sent back to New Zealand, "as the owner is not disposed to part with it at the price."



Postscript: The above figure is very similar to the illustration of the Lesser megalapteryx on the front cover of *Moa: the dramatic story of the discovery of a giant bird*, Richard Wolfe, Penguin Books, 2003, 249 pp.(Ed.)

Canterbury Field Trips in the 1950s

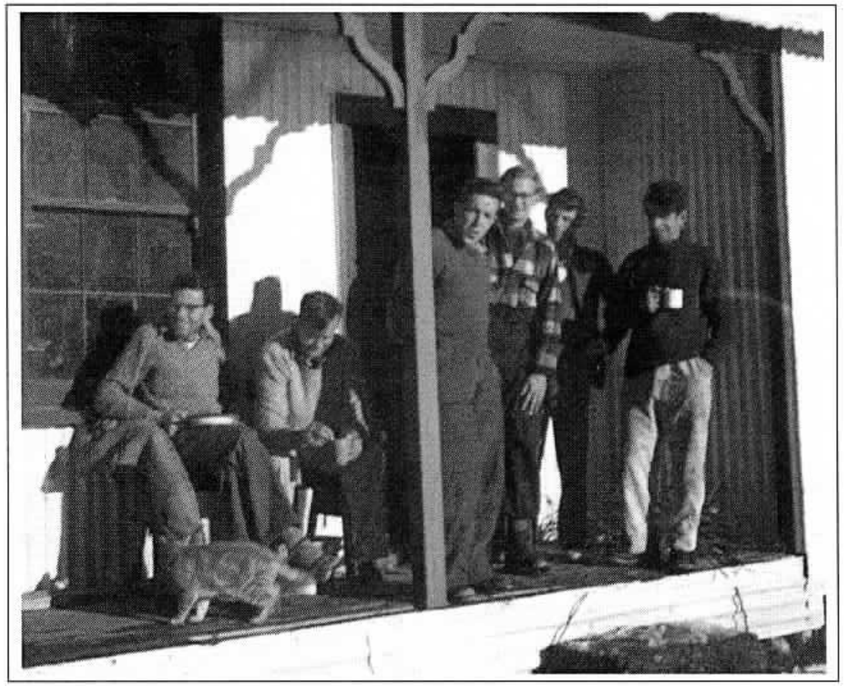
☆

Graeme Howard

Graeme Howard was recently sorting out his colour slide collection, and has kindly let us use a few of his images of geology field trips from Canterbury in the mid 1950s. He also provided the following notes and the captions for the images.

I was a geology student at Canterbury in the mid to late 1950s. In those days there were only three staff members in the Geology Department: Professor Robin Allan, Max Gage, and Doug Campbell (father of Hamish). Our small class included Gary Speight, David Ives, Colin O'Loughlin, Ian Campbell, Ian Simmers, Mike Stadnyk (Canadian), and Kelvin Liggett, as well as two Fijian students, Epeli Kacamaiwai and Peni Waga. Peter Andrews, Guyon Warren and George Scott were a bit ahead of us. Sadly, not all of them are still with us.

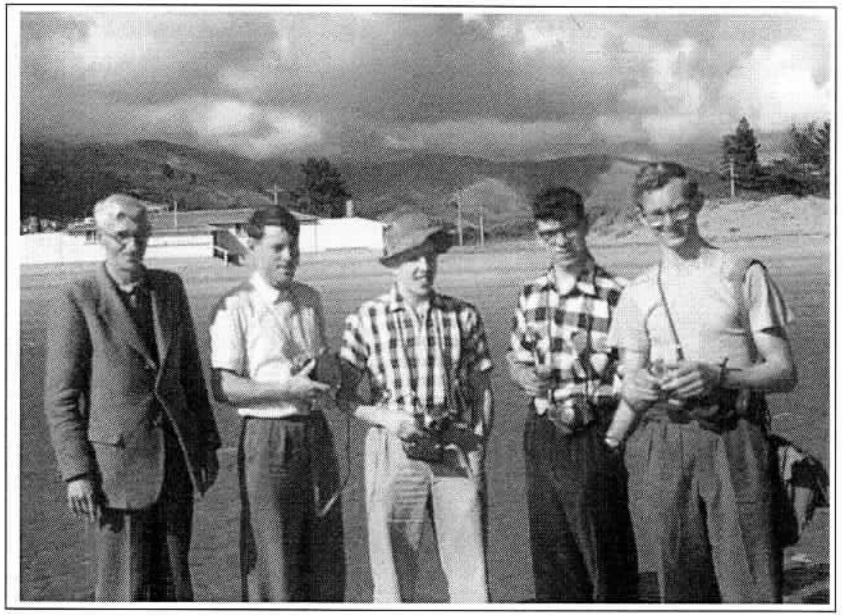
One of my most vivid memories is a field trip with Max Gage, staying in the Cass Field Station (which was originally the stationmaster's house). At the time Max was finishing off his work on multiple glaciation in the Waimakiriri valley. Travel was in a 3 ton Austin "College" truck, non synchro-mesh, driven by P.J. Alley (brother of Rewi Alley), an engineering lecturer who loved to come along on field trips as cook and driver. His skills in neither were very great. The students cowered in the back of the covered wagon, army-style. The tar seal ran out after Darfield, so it was corrugations, dust and crashing of gears from then on. After we got to the field station, Max would take off at high speed across the tussock, the rest of us struggling to keep up, while he poured forth a barrage of information. Lunch consisted of a pocket-knife attack on a roll of salami he kept at the bottom of a pack and a mug of tea from a Thermos. But the bottom line was that he was a great teacher, and we learned hugely from him in the field – material that is hard-wired into us to this day.



1957 ANZAC Weekend trip to survey moraines on the Cameron Glacier. From left: Bill Packard (Geography Dept), Max Gage, Ian Campbell, Mike Stadnyk, Gary Speight and Doug Campbell

The weekend didn't work out quite as planned. We reached the foot of the Cameron Glacier, . but it came on to snow very heavily, so we had to beat a hasty retreat when the snow was knee- to thigh-deep. The photo was taken outside the shearers' quarters at Lake Heron station

After leaving university, I spent most of my professional life in the old Department of Agriculture in Christchurch, then MWD Headquarters in the Vogel Building in Wellington working for the National Soil and Water Organisation. I moved back to Christchurch, and a few of us were transferred to the Geological Survey when NAWASCO ceased to exist. But this turned out to be only a temporary phase in the Douglas/Richardson era of change, and there were redundancies round the country with early retirement for those of us a bit longer in the tooth.



Group at Tahunanui Beach, Nelson in 1958. We were en route to the Victoria University field station at Onekaka. From left, Prof Allan, Gary Speight, Ian Campbell, Peter Andrews and Mike Stadnyk

Postscript (by Simon Nathan)

I followed Graeme at Canterbury about five years later. Prof Allan and Max Gage were still there as well as some younger staff who had arrived more recently. Like Graeme I had vivid memories of the Cass field trip in 1962. Max took pride in being very fit, and would charge ahead across the bare hills while the class spread out like a trail of sheep. Only the fit group would hear what Max had to say as he waved his hands around the landscape, then he would be off again, with a word to the late arrivals, "You people really must try and keep up".

I really didn't learn much geology on that trip, so decided to repeat it three years later when I was a grad student. What a change. Max was older and slower, and we were able to travel as a single group. As we puffed our way up the ridges, Max would stop for regular breaks while he pointed out the geology.

Like Graeme, I came to have a great regard for Max. He was rather shy with students to start with, but was a great teacher and later a helpful and sympathetic supervisor.

HEAPHY AND HOCHSTETTER – THE FIRST RECORD OF BASALT IN THE COROMANDEL VOLCANIC ZONE

☆

David Skinner

Introduction

In 1967, while doing field mapping for the Northern Coromandel 1:63,360 (1 inch to the mile) Sheet N40, I was working along the north side of the Kuaotunu Peninsula in andesites (Mahinapua Andesite) east of Otama Beach (Fig. 1). I scrambled around the rocks into Whaorei Bay and was amazed to see on the next headland (Tamaihu), a 110 m high pile of 1-3 m basalt lava flows interlayered with scoriaceous breccia (Mercury Basalts – Skinner 1976). On the east side of Tamaihu, the small peninsula of Tokarahu exposed a basalt dike swarm in a residual eruption centre of basalt scoria and broken lava bombs within a spatter-filled rift (Fig. 1).

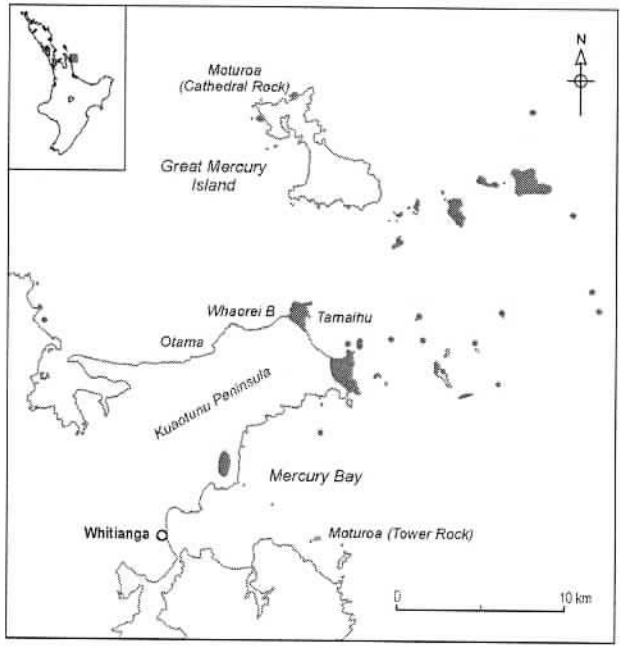


Figure 1: Sketch map of the Kuaotunu Peninsula, Mercury Bay, & Great Mercury Island showing locality of Moturoa – Cathedral Rock on Great Mercury Island; basalt outcrops in red. (after Skinner 1976).

I say 'amazed' because up to that time there had been no recognition of basalt during earlier geological surveys of the Coromandel region. Instead, the areas of basaltic rocks known today were variously mapped as andesite, greywacke, rhyolite and ignimbrite (e.g. Sollas & McKay 1905; Fraser & Adams 1907; Schofield 1967)! Although Sollas & Mckay (Vol 1: p. 10) noted that in Coromandel rock collections made between 1854 and 1885, prior to thin section petrographic identifications, the rock names "Dolerite basalt" "Trap basalt" and "Basalt" had been used, neither identification of the source(s) of these names, nor the localities from where the rock specimens were collected were given. No basalt was included in McKay's collection of 406 rock samples sent to Professor Sollas for petrographic description.

Charles Heaphy in Coromandel

Charles Heaphy was employed as a draughtsman in the Auckland office of the Colonial Survey Department. In 1852, he was appointed to supervise the fledgling Coromandel gold diggings and Gazetted as Superintendent (Heaphy 1852a & b), regularly reporting on the state of the gold diggings (Heaphy 1854 - misspelt "Heaply"). By 1855, he had been appointed Commissioner of Goldfields (Heaphy 1855) although he administered them from Auckland where he produced a water-coloured, hand-drawn map of the geology of Coromandel Harbour and east from Kennedy Bay through Whangapoua and along the north side of the Kuaotunu Peninsula to Opito Bay, and north to northern Great Mercury Island (Heaphy 1857). Heaphy's geological map of the volcanoes of Auckland has a sketch of the North Island of New Zealand that includes the general volcanic geology of Coromandel (Heaphy 1860). By this time Heaphy had met Hochstetter and had accompanied him on a visit to Coromandel Harbour and town from the 8th to the 12th of June 1859 (Johnston & Nolden 2011).

Heaphy is renowned as a more than competent artist. During his goldfields days at Coromandel, he produced a number of watercolour sketches of the region that included Maori, a marine view north of the topography from Whangarei east to Coromandel, and details of Coromandel Harbour geology and miners' activities (Nolden & Nolden 2011; Johnston & Nolden 2011). Heaphy notes (1860, p.250-251) that he "has also supplied several original water-colour sketches, indicating the geological and volcanic features of the district" to Hochstetter. Among these was a rather faint pencil drawing of columnar islands annotated in Hochstetter's hand "Motu roa an der Mercury Bay Nordinsel", and preserved in Hochstetter's estate collection of papers in Basel, Switzerland as drawing 1-4-11 (Nolden & Nolden 2011: p. 38).

Hochstetter and Coromandel

In *Hochstetter's Geologie von Neu Seeland* (Hochstetter 1864; translated by Fleming 1959), a similar illustration is included before page 89. However it is far more detailed, and is strongly drawn with fern foliage, extra rocks and additionally, has four Maori canoes, two with sails in the bay and two drawn up on the beach. The illustration is labelled as for the Basel drawing, "Motu roa, an der Mercury Bay, Nordinsel" but has (in brackets) "saülenformiger Trachyt" = columnar trachyte. In addition there is also printed "Ch. Heaphy del. Grefe Lithogr." (lithograph by Grefe) and "Aus d. k. k. Hof. U. Staatsdrucherei" (Aus der Kaiserlich-Königlichen Hof und Staatsdrucherei = from the (Austrian) Imperial & Royal Court and Government Printing Office). In the list of Chromolithographs (p.XIV), the title is given as "Moturoa, Trachytfelsen an der Mercury Bay, Ostküste der Nordinsel".

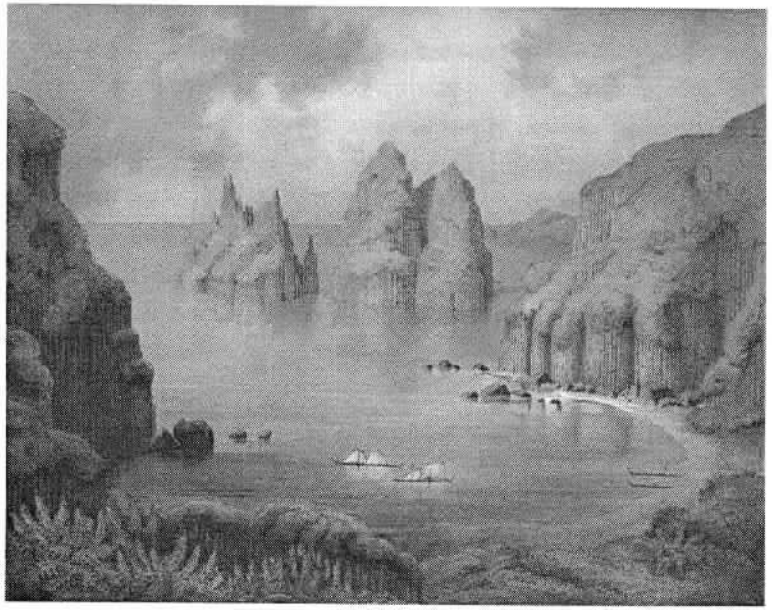


Figure 2: The chromlithograph by Grefe from Heaphy's drawing, in Hochstetter (1864, before page 89).

In Hochstetter's text (p.89; see Fleming 1959 p.119), he states " Von den Mercury-Islands brachte mir Mr Smalfield Handstücke von gelbem Trachyttuff mit eingebackenen Trachyt-, Bimstein-, Obsidian- und Thonmergelbroken mit, und eine kleine Insel unter der Gruppe soll aus den regelmässigsten Säulen eines trachydoleritischen oder basaltischen Gesteines bestehen. Ich verdanke Herrn Ch. Heaphy eine schöne Skizze dieser Säulenbildungen, Welche von Herrn Grefe in Farbendruck ausgeführt wurde." (Fig. 2).

"From the Mercury Islands, Mr Smallfield brought me hand specimens of yellow trachytic tuff with baked scraps of trachyte, pumice, obsidian and clay marl, and a small island of the group is said to consist of regular columns of a trachydolerite or basaltic rock. I am grateful to Mr Ch. Heaphy for a fine sketch of this columnar formation, which has been reproduced in colour by Mr Grefe." (Fig. 2).

So here Hochstetter refers to the columnar rock as 'trachydolerite or basalt'. Then why is the lithograph labelled 'Trachyt" = trachyte? On pages 82-84 in the german text (Fleming p. 113-115), Hochstetter discusses and provides a table of the various names used for volcanic rocks by European geologists at that time. He concludes that the german term 'Trachyt' is actually a carpetbag of six different volcanic rock types – true trachyte, amphibole andesite, pyroxene andesite, dolerite and leucite-porphyry. These last two he considers are varieties of the dolerite or basalt family. He then goes on to divide volcanic rocks into four types – rhyolite, trachyte, andesite and basalt. Hochstetter's writing is thus the first to establish rhyolite and andesite as independent rock types. In Heaphy's time in Coromandel, and with the probability that he learnt his geology from Ernst Diffenbach with whom he sailed to New Zealand in 1839 (Nolden & Nolden 2011), the term 'trachyte' was universally used in New Zealand for almost all volcanic rocks older than Pleistocene-Quaternary. Hence, although Heaphy and initially Hochstetter labelled the sketch as trachyte, Hochstetter later amended the rock name to dolerite or basalt.

Into the 20th Century

After this there was a time gap of some 68 years when little or no interest was shown by New Zealand geologists in an obscure, in their eyes, occurrence of basalt. Marshall (1932) suggests that this was, at least partially, because of the confusion in the naming of the locality. Great Mercury Island is not actually in, but is north of

Mercury Bay, it is not on what is generally known as 'the east coast' of the North Island, and on the outside of southern Mercury Bay proper there is a tiny island also named Moturoa, or as James Cook named it, "Tower Rock". It was not until Marshall visited Mercury Bay and many of its islands that the locality of Motu-roa (meaning high or long island) was confirmed as the north end of what Marshall called "Mercury Island" = Great Mercury Island (Moturoa), or as it is also known today "Cathedral Rock". He also confirmed the rock type as hypersthene basalt, and included a photograph captioned as "Fig. 4. – View of basaltic rocks, north end of Great Mercury Island". Not being critical, but in reality, a comparison of Marshall's photo, the more recent one I have included in this article (Fig. 3) and the chromolithograph in Hochstetter (1864), shows that both Heaphy and Grefe used a beautiful degree of 'artistic licence' in their depiction of the rock structures at Moturoa.

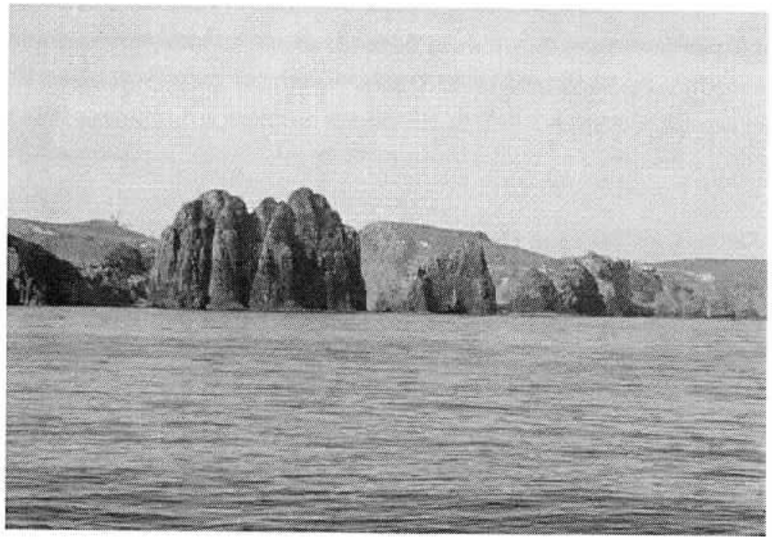


Figure 3. Colour photo from 35 mm slide of Moturoa-Cathedral Rock; view from the north. (Photo: Skinner).

Another 30 odd years were to pass before any further sampling of Moturoa-Cathedral Rock was undertaken. During a geological reconnaissance of Great Mercury Island in the early 1960s, R.N. Brothers (Nick) collected *inter alia* a sample recorded as Field number 32; Auckland University Geology Department Rock Collection number 14377 (amended later to 14363 &/or 14364); Dolerite intrusion at

locality NZMS1-N40/272934 Cathedral Rock. I have examined a thin section of this rock and, as Marshall, noted, it is a slightly porphyritic, hypersthene-rich, two pyroxene ± olivine basalt with a dolerite-microgabbro, subophitic texture. Olivine is relatively rare and almost entirely replaced by iddingsite/chlorite pseudomorphs with later partial alteration to siderite/calcite.

Another, perhaps final, twist in the tale is reported by Murray-Oliver (1966: pp.133 &136). In an article on New Zealand geologists who were also artists, he sets Heaphy as of "greatest value" in this respect. In particular he notes that the locality "Mercury Bay" as shown on Heaphy's 'chromolithograph' by Grefe as reproduced in Hochstetter (1864) is "faulty" as proved "by another Heaphy sepia wash drawing in private hands in Wellington. This is a closer study of Tower Rock, as Cook named it, bearing Heaphy's own title, *Moturoa. Basaltic Rock, Great Mercury Island*." Unfortunately Murray-Oliver does not reveal the ownership of the 'private hands', and as noted above, Cook's 'Tower Rock' is the other, small Moturoa in Mercury Bay itself. So who is or was confused? I can say without any doubt, having been there, that the Heaphy Basel pencil drawing and the Hochstetter chromolithograph attributed to Heaphy really do depict, allowing for artistic licence, Moturoa-Cathedral Rock on the north end of Great Mercury Island, and the first recorded basalt locality in the Coromandel Volcanic Zone.

Acknowledgements

This account is an expansion of an oral paper presented at the recent Hamilton Conference of the Geoscience Society of New Zealand (Skinner 2012). My thanks to Simon Nathan and Tony Christie for reviews, and Philip Carthew for figure scans and draughting.

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PDF copies of this article with illustrations in colour can be obtained by emailing David Skinner (see address above)

Collections of letters written by or about James Hector

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Simon Nathan

James Hector (1834-1907) was the dominating personality in the late 19th century scientific community in New Zealand. As the first professional scientist to be employed by the government, he founded the Geological Survey (now GNS Science), the Colonial Museum (now Te Papa) and the New Zealand institute (now Royal Society of New Zealand) as well as supervising weather forecasting, the time service, and the Colonial Botanic Garden.

As part of a forthcoming biographical study of James Hector, several collections of letters have been recently been transcribed – more than 800 letters, mainly from the Alexander Turnbull Library, Te Papa archives, Hocken Library, and the archives of the Royal Botanic Gardens at Kew – by a small team including Rowan Burns, Esme Mildenhall, Judith Nathan, Simon Nathan and Sascha Nolden. These transcriptions are a valuable research tool for researchers in a variety of fields, so they have been published by the Geoscience Society of New Zealand as parts of *GSNZ Miscellaneous Publication 133*, and are available as free downloadable PDF files from the GSNZ website: www.gsnz.org.nz – click on Publications, then Misc. Pub. Series.

So far the following six volumes have been published:

- "My Dearest Georgie": transcriptions of 22 letters from James Hector to his wife Georgiana written in 1890 by Judith Nathan & Simon Nathan. *Geoscience Society of New Zealand miscellaneous publication 133A*, 35 pages
- "My Dear Hooker": transcriptions of letters from James Hector to Joseph Dalton Hooker between 1860 & 1898 by Rowan Burns & Simon Nathan. *Geoscience Society of New Zealand miscellaneous publication 133B*, 208 pages
- "My Dear Dr Haast": transcriptions of selected letters from Robert Langley Holmes to Julius Haast between 1864-65 and 1868-70 by Rowan Burns & Simon Nathan. *Geoscience Society of New Zealand miscellaneous publication 133C*, 53 pages.

- The correspondence of Julius Haast and James Hector, 1862-1887 by Sascha Nolden, Rowan Burns & Simon Nathan. *Geoscience Society of New Zealand miscellaneous publication 133D*, 315 pages.
- "A Quick Run Home": Correspondence while James Hector was overseas in 1875-1876 by Rowan Burns & Simon Nathan. *Geoscience Society of New Zealand miscellaneous publication 133E*, 144 pages.
- Transcriptions of selected letters from Frederick Wollaston Hutton to James Hector and Julius Haast by Esme Mildenhall, Rowan Burns & Simon Nathan. *Geoscience Society of New Zealand miscellaneous publication 133F*, 141 pages.

As well as information on Hector's scientific interests and his rivalry with Haast and Hutton, there is information on life in each of the four main centres, political gossip, comments on the 'native problem', and the workings of the government. There are gloriously gossipy letters from R.L.Holmes (MP 133C) and Walter Mantell (2nd part of MP13E), Hector's concerns about the 1890 industrial unrest (MP 133A), and Hutton's complaints about problems in the flax industry (MP133F).

Hector kept Joseph Hooker up to date with developments in New Zealand (MP133A), including notes on earthquakes, volcanic eruptions and other hazards. Hooker often sent extracts from Hector's letters to the newly established scientific journal, *Nature*, including a fascinating note about how he collected information about earthquakes throughout the country in 1870.

Several more collections of letters are in preparation, including an account of Hector's travels in Northland in 1865-66, correspondence between Julius Haast and Joseph Hooker, and a bibliography of Hector's publications.

For more information, please contact Simon Nathan – s.nathan@xtra.co.nz We would appreciate feedback from readers, information on more letters that may come to light, and the inevitable corrections that will be discovered.

Last word

Thank you, Heather, for the wonderful job you have done as our editor of the JHSG for the last three years.

Alan Mason Historic Studies Fund

The Alan Mason Historic Studies Fund was set up to provide financial assistance for those undertaking research into the history of geoscience in New Zealand. It is named after Alan Mason, to mark the large contribution he has made to the historical Studies Group.

A capital sum was collected almost a decade ago, and has been invested prudently. The rules specify that at least a third of the annual interest be reinvested in order to build up the fund, and the remainder may be available as grants. Applications for grants are called for once a year, about August. Details are given on the GSNZ website www.gsnz.org.nz.

We would like to build up the fund as there are few alternative sources of funding to support research into the history of geoscience. Donations are very welcome at any time. We also ask you to consider leaving money to the fund in your will as it would be a very tangible way to encourage future researchers to work on the history of geoscience.

Articles submitted for publication in this journal

Although this journal is about the history of the geosciences and geoscientists in New Zealand, other articles relevant to New Zealand geology, geochemistry and geophysics or their histories generally are welcome, as well as book reviews, news items and relevant photographs. Notices of forthcoming events, lecture series and conferences are also published.

New work is preferred, but shortened or otherwise modified versions of previously published work may be included. Reproduction of published work especially those hard to access e.g. excerpts from 19th century sources may be included, subject to copyright laws.

Because A4 pages are reduced to A5, illustrations must still be clear when reduced. All illustrations are in black and white, colour is not available.

Articles are not refereed, but the Editor may consult with the Convenor as to the suitability of an article.

Except for minor changes to grammar or formatting to the 'house style', articles modified by the Editor will be returned to the author for checking and approval of the changes.

Please forward articles in MS Word or other standard electronic format, but typed hard copy is acceptable.

Please set your word processor to write in English (New Zealand), (UK), or (Australia), rather than English (US). And please, please do not set your articles to Read-only.

When setting out articles I use *The New Zealand Style Book* (1993) GP Publications Ltd and the *MLA Handbook for Writers of Research Papers* (1995) as my chief guides to style, along with *The Concise English Dictionary* in its manifestation as *Reader's Digest Complete Wordfinder* and *The Concise Oxford Dictionary of Earth Sciences*.