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Geoscience Society
of
New Zealand

GEOSCIENCE SOCIETY OF NEW ZEALAND

A member body of the Royal Society of New Zealand
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Flow bands in Cambrian Gneiss/calc silicate rocks— Cascade Basin, Long Sound, Preservation Inlet. (QMap 17, Fiordland). Taken in September, 2020, by Richard Cotton.

Geoscience Society of New Zealand Newsletter - Issue 36

Kat Holt
President

Tēnā koe,

No Ingarangi, Me Wēra, Me Aerana, Me Wītana hoki ōku tīpuna. I whanau mai au I Ahuhiri. I tipu ake au Tamatea ki Ahuriri. Ko Holt te ingoa o tōku whanau. Ko Kat Holt ahau. I tenei wā, ki Papaioea e noho ana. Kei Te Kura Mātauranga mō Ahuwhenua me te Taiao ki Te Kunenga ki Pūrehuroa e mahi ana. Ko kaiako pūtaiao whenua ahau.

Greetings. Welcome to the first GSNZ newsletter of 2022! It gives me great pleasure to introduce myself as the incoming President of the Society. As per my mihi above, I am originally from Napier, having grown up in the suburb of Tamatea. I have largely English, Welsh, Irish and Swedish ancestry. I moved to Papaioea Palmerston North in 1999 to begin studying Earth Science. Much to my surprise, I've been here ever since! I completed my PhD on the Quaternary history of Rēkohu/Wharekauri/Chatham Island in 2008, and since then I have been employed as a lecturer in physical geography/Earth science at Te Kunenga ki Pūrehuroa Massey University. Today, much of my research focusses on palynology (pollen) analysis, with emphasis on using pollen to interpret environmental change in the past, but also on developing systems for automated identification and counting of pollen.

I was first elected on to the National Committee in 2009. In 2010 I took on the role of Secretary, and then later Publications Officer, replacing Kate Clark when she went on maternity leave. Shortly afterwards, I too stepped down from the Committee, to have my daughter Lillian, now 5 years old. Its been great to have the opportunity to come back on board and to continue working to support Geoscience and Geoscientists in New Zealand.

2022 looks to maintain the pattern of the past two years, with challenges resulting from the COVID-19 pandemic continuing to present themselves. As you will all be aware, organisers were forced to postpone the 2021 GSNZ Annual Conference due to uncertainty around alert levels and constraints at the venue. The conference is now scheduled to be held in late November 2022, at the original venue of Massey University campus in Palmerston North. I'm sure you'll share my optimism that the worst of the pandemic will be over by then, and we can enjoy another successful face to face conference like we were able to in 2020. Keep an eye on the conference website (https://confer.eventsair.com/gsnz2021/) for updates.

In the meantime, I'm looking forward to working with my fellow National Committee members to continue running our amazing Society. There's been a lot of momentum in the past two years, under our former President, James Scott, and I've got some big shoes to fill to keep that momentum up. Some of our tasks for the year include the ongoing development of our Strategic Plan, a review of the GSNZ Awards portfolio, and, as always, working on ways to continue to grow the membership.

That's it from me for now. I look forward to meeting some of you during my President's Tour. COVID permitting, I hope to embark on this in the latter half of 2022. Keep an eye on the GSNZ website for dates. ■

Ngā manaakitanga,
Kat Holt

Janis Russell
Editor

Kia ora koutou,

While the challenges posed, by an ongoing game of chess between ourselves and a miniscule virus, seem set to continue for the foreseeable future, it is our intra-species battles that are more frought with danger to our everyday lives.

We have seen, all too vividly, this week, that lone political actors or, indeed, a group of misinformed or misguided individuals, can test the limits of the patience and goodwill of the majority in any community, large or small. Acts of unbridled aggression, whether they belong to a mob of protestors at our parliament's doorstep or one country's leader against another, seldom engender feelings of hope and conditions conducive to rest and recuperation required to set us all up for a post-pandemic recovery—economic and otherwise.

At a time when our health workers, police, politicians, and more vulnerable groups are battle weary from the workload and stresses placed upon them as a result of this external fight, we should be forgiving of errors, slip-ups and general absence of perfection. Despite the incessant demands and the toll it has taken on those at the front line, and most of our citizens here and abroad, the vast majority have not resorted to the despicable behaviour witnessed in recent weeks and months.

In stark contrast, the outpouring of emotions shown when passengers reconnected with their loved ones, during the first phase of our reconnecting with the world strategy, was joyous to watch. There is no substitute for a long-held embrace after a long period of physical disconnection. As we have all come to realise, an online meeting, or chat, may be better than nothing but it cannot replace the physical proximity to a colleague, in a shared space or activity, or the touch of a loved one's hand.

During this time, many people, have allowed their fears to dictate their attitudes and behaviour (or amplify them). There is a tendency to become more insular when feeling threatened. Once, in the not-too-distant past, our 'big OE' was considered a rite of passage for all Kiwis to spread their wings and see the world. Yet, over the past year this customary act was turned against those who had done just that, by our residents, and we saw a raft of heartbreaking stories coming from those stuck offshore, seemingly abandoned by their government.

However, in the face of threat, hard decisions must be made to keep the vast majority of people safe. If it means erecting barriers—physical ones via borders or strategic ones via medical intervention or mandates, then acceptance of short(er) term hardship for longer term gain is a prudent option. In reality, our death rate is exceptionally low and any counterfactuals will never truly be known. Communities generally rally and pitch in in the wake of flood, earthquake, or volcanic eruption. With hindsight, rules and changes are made, for better future outcomes and little protest ensues.

Yet, the border closures have had a silver lining for many of us who remained here. Mostly, we have enjoyed periods of time where we have had the opportunity to either discover or revisit and reconnect with some special places, throughout the country. Without the tourist throngs, we have had relatively quiet, restorative and more intimate experiences with the landscapes, flora and fauna of Aotearoa/New Zealand than in previous years. The old 80s advertising slogan of "Don't leave town until you've seen the country" was revitalised and we have been re-realising what unique and precious taonga we have here, right in our own backyard.

These stories of division and connection serve to highlight the fact that GSNZ is lucky to have a vibrant and hardworking group of contributors, all pulling in the same direction, to nourish and sustain our community well into the future. Let's use our bond with, and knowledge of, the land and our people to forge and strengthen those connections in 2022. ■

PROTECTION OF THE WAIOHINE FAULTED TERRACES

Bruce W. Hayward and Tim A. Little

A recent enquiry about the potential impacts of a proposed new gravel quarry on the Waiohine Faulted Terraces in Wairarapa (Fig. 1) led to an investigation into their current level of protection.

The Waiohine Faulted Terraces have been assessed by New Zealand neotectonists as being of international scientific significance (since first entry in the NZ Geopreservation Inventory in 1990 by Gerald Lensen, Kelvin Berryman, Graeme Stevens and Vince Neall). This is because they are one of the best places in the world to see and study an irregular staircase of intricately carved river terraces (Fig. 2) that have been progressively displaced, and remodified, after a series of major earthquake displacements across a major active fault trace in the Holocene (last ~12,000 yrs).

The first published detailed study of the terrace displacements was by Lensen and Vella (1971). This study has been built on, and the resolution and description improved, over the years by further work and more advanced dating and surveying techniques (e.g., Grapes and Wellman, 1988; Carne et al., 2011). Undoubtedly, there will be many opportunities in the future, as new and improved techniques of dating become available, to further refine the history of displacements that help understand the role of the Wairarapa Fault in the suite of active deformation features of the southern North Island.

The site comprises the post-glacial Waiohine aggradation surface (terrace A in Fig. 3) that was abandoned ~12,000 years ago, where dated by 14C methods farther to the south near Featherston (Little et al., 2009), and a flight of five additional terraces (B to F) that have been formed since then on the north side of the Waiohine River, just downstream from where it exits the Tararua Ranges. The Wairarapa Fault does not displace the lowest terraces (G and H of Lensen and Vella, 1971) and have been formed subsequent to the most recent rupture.

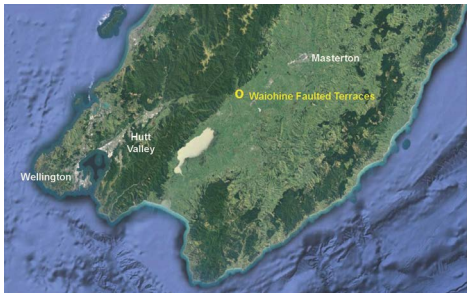

Fig. 1. Location of Waiohine Faulted Terraces in the Wairarapa.

Fig 2. Oblique Google Earth image to the north of Waiohine Faulted Terraces, 2016.

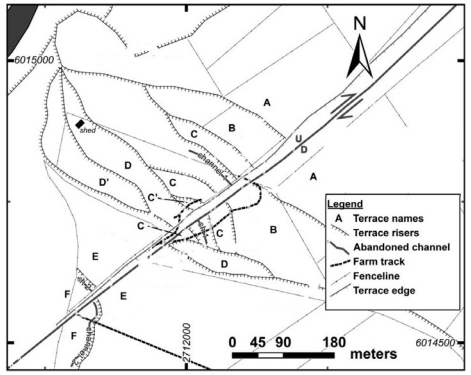

Fig. 3 Map of Waiohine fault-displaced terraces (A, oldest to F youngest) from Carne et al. (2011).

The most recent rupture on the Wairarapa Fault was during the Mw >8.1 Wairarapa Earthquake on 23 Jan 1855 (Rodgers and Little, 2006). This resulted in 12.4±0.8 m dextral displacement and 1.30±0.02 m vertical displacement at Waiohine terraces (Carne et al., 2011). The most recent published study (Carne et al., 2011) measured the fault displacements across five risers, two paleochannels and 6 treads to calculate individual displacements and arrive at late Quaternary dextral slip rates of ~10 mm per annum.

History of protection

In the early 1960s, Gerald Lensen (NZ Geological Survey) suggested that the Geological Society of NZ (GSNZ) seek protection for the faulted river terraces at Branch, Maruia and Waiohine Rivers. After initial approaches to the NZ Historic Places Trust and the new Nature Conservation Council had proved fruitless, the Society recognised that direct approaches to the District Commissioners of Crown Lands might be the most effective means. Initial success came from personal lobbying by Society member Prof John Mackie of Nelson, resulting in Branch River terraces becoming a covenanted Private Historic Reserve in 1964. In 1965 and 1966, submissions were sent to the Lands and Survey Department seeking reserve status for the remaining two terrace sites (Hayward, 2005).

Every few years, GSNZ would send a letter to the Minister asking what action had been taken to achieve reserve status for the Waiohine Terraces. Eventually, in 1987, we learnt that the northern section of the Waiohine faulted terraces had been purchased by the late Department of Lands and Survey and gazetted a Scientific Reserve. From then on, GSNZ shifted its focus to other geoheritage issues and did not actually check on exactly what proportion of this important site was, in fact, now protected within a scientific reserve. It is only in recent months, with enquiries about the impact of a proposed new quarry nearby, that most of us have become aware that the reserve in fact only encompasses the fault trace at the northern end of the terrace site— where it displaces the Waiohine Surface but none of the younger (and lower elevation) terraces (Fig. 4).

Following a study commissioned by the combined Wairarapa District Councils (Boffa Miskell, 2010), the Waiohine Faulted Terraces were scheduled as an Outstanding Natural Landscape, ONL, for protection under RMA Clause 6b in the Wairarapa District Plan 2011. The other scheduled ONLs in the plan are Tararua Forest Park, Remutuka Forest Park, Aorangi Forest Park, Nga Waka o Kupe Hills, and Mangaraki Ridge. In the same District Plan, 13 Outstanding Natural Features, ONFs (with higher level of protection as they are smaller sites), were also scheduled. These are Castlepoint, Honeycomb Rock, Tinui Taipos, Uruti Pt and dunes, Taipo Minor, Kupe's Sail, Cape Palliser, The Pinnacles, Ngapotiki Fan, Ruakokopatuna Chasm, White Rock, Glendhu Rocks, and Blue Rock Stream Glow Worm Caves. All these ONFs and Waiohine Faulted Terraces were selected from GSNZ's NZ Geopreservation Inventory for inclusion. For some unknown reason, the Waiohine Faulted Terraces were classed as ONL rather than ONF, possibly because the plan's mapped extent of the terraces far exceeds (but includes) the scientifically-important part of the faulted terraces (Fig. 4). The Geoheritage Subcommittee of GSNZ has agreed to lobby for the more precise boundary to be used to schedule the terraces as an ONF in the next plan review, which will make it more difficult to cause damage

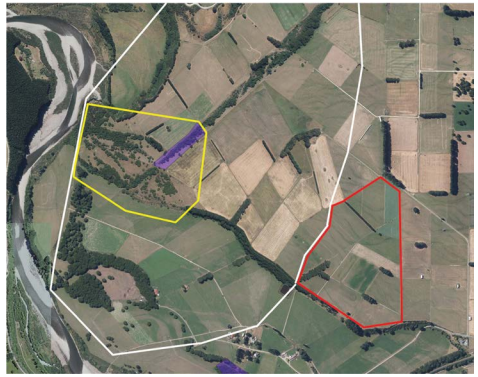

Fig. 4. Map showing actual extent of Waiohine Faulted Terraces (yellow), Waiohine Scientific Reserve (purple), Waiohine Faulted Terraces scheduled Outstanding Natural Landscape (white) and proposed quarry site (red).

to the displaced terraces – such as by earthworks, buildings, commercial forest planting etc.

Present situation

Figure 4 shows the present day mapped extent of the scientifically-most important part of the Waiohine Faulted Terrace complex, the Waiohine Scientific Reserve, the scheduled Waiohine Faulted Terraces ONL in the Wairarapa District Scheme, and the reported location of the proposed new gravel quarry. GSNZ takes a neutral stance on the proposed site of the gravel quarry as the Geoheritage Subcommittee assessment is that it will have no adverse effect on the internationally-significant Waiohine Faulted Terraces. In the meantime, the scheduled ONL does provide a level of protection and a landscape buffer around the important site. Undoubtedly the mapped extent of the ONL, as it is now scheduled, has determined the outer boundary of the proposed large alluvial gravel quarry. The majority of the terrace site is in private farmland (Fig. 5) and we believe that its continued use for this purpose is the most viable way of protecting the terrace landforms, enabling a continued view of them, and most importantly providing for the opportunity for future studies. The only downside is that the terraces are on private land and not generally accessible to the public. The best view of them, for the time being, may be to fly low over them in a hot-air balloon. ■

Fig. 5. Oblique aerial looking north across Waiohine River along the Wairarapa Fault trace and the Waiohine Faulted Terraces (white outlined). Photo by Lloyd Homer, 1986, GNS 1790.

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Geoscience Society of New Zealand

GSNZ NEWSLETTER

SUBMISSION DEADLINES

Please note that the GSNZ Newsletter submission deadlines have changed.

- **1ST FEBRUARY (FOR MARCH ISSUE)**
- **1ST JUNE (FOR JULY ISSUE)**
- **1ST OCTOBER (FOR NOVEMBER ISSUE)**

WOMEN IN GEOSCIENCE

A REFLECTION ON A CAREER

Gill Jolly: GNS Science

There weren't many women in geoscience that I could look up to in my early career. Often, I was the only woman in the room, and when I wasn't, it was other young women joining me, all of us taking our first tentative steps into a male-dominated field.

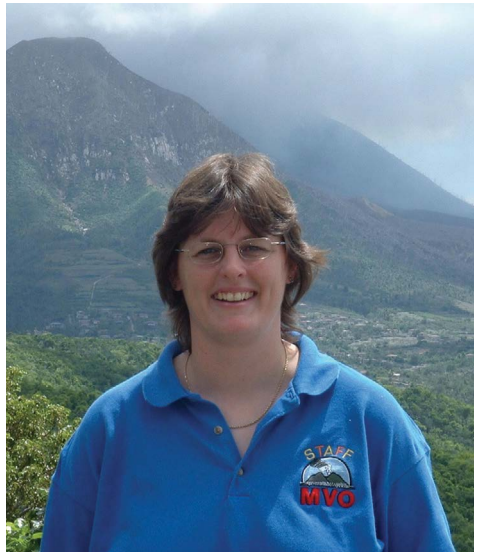
Today is the International Day for Women and Girls in Science, and I've been reflecting on my career, the importance of mentors, and what changes we still need to see in science.

Growing up in Sheffield, UK meant that every Saturday, come rain or shine, my parents would haul me and my brother out the door to go walking in the Peak District. My brother and I would clamber over ancient lava flows and try to pick out fossils that dotted the boulders. We were fascinated by the idea that, millions of years ago, this place had been shaped by tropical oceans and volcanic activity.

My parents always encouraged my passions. Despite the prescriptive gender roles that my Dad grew up with in the 1930s and 1940s, he would often remind me, "the world is your oyster".

I enjoyed science in school and so applied to study natural sciences at Cambridge. I briefly considered specialising in physics, but geology was where I found my home.

My role models were my academic mentors, Professors Steve Sparks and Harry Pinkerton. They never made me feel like my gender affected the value of my science or the possible trajectory of my career. Steve is a world leading volcanologist and I owe much of my interest in volcanoes to him. He was my tutor at Cambridge and my biggest champion as I headed off to study magma rheology at Lancaster University (essentially how magma flows) for my PhD.



Gill Jolly in Montserrat

After my PhD, I started work at the British Geological Survey. With a deficit of active volcanoes in the UK, I pivoted to learn new skills and embrace new research fields. Then my career changed in 1995 with the start of the eruption of Soufrière Hills Volcano, Montserrat, West Indies – an eruption that waxed and waned over the following few years.

I arrived on in Montserrat for the first time in 1996. As the plane descended, I saw pyroclastic flows spilling from the volcano. Later that night, I was woken by someone yelling "the volcano is erupting", with the largest eruption up until that time kicking off just before midnight

Over the next few years, I saw beyond 'the science' of volcanoes for the first time. I saw what it takes to monitor a volcano and provide real-time advice to decision-makers; and I saw first-hand the societal impact of the eruptions. It was a tough place to work in many different ways, but it focused me on what was important – providing science to help communities live with volcanic activity.

I took on more leadership responsibilities and fronted the media when people needed answers, often whilst the volcano was erupting. And I met my future-husband, Art – another volcano scientist - during a stint on the island in 1999.

During my years on Montserrat, I supported an initiative to mentor Montserratians to be trained in volcano science and technical support with the aim that they would return to run the observatory. I'm pleased to report that today it's run by a Montserratian scientist who completed his studies in the UK.

Art and I left Montserrat for the last time in 2005 and were faced with the predicament – whose career do we follow now? My base was in the UK and his in Hawaii.

Steve Sparks pointed us toward roles being advertised in New Zealand at GNS Science. Eventually, I was hired as a volcanologist, and Art, as a volcano seismologist. We felt fortunate to be moving together to a beautiful country with two young kids in tow.

In my years at GNS I have moved between focusing on the science and on developing the incredible people who make the science possible: scientists, technicians and a whole range of other specialists who deliver the science. I've tried my best to emulate the incredible mentors who shaped my early career.

In 2007, I became the head of the volcanology department and the first woman to lead one of GNS' science departments. While I believe that more women in science leadership was inevitable and overdue, I hope that by being the first in my own corner of the sector, I encouraged other women to step up.

Today there are many brilliant women leaders at GNS. This is the result of many changes – including increased focus on the value of diversity and better support to balance work and families. But women are still underrepresented in the wider research sector, particularly in science and senior leadership roles. There are sector wide gender discrepancies in pay and in successful funding applications.

I've seen a lot of change in my career, and I'm sure there is more just around the corner. I don't have the solution, but I do have some advice, based on what got me to where I am today.

My advice to anyone considering a future in science is – follow your passion and seek out mentors and peers that support you for everything that you bring to the table. Embrace your uniqueness.

To my fellow scientists – take time to be a mentor. Your guidance will shape the next generation. I guarantee it will be one of the most fulfilling things you can do in your career. I know as well as anyone the impact of a great mentor. ■

Gill Jolly with Montserrat Volcano Observatory staff in 2004

A 90TH BIRTHDAY TRIBUTE TO IAN SPEDEN

Simon Nathan

Former GSNZ president, Ian Speden, celebrated his 90th birthday recently. He and Erica are active and in good health. This is a chance to remember Ian's distinguished career in both research and science administration.

Ian completed his MSc at Otago in 1956 on the fossiliferous Murihiku rocks around the Catlins coast. He was awarded a postgraduate scholarship, and completed his PhD at Yale university – a radical decision in the days when England was seen as "Home" and a natural destination for overseas study. On return to New Zealand in 1964 moved his research interests to the Cretaceous where a number of stratigraphic problems had long been controversial. His approach of careful field mapping of key areas aided by paleontology led to publication of a series of papers and monographs. Much of this work was done in conjunction with students and staff from Auckland University, including Mike Isaac and Phil Moore. Ian's research was recognised by the award of the McKay Hammer in 1975-76, and his subsequent election as a Fellow of the Royal Society of New Zealand (FRSNZ).

Ian was appointed Director of the NZ Geological Survey in 1984. His management style was always vigorous and enthusiastic, and he made a point of maintaining contact with all his staff – and it was sometimes a surprise when he appeared, and enquired about progress of your latest project. He was always very supportive of the need to rapidly publish the results of scientific investigations promptly. There was a major expansion of publication of monographs, maps and popular publications, and publication delays became a thing of the past.

Unfortunately the period of Ian's directorship coincided with a period of major government reorganization combined with demands for increasing commercial revenue and decreasing core funding. He faced an exhausting struggle to hold the organization together and survive, culminating in enforced redundancies. It needs to be recorded that over several years Ian actively resisted attempts to disperse geoscientific work into different organisations. Following a reorganization of the DSIR in 1989, Ian was appointed the first (and only) director of DSIR Geology and Geophysics.

In a subsequent reorganization into Crown Research Institutes, Ian was appointed to a senior management position in GNS Science, where his background proved invaluable for the new organization, and played a key role in getting the QMAP project underway.

Ian has had a major involvement with external organisations. He was president of the Geological Society in 1973-74 when there was a marked expansion of the Society's activities including the establishment of the Hochstetter lecture and publication of the first GSNZ guidebooks. He was actively involved in the International Geological Correlation Program (IGCP) from 1968-91, and was a member of the National Committee on UNESCO. Ian officially retired from GNS in 1994, but was appointed a Research Associate when he was able to renew his research in the Cretaceous. For several years he assisted with the QMAP project, especially the complex geology of the Raukumara sheet.

Ian was the last of a breed of managers who knew not only their staff, but many of their partners and families. Ian and Erica were always very hospitable to members of the geoscience community, and are remembered very fondly by many older members of the geoscience community. ■

Erica and Ian Speden in January 2022 Photo: Simon Nathan

THE LACK OF GEOSCIENCE STUDENTS IN NEW ZEALAND

Don Haw: Waikanae

Glenn Vallender has raised some really serious concerns on the lack of interest within our schools and indeed within our Tertiary Institutions on courses and degrees embracing earth science in its many forms.

As an earth scientist in the oil industry for many years with BP Exploration worldwide and subsequently with Todd in New Zealand I would like to suggest a few reasons why this might be happening.

The *first and obvious reason* is because college schoolchildren, and young adults are not taught in their formative teenage years just how exciting it is to understand what the Earth's crust is all about and what really is beneath your feet. !! Do they stop to think how our planet has developed over millions of years. This planet has an amazing time line which can be understood by looking at its crustal composition, namely the rocks and its contained biota. And this can be seen in the landscapes around us. This can only happen if we have a teacher who understands landscapes and who can take us out into the hills and valleys around us and ask exciting questions about what we are looking at !!

I recall a three day field trip for some Intermediate age boys and girls in western Hawkes Bay some 12 years ago led by three GNS scientists to many locations of interest in that region. I was invited to help. It was huge success and received many plaudits. We need more of this type of science education. But what is really important is getting together the student and the teacher in the field so they can look at, and see and examine, what they are looking at in that hillside cutting or that coastal cliff !! Geoscience has to be taught in the field and not in the classroom. Although I acknowledge that the basics have to be introduced in the school class, with the promise that we are going to check it out in the field.

The *second reason* for teens lack of interest is their perceived lack of career opportunity. I find this surprising especially when we consider the many ways a knowledge of geoscience is of huge value in many areas.

Consider the following within New Zealand:

1) Transport infrastructure and Roading

Consider the numerous issues facing roadmakers regarding earthquakes, landslips, flooding, subsidence etc. all of which need a knowledge of the geological terrain.

2) Real Estate—Building locations—Ground stability

Consider the issues which developers should know to create building integrity, structural stability, and even longevity. Apart from issues combatting liquefaction and foundation strength. When you bought your house did you think about these things?

3) Geophysics and Earthquakes

We all need to know and understand earthquakes and how to reduce risk and utilize this knowledge when disaster strikes. Academic and 'industrial geophysicists are still needed and career opportunities with Corporates and local and central government must still exist, although politicians need to recognise this need more.

4) Need for Minerals—Metal Ores—Rare Earths

This seems so obvious and yet some corporates and indeed governments don't seem to realise exploration and exploitation for such is still a vital industry. Recently the worldwide surge in the rare earths business is remarkable. Consider the share price of Lynas Corporation. !! Mining careers must still be an interesting option.

5) Relevance to Climate Change

Our atmosphere is changing and its effect on climate is profound. This is partially an earth science issue. The exposed surface of the earth and hence its geological make up does affect the atmosphere. I wonder whether this has been researched enough especially where it has been severely modified by human activity.

The *third reason* could be a lack of understanding about evolution and the new insights we have which the world needs to know about. This may seem a distant third but I consider it a really interesting and vital new research topic. Especially in the light of extinction of certain species which is now happening.

The fourth reason for disinterest might be negative thoughts about the oil industry, and potential careers, because they perceive jobs no longer exist. This is not true. The world will still needs Oil. Gas, and Minerals (especially gas) and such careers are still exciting. Believe me I know.

There is also a fifth reason -- don't forget Geoscientists live longer !!! ■

EDITOR'S NOTICE:

A REMINDER FOR CONTRIBUTORS

Please remember that contributions for the Newsletter should adhere to the guidelines set out in the Newsletter section inside the back cover of each issue.

In particular, all images (figures, tables, photos etc) must be supplied separately and not just embedded in a Word document. Pre-formatted (grouped or annotated) images are unnecessary and undesirable as this may hinder page formatting. Similarly please check legibility of text when used as a label on a figure that may need to be be reduced in size to fit an A5 format.

It is the responsibility of the submitter to ensure that these requirements are followed. This is especially so when forwarding articles on behalf of others.

LAKE ONSLOW'S SMALL SCROLL PLAIN, OTAGO

Bruce W. Hayward

A scroll plain is an alluvial plain with a very low gradient through which a river meanders. It is characterised by the presence of meandering river scrolls with many cut-off, ox-bow ponds, old braids and wetlands. Meandering rivers on alluvial plains like these, usually have deep pools on the outside of bends, where the current is faster and scours out and erodes the riverbed and bank. This eroded sediment is transported downstream and deposited on the edge of the slow-flowing water on the inside of bends. This process backfills the meanders as they migrate downstream and builds the distinctive scrolls you can see from the air. The Upper Taieri River valley in east Otago contains the two best and largest examples of scroll plains in New Zealand (Fig. 1). They are also among the most stunning examples anywhere in the world. The downstream (northeastern) belt is 1-2 km wide and extends 25 km between Patearoa and Waipita, where the Taieri River flows through the Maniototo Basin at an elevation of ~370 m above sea level. The upstream (southwest) belt is also 1-2 km wide and extends 16 km from Canadian Hut to Paerau in the Styx Basin, 200 m elevation higher. The two belts are separated by a 12 km gorge where the river has incised 100-150 m into an uplifted block of schist. These two stretches of the upper Taieri valley have such low gradients because of the tectonic history of the region over the last half million or so years (Craw et al., 2016; Craw, 2021). Prior to this the NE-SW oriented upper Taieri Valley drained south (as an ancestral Kye Burn River) into the Clutha River, but uplift of the Lammerlaw Range across its southern outlet dammed the valley creating lakes, that have subsequently filled in with alluvium. The river has reversed its direction to flow northeast and around the northern end of the Rock and Pillar Range before heading southeast again down to the coast south of Dunedin. The two long sections of infilled lake in the Upper Taieri are now home to these spectacular scroll plains.

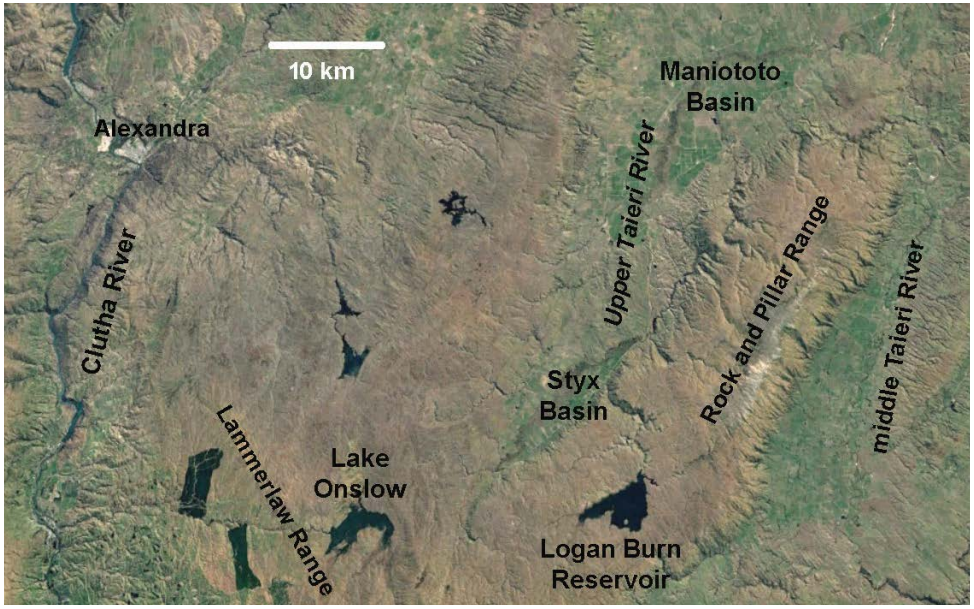


Fig. 1. Location map showing the U-shaped course of the Taieri River Valley and the four locations of scroll plains in Maniototo and Styx basins and partially drowned by Lake Onslow and Logan Burn Reservoir.

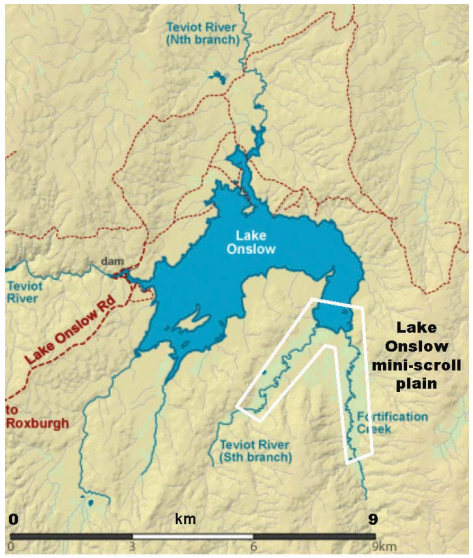


Fig. 2. Map of Lake Onslow showing location of the remaining part of the small scroll plain.

The rising Lammerlaw Range has also created a delightful 2 km-long, 200-300 m wide miniature version of the Taieri scroll plains, 12 km southwest of the Styx Basin, at the head of Lake Onslow (Figs. 2-3). This area of extremely low gradient occurs around the junction of the two southern tributaries of the Teviot River – the South Branch and Fortification Creek. Each of the tributaries has a 2-3 km long, 200-300 m wide section of scroll plain extending upstream from their junction.

Fig. 3. Oblique aerial view looking north over Lake Onslow. In the foreground is the Lake Onslow scroll plain with Fortification Creek in the centre and Teviot River south branch on the left. Photo by Lloyd Homer, 1996, GNS 3958.

The accompanying aerial photos (Figs. 3-7) show that in all respects the meanders and ox-bow lakes, and in places meander scrolls, are of an extremely similar character to those in the Taieri scroll plains. The Lake Onslow scroll plain is an order of magnitude smaller than either of the two Taieri scroll plains.

Fig. 4. Portion of the Lake Onslow small scroll plain on the Teviot River south branch showing the complexity and density of abandoned sections of stream channel. Width of photo 250 m. Photo: Google Earth.

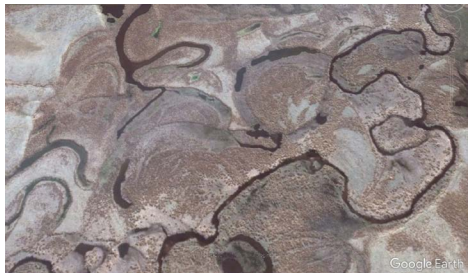


Fig. 5. 150 m-wide section of the Teviot River arm of the Lake Onslow scroll plain during dry season. Note the sediment scrolls deposited on the insides of meander bends. Photo: Google Earth.

Fig. 6 Part of the Teviot River arm of the Lake Onslow scroll plain in the wet season. Note the present water channel and all the abandoned sections. Photo: 400 m across, Google Earth.

This is because it has been created by two streams that have relatively small catchments extending no more than 8-10 km to the south, compared with the much larger Taieri River scroll plain catchment. The rising Lammerlaw Range also caused isolation of native freshwater Galaxiid fish in what is now the Lake Onslow-Teviot River catchment. These fish are related genetically to the fish in what is now the Taieri River catchment, but have been isolated long enough to have evolved to become a separate species, currently designated Galaxias 'teviot' (Craw et al., 2016). The fish therefore provide a unique genetic record of the processes of development of the landscape that now hosts the high scroll plains in the catchment in which the fish survive in isolation. One other small, 2 km-long, scroll plain, similar but

Fig. 7. Oblique view of lower half of Lake Onslow scroll plain with Teviot River branch at top and Fortification Creek on right. Photo by Lloyd Homer, GNS 3958.

Fig. 8. Part of the Lake Onslow scroll plain at the junction of Teviot River south branch and Fortification Creek. Virtually all of this area is drowned when the reservoir water level is full. Photo: Taken in dry summer when lake level was low. 1.2km across, Google Earth.

not as well developed as at Lake Onslow, occurs 15 km to the east in Shepherd Hut Creek above the Logan Burn Reservoir. In the past, this scroll plain was probably superior to that at Lake Onslow because for at least another 5 km downstream was a wide valley floor known as the Great Moss Swamp (500 ha), which was drowned by the damming of the valley and creation of the reservoir in 1983. To a certain extent this repeated the drowning of a similar swamp, known as the Dismal Swamp, when the Teviot River was dammed in 1890 creating Lake Onslow. Of these two remaining portions of small scroll plains, the Lake Onslow one is now the largest and best developed. When Lake Onslow lake level drops it is possible to see some of the scroll plain that was drowned (Fig. 8). These scroll plains also have high values for indigenous wetlands' biota. The key to the long-term survival of the wetlands are the dynamic natural forces that occur during seasonal flooding which create new wetlands and change existing ones. The Lake Onslow scroll plain (called the Fortification Creek Wetland) is scheduled as a Regionally Significant Wetland in the Otago Regional Plan. Its wetland values are listed as including its high degree of naturalness, habitat for the threatened banded dotterel, and one of the last remaining areas of red tussock wetland.

References:

Craw, D., Craw, L., Burridge, C., Wallis, G., Waters, J. 2016. Evolution of the Taieri River catchment, East Otago, New Zealand. *New Zealand Journal of Geology and Geophysics* 59, 257-273.

Craw, D. 2021. *The circuitous path of the Taieri River, East Otago*.
https://www.otago.ac.nz/geology/research/environmental-geology/geomorphology/taieri-river-path.html

No mention is made of its significant heritage values as a landform, or of the rare galaxiid fish species. River and stream meanders with cut-off ox-bow lakes are common features of mature streams and rivers both overseas and New Zealand, but such a dense development in a wide-belt with evidence of active meander migration and scroll construction as seen in the upper Taieri-Lake Onslow area are rare. There are a few other places in New Zealand that might have been classified as pseudo-scroll plains, such as through the Hikurangi Swamp in Northland, but these are not as well developed, nor as well preserved because of the more intense farming and drain construction. Thus I conclude that flowing into the southern arm of Lake Onslow is the best remaining example (largest, well-developed, well-preserved) in New Zealand of a small scroll plain. A large proportion of the two best original examples (Dismal Swamp, Great Moss Swamp) have already been lost through drowning by reservoirs behind man-made dams. It is probably too late to undo this damage by removing one of these dams and letting nature restore the Teviot Valley (=Lake Onslow) scroll plain, but it could be an option in the future. In the meantime, there are proposals to build a $4 billion high dam at Lake Onslow that would completely destroy what remains of this nationally-significant landform. ■

THE GEARSTICK AWARD

FROM THE GEOLOGICAL SURVEY ARCHIVES

Simon Nathan

The Gearstick Award

Director Ian Speden, current holder of the Gearstick Award.

In 1976 a Geological Survey petrology technician, Neville Orr, visited the Lower Hutt rubbish dump. He returned with a gearstick from an abandoned car and mounted it in marble for the McKay Club which organised social activities at Lower Hutt.

The club awarded the Gearstick annually to the person who had had the most serious accident in a Geological Survey vehicle.

It is currently held by Geology & Geophysics director Ian Speden, who drove his directorial Ford Sierra under the tray of a truck.

When George Grindley retired he was given the award for a career of atrocious driving. He once phoned the office and reported, 'There's something stuck in the radiator.'

'What is it?' he was asked.

'A bus.'

Miles Reay won the Gearstick for being a Jonah passenger. He put his head through the windscreen when driver Vaughan Williams crashed while helping him into his seatbelt.

He was also a passenger when Nat Beatus rammed an LTD with ministerial plates outside the Government Printing Office.

Opera singer and geologist Dave Skinner didn't feel like breaking into song when he

This crash earned photographer Lloyd Homer the feared Gearstick *(Photo: Lloyd Homer).*

forgot to set the handbrake on his Land Rover in the Coromandel. It rolled over a cliff and was written off. He earned the gearstick.

In 1981 Lloyd Homer was taking aerial photographs for the Clyde Dam project when the pilot flew the Cessna into a gully that was steeper than the aircraft's rate of climb. Of the passengers, geologists Roydon Thomson and Sarah Beanland walked out for help, and Wendy St George vowed never to fly again. Lloyd won the Gearstick.

Jim Lowery was trapped in a crashed car and shocked onlookers enquiring if anyone was injured by saying, 'I've lost my legs!'

But that had been years earlier in the 1950s when he spent 12 hours trapped in a snow cat down a crevasse in Antarctica. The legs he lost this time were artificial ones.

Mike Hall is another deserving case. He was on a field trip to the Clarence Valley with Roger Cooper, Mike Johnston and Gerald Lensen when a pack horse bolted. So incensed was Mike Hall that he shot the horse.

The last word should go to Alan Hull who said when presenting the recent award: 'The person who pulls the gearstick out of the marble will be the next Director.'

The article above is reproduced from the DSIR Newsletter for June 1992, the last issue before DSIR was disbanded and replaced by Crown Research Institutes. It records the story of the Gearstick Award, one of the quirky, light-hearted features of the Geological Survey. It is also a reminder of how much things have changed over the last thirty years. In the 21st century no-one would consider having an award to recall the worst vehicle accident of the year.

The Gearstick Award languished after 1992. The new management of GNS were discouraging, and refused to allow it to be presented at a staff function. In 1995 Lloyd Homer survived another plane crash while photographing the eruption of Mt Ruapehu, and it was decided to present it to award to Lloyd in perpetuity as no-one else could match the number of crashes and near-misses he had survived.

UPDATE OF THE GEOCENE MAGAZINE

Jill Kenny: Geocene Editor jill.kenny@xtra.co.nz

Geocene is a periodic publication of GeoClub - a section of the Auckland branch of the Geoscience Society of New Zealand. It is an outlet for members and others to describe field trips and record new findings and observations. It is crammed with valuable information that is not available elsewhere.

Geocene is not peer-reviewed but has been lightly edited from 2006 to mid 2014 by Hugh Grenfell and Helen Holzer and since then by Jill Kenny. Geocene issues are in pdf format and include coloured photos and maps. They are available online by visiting the GSNZ website then using the link through the Auckland Branch to 'Geocene Magazine'. An index of all Geocene articles is also available in this site.

It can also be downloaded as pdfs from https://natlib-primo.hosted.exlibrisgroup.com/permalink/f/1s57t7d/NLNZ_ALMA11350419440002836. Since the Geocene Magazine article in GSNZ Newsletter 30, March 2020, Geocene numbers 22 – 28 have been added.

The following topics are included:

Geocene 22:

- River deltas, bird's foot deltas, digitate deltas, silt jetties – what is a silt jetty?
- Orbicular granite localities in Separation Point Granite, Kaiteriteri coast, Nelson
- Rockfall at Tuialamu, Upolu, Western Samoa
- Oligocene shrimp burrow network at Puponga Point (Abel Head), Northwest Nelson
- Young age for drowned fossil forest at Rangihaeata (Takaka) suggests ongoing regional subsidence

Geocene 23:

- A curious case of riverbed potholes in West Auckland
- Granite fluting, basins and tafone on southern Stewart Island
- Evidence for tuffs at Mangawhai Heads
- Exhumed lava cave at Kerikeri, Northland
- A record of the distinctive bryozoan genus Retelepralia from the Early Miocene Waitiiti Formation of Northland, New Zealand
- Ihumatao Road end fossil forest
- Rafts of Pleistocene sediment in Pupuke Volcano lava flows

Geocene 24:

- New 14C result confirms 28,000-year-old Maungawhau / Mt Eden eruption age
- Forty-seven years of erosion and weathering of Lion Rock bomb, Piha
- Maori Bay microminerals
- Proxy evidence from Tamaki Drive for the location of submerged stream valleys beneath Hobson Bay, Auckland City
- The first explanation is not always the best

Geocene 25:

- Notes on the Geology in the Vicinity of Pokeno [northern Waikato]
- Jack Grant-Mackie's Contributions to Geocene
- Diversity of Fossils Named for Jack Grant-Mackie
- The Sand is Coming – New Beach South of Piha
- Cook Islands karst
- Auckland Geology Club Field Trips 1992 – 2020

Geocene 26:

- Compaction at Airedale Reef fossil forest, Taranaki
- Te Tarotiri Ō Takamiro/Cutter Rock is falling down
- Some notes on Erionite, a zeolite 'asbestiform'
- Road cutting exposure in Panmure Basin tuff ring
- Maungauika/North Head lava froth (pseudo-reticulite)
- Formation of Geoclub

Geocene 27:

- Thoughts on granitoid orbicule formation
- Dr Kobe and his orbicules
- Moulds of nine inferred kauri tree trunks in basalt lava flows, Takapuna Fossil Forest
- Serpulid tubeworm "rock" (Polychaeta: Serpulidae) from the Hokianga coast, western Northland, New Zealand
- Continental drip
- Les Kermode – co-founder of Auckland Geology Club

Geocene 28:

- The tragic 1965 Muriwai landslip
- Enigmatic fossils at Waitomokia [South Auckland volcano]
- Tuff layers under the sea reveal pre-volcanic topography beneath Motukorea/Browns Island Volcano
- Upper Oakley Creek lava flows
- Campbell Island pillow lava
- Memories of Geoff Jenkins – Geoclub Treasurer

Contributions for Geocene 29, describing field trips and recording new findings and observations, would be welcomed from Newsletter readers. Please send these to Jill Kenny (jill.kenny@xtra.co.nz).■

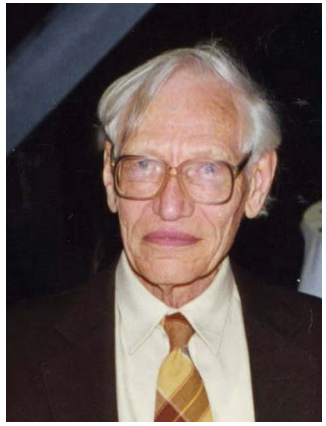
100 YEARS AGO

1922 IN NEW ZEALAND GEOSCIENCE

Richard Patrick (Pat) Suggate was born in London, England, on March 17* 1922.

Pat was one of our leading researchers into coal properties and its rankings. After WW2, he had moved from England to Greymouth with his wife, Daphne, in 1947, and began work with Harold Wellman on the coals in Murchison.

From there, the Suggates moved to Christchurch and Pat took interest in the ground below it. He produced subsurface stratigraphy, beneath Christchcurch city, using extensive, historical water drilling data which led to work on the glacial and interglacial works in Canterbury and West Coast. This, in turn, spurred further interest in Quaternary Straigraphy that saw him return to England for a short stint at Cambridge University to pursue the subject further.



Pat Suggate: Director of New Zealand Geological Survey from 1974-1984.
Photo : Simon Nathan

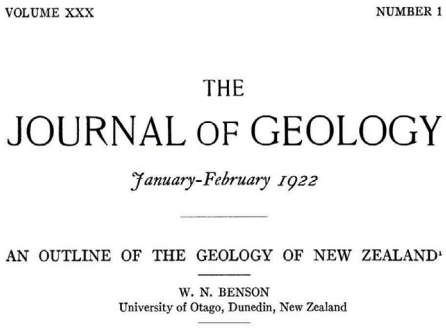
See Simon Nathan's article on p48 for more on the 125th anniversary of the NZ Geological survey attendees, of which Pat Suggate is one.

One of Pat's enduring legacies is the familiar, widely-used, two volume set of 'Geology of New Zealand' which he not only edited but also wrote large parts of the weighty tome himself . In addition, he oversaw its compilation Incredibly, but for Pat's quick thinking, in protecting an important section of the manuscript prior to abandoning the Wahine, during the 1968 disaster, those faded blue volumes may not have been gracing our shelves in the years that followed.

*17th March is St Patrick's Day — a good day to remember and reflect on Pat's contributions to NZ Geoscience. You can read more about Pat's career here: https://www.royalsociety.org.nz/who-we-are/our-people/our-fellows/obituaries/fellows-obituaries/richard-patrick-pat-suggate/

100 YEARS AGO

1922 IN NEW ZEALAND GEOSCIENCE



VOLUME XXX NUMBER 1

THE

JOURNAL OF GEOLOGY

January-February 1922

AN OUTLINE OF THE GEOLOGY OF NEW ZEALAND[1]

W. N. BENSON
University of Otago, Dunedin, New Zealand

William Noel Benson published his paper: An Outline of the Geology of New Zealand. A small excerpt is given below and a graphic (right), depicting his sketch map of the New Zealand, showcases his well known artistic skills. (Courtesy of Jstor). W. N. Benson was Professor of Geology at the University of Otago from 1916-1949. A bequest from his estate started the Benson fund which continues to support field-based research.
More information can be found here: https://www.otago.ac.nz/geology/about/professor-benson/

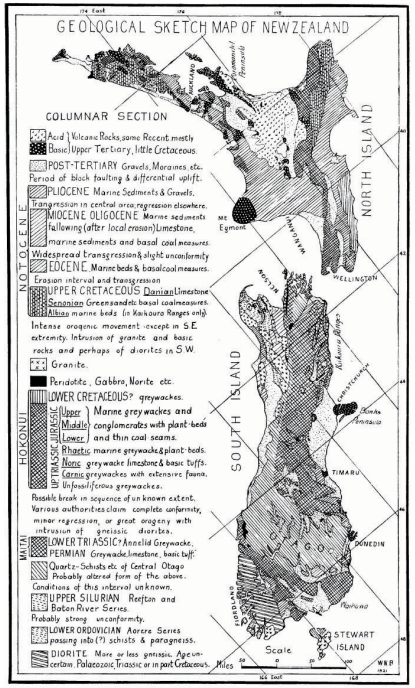


FIG. 1

Correction: Insert ? after "Erosion interval" between EOCENE and UPPER CRETACEOUS in section above.

> *Undetermined schists*—We may here describe one of the most puzzling formations in New Zealand, a broad zone of mica-schists running to the southeast from the main mountain range, through the Otago province of the South Island. These have for the most part a very flat position, but dip to the southwest and northeast of the broad anticlinal axis, which reaches the sea near Dunedin. To these rocks of all ages have been assigned from Archaean to Jurassic. They are not associated with plutonic rocks, but may be traced outward from a central zone of maximum schistosity, through gradually decreasing metamorphism into graywackes indistinguishable from the Ordovician or Lower Mesozoic Graywackes. The Geological Survey and the majority of other authorities hold that the schists are ancient and must be spearated by obscure disconformities from the Mesozoic rocks. Marshall considers the schist Mesozoic and, after much hesitation, the writer inclines towards a modification of this view. In this it is suggested that the flat arch of metamorphic rocks is the base of a great series of recumbent folds of late Paleozoic and Lower Mesozoic rocks which were pressed against a resistant or continental mass now concealed beneath the southern portion of the island.

GEOCRYPTIC CROSSWORD 03

by Cryptonite

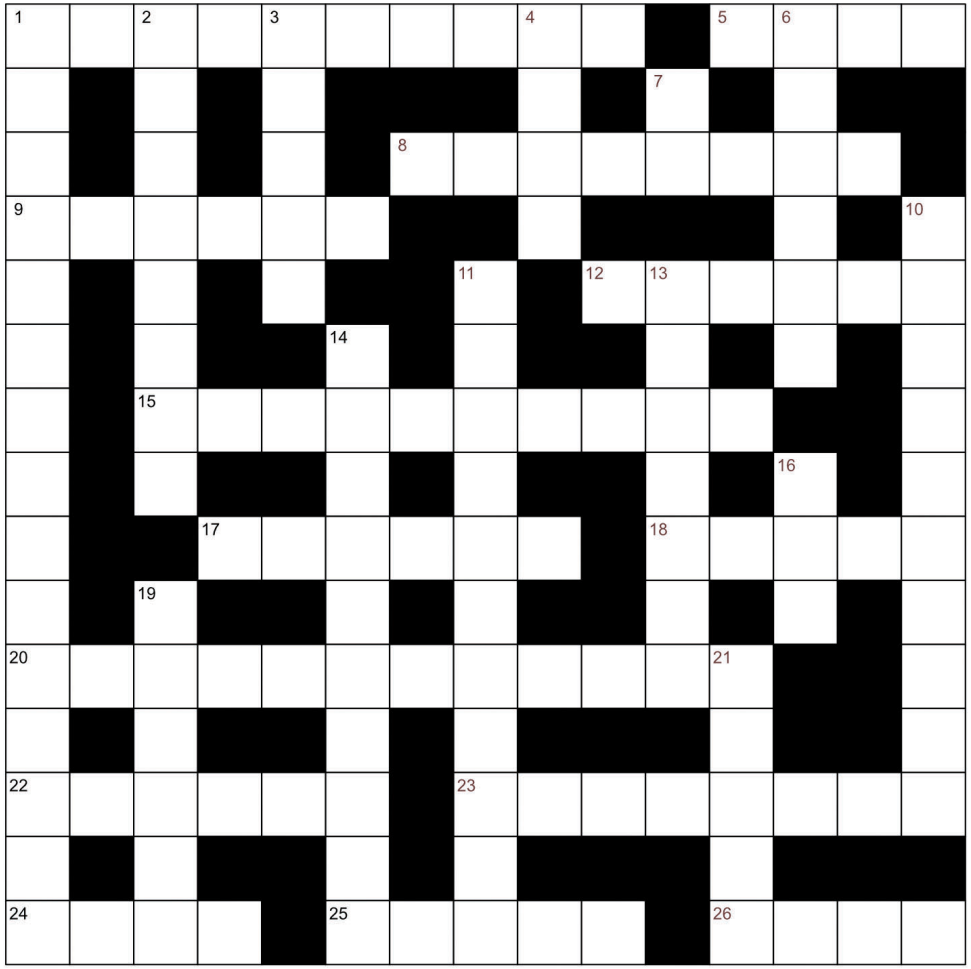
ACROSS

1. Some upset before ball in the mantle (10)
5. We hear an instruction to put something in this tunnel may provide access to the mine (4)
8. Ar for argon? No! It's time for Bolivina pontis' stage debut (8)
9. A protective volcano? (6)
12. Randomly trickle potassium out of surviving minerals and textures (6)
15. Molybdenum plot embraced by toy produces images of Earth's interior (10)
17. French circus spawned a glacier (6)
18. Nothing after absurd clue describes pale rocks (5)
20 & 11D. Hallucinate their Omicron? Could be the result of oceanic density gradients (12,11)
22. Tolkien's goblin tried to avoid detection...but was found among fossils from Foulden Maar (6)
23. Ice lions prancing about a tight fold (8)
24. This part of the plant initially describes four key disciplines (4)
25. Lad swallows neon backwards to describe standard feldspathoids (5)
26. A Regency libertine gives the angle from strike (4)

DOWN

1. Rapid exterminations from sulfur-bearing masons gathering around dead one (4,11)
2. Rise anew and acknowledge a source of this mica (8)
3. A quiet beer may contain oil (5)
4. Position in coal's hierarchy smells bad (4)
6. One rapid reshuffle produces a dome (6)
7 & 13D. Hence tipsy Mr Musk produces oblique, parallel structures (2,7)
10. Arts back youngster before Yield Point Elongation produces reference section (10)
11. (see 20 Across)
13. (see 7 Down)
14. Robot daily reformed a habit (10)
16. A hole in deja vu glitch (3)
19. Standing wave from ice she melted (6)
21. A headless boiler posited a pole, we hear (5)

Answers on p.52



SJ HASTIE AWARD REPORT

Matthew Parker: 2020 recipient

Thesis title: Provenance of Miocene–Pleistocene conglomerates in the northern Canterbury Basin

Supervisors: Kari Bassett, Matt Sagar, Greg Browne, and Alex Nichols

Understanding how the Australian–Pacific plate boundary and associated topography evolved in Zealandia is important for tectonic reconstructions, and recognising changes in sediment transport pathways can play a key role in understanding this evolution. Recent and past provenance studies using detrital zircon (DZ) geochronology or conglomerate clast composition from Zealandia's sedimentary basins have been able to use provenance changes and relate these to the development of the plate boundary (e.g., Sutherland 1996; Mortimer et al. 2001; Cutten et al. 2006; Gooley and Nieminski 2022; Sagar et al. manuscript submitted) . My thesis aims to better understand the provenance of under-explored Miocene–Pleistocene conglomerates in the northern Canterbury Basin by analysing samples along a NE–SW transect perpendicular to distinctive basement terranes (Figure 1). The mineralogy, geochemistry, and geochronology of conglomerate clasts and interbedded sandstones are being used together to provide constraints on when and where different basement terranes were being uplifted and eroded near the developing Australian–Pacific plate boundary.

During fieldwork in mid-2021, samples were collected from the Waima, Greta, Kowai, and Brechin Formations from bathyal debris flow to fluvial strata, with conglomerates usually dominated by weathered greywacke clasts (Figure 1, 2). Representative greywacke clasts analysed for whole-rock geochemistry (n=28) confirm a Torlesse Composite Terrane (TCT – Rakaia, Kaweka, and Pahau terranes) source, with immobile element ratios (e.g., Th/Sc, Ti/Zr, La_N/Y_N) similar to published data. Linear discriminant analysis using natural logarithm-transformed immobile trace element ratios is also being used currently to probabilistically classify clasts into the Pahau Terrane or within petrofacies of the Rakaia Terrane. Interestingly, a late Miocene clast from Castle Hill Basin is compositionally similar to the Pahau Terrane, now located c. 80 km to the NE. Altered porphyritic basaltic clasts in Plio-Pleistocene conglomerates collected near Amberley and Culverden have Zr/Nb and Nb/Y values that match best with the Banks Peninsula volcanics and Cookson Volcanics Group, respectively. A rhyolite clast also collected from near Amberley matches best with the Mount Somers Volcanics Group, indicating transport distances <75 km to the NE.

New DZ U–Pb ages (n=705) range from 2936–95 Ma for six middle Miocene to early Pleistocene sandstone samples. DZ age spectra for all six sandstone samples contain a major peak at 260–250 Ma, and, combined with <16% Precambrian–Silurian DZs, match well with published DZ age spectra for the terranes of the TCT. Of note is that all samples contain a small to moderate 145–110 Ma age group (1–17%), regardless of location on the transect. This age group is interpreted to be derived from either erosion of the Pahau Terrane, or recycling of DZs from the underlying cover stratigraphy. At least some recycling of sediment is evident based on the presence of recycled glauconite grains within fluvial Brechin Formation sandstones (McConchie and Lewis 1978) . A 95 Ma DZ could to be derived from the Mount Somers Volcanics Group rather than the Pounamu Terrane, based on relatively high Th/U (0.6), whereas Pounamu Terrane DZs <100 Ma typically have Th/U of <0.1 (Cooper and Palin 2018) .

Ongoing work as part of my thesis will include additional whole-rock geochemical analyses of clasts, point-counting greywacke clasts and sandstones, and assessing the dissimilarities of DZ age spectra in published and new basement and cover samples in the northern Canterbury Basin using multi-dimensional scaling to help recognise similar sources. My sincere thanks to the GSNZ for awarding me the SJ. Hastie scholarship, which has helped significantly in the logistics of my thesis so far!

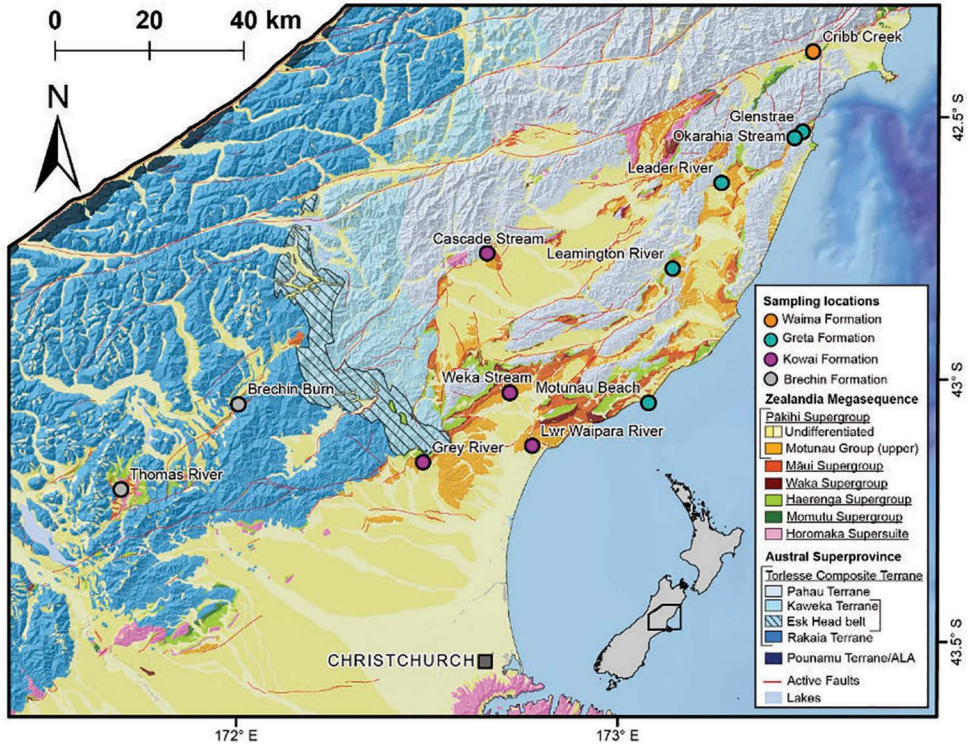


Figure 1. Geological map of the northern Canterbury Basin area, indicating locations of samplinglocations for this thesis. Geology after Heron (2020). Inset map of New Zealand showing location of detailed map. Bathymetry and geographical data sourced from NIWA and LINZ. ALA — Aspiring Lithological Association, Lwr - Lower

Figure 2. Middle Miocene fluvial Brechin formation pebble-cobble conglomerates and minor interbedded silty sandstones exposed within a gorge of Brechin Burn (south branch). River is c. 3m wide. Photo taken 24/06/2021.

References

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AWARD WINNERS 2021

ANNOUNCED AT THE 2021 ONLINE AGM

The Society held its first ever online awards presentation on 2 December. In case you were not able to attend the following awards, prizes and scholarships were announced:

Honorary Life Member: **Julie Palmer (Massey University**) for over 25 years of service to GSNZ at the local and national level

McKay Hammer: **Joshu Mountjoy (NIWA)** for a seminal contribution to our understanding of New Zealand's submarine canyon systems and deep-water dispersal events

Hochstetter Lecturer: **Dave Prior (University of Otago**) Lecture title: The Shear Zones that Hold Back the Ice Sheets

S H Wilson Prize: **Kevin Brown** for a lifetime of service to Geochemistry

New Zealand Geophysics Prize: **Donna Eberhart-Phillips (GNS Science/UC Davis)** for a significant contribution to New Zealand geophysics through seismic tomography work

Werner F Giggenbach Prize: **Terry Isson (University of Waikato)** for a comprehensive review article of the global long-term carbon cycle

Hayward Geocommunication Award: **Oliver McLeod (Victoria University of Wellington)** in recognition of sustained efforts to engage in geoscience communication with community groups in the Waikato region and beyond

Wellman Research Award: **Ella Nisbet (Massey University)** for PhD research into paleo-history of large, soft-rock landslides in the Manawatū/Rangitikei Region

Kingma Award: **Sascha Baldwin (University of Canterbury)** for support to both teaching and research at the University of Canterbury

Alan Mason Historical Studies: **John Griffiths (Massey University)** for research entitled Displaying New Zealand's Mineral Wealth at International, National and Provincial Exhibitions 1851-1990

Jim Ansell Geophysics Scholarship: **El Mestel (Victoria University of Wellington**) for research using seismicity and tomography to investigate the magma system and volcano-tectonic interactions at Taupō

S.J. Hastie Scholarships:

University of Auckland: Ema Nersezova

University of Canterbury: George Young

Massey University: Susan McLachlan

University of Otago: Zoe MacClure

Victoria University of Wellington: Jessie Schuler

University of Waikato: William Starzynski

GEOID UPDATE

GEOEDUCATION, OUTREACH, AND INTERNATIONAL DEVELOPMENT

Jenny Stein: GeOID convenor

Kia ora koutou,

It's been an exciting start to the year for GEOID. In February we launched our "new-look" newsletter which contained a range of great articles submitted by our members. One of these you can read as part of the "Convenor's Choice" segment in this edition of the GSNZ newsletter. I chose Sriparna's article for this slot as I thought it was a great example of how to go about bicultural communication and collaboration to produce meaningful resources and experiences. But that isn't to say the other articles in our February newsletter weren't also excellent! So while it's supposed to be a perk of SIG membership, just this once I'll invite anyone who is interested to check out the full GEOID newsletter here: https://www.gsnz.org.nz/assets/CustomTabs/SubscriptionView/5/Newsletters/GeOID-Newsletter-7-Feb-2022.pdf?vid=14

As convenor, I intend to publish quarterly GEOID newsletters going forward, and encourage all our members to consider putting their thoughts and experiences into words and photos to share with our group in this way.

February also saw the launch of a what I hope will become a regular online seminar series we are promoting as "GEOTalks" (GeoEducation and Outreach Talks). Our first session was held on February 9th and I wish to extend my sincere thanks to our first speaker, Suzanne Bull of GNS Science, who was more than happy to kick off the seminar series with her talk "GeoTrips: Turning your fieldwork into tangible outreach (and how a user-based approach can help optimise online learning)". The talk was attended by several interested listeners and stimulated some great discussion, sharing of ideas and even some networking after the event.

This is just what I had hoped the seminar series would achieve and I look forward to gaining more traction and interest as we continue the series with monthly talks throughout the coming year. The next thing on the to-do list is to update our page on the GSNZ website and brainstorm further activity ideas with our new GEOID SIG committee. So stay tuned and watch this space!

In the meantime, I would like to acknowledge that geoeducation and outreach is a vital but notoriously underfunded and under-resourced branch of geoscience. As such, I want GEOID to support those active in this space in any way we can. My vision is for our SIG to become an active network of people who regularly share and celebrate each other's successes, whilst also learning from one another's challenges in ways that will help promote and support the many and varied outreach initiatives our members may be involved in, both now and in the future.

As always, I welcome any ideas, comments, questions or suggestions anyone may have, and encourage anyone interested in finding out more or contributing to GEOID SIG activities to reach out by emailing geoid@gsnz.org.nz ■

Kia pai tō koutou rā (have a great day everyone),

Jenny

CONVENOR'S CHOICE:

BRAIDING LESSONS FROM MAGMATIC LANDSCAPES

Using bicultural co-creation to create valuable learning tools

Sriparna Saha: GeoID member

Last month, the island of Tonga was hit by a massive tsunami triggered by a volcanic eruption. In the past year, volcanic eruptions lasting many months in La Palma, Spain and in Iceland have served as reminders of the fragile nature of the landscape around us. Not too long ago, in December 2019, the deadly eruption at Whakaari (White Island) Aotearoa, New Zealand was another reminder of the dynamic nature of the landscape and its impact on society.

Geologically, volcanic eruptions in Aotearoa can be attributed to its location at the boundary of the Australian and the Pacific plates. Consequently, Aotearoa is also prone to other physical processes like tsunamis and earthquakes. Māori, the Indigenous people of Aotearoa, New Zealand have an extensive knowledge of their local area and history of past volcanic activity, developed through experience gained over generations by direct observations which are embodied in pūrakau (Māori cultural narratives) and tikanga (cultural practices) associated with the landscape. Specific to Aotearoa, New Zealand, there is a public imperative to enhance community disaster and natural hazards preparedness in culturally empowering ways. This has led to the recognition that braiding of the Indigenous knowledge system of Mātauranga Māori with Western science can lead to increased preparedness and understanding of local landscapes.

To support this imperative, the Ministry of Business, Innovation and Employment (MBIE) funded the ECLIPSE (Eruption or Catastrophe: Learning to Implement Preparedness for future Supervolcano Eruptions) programme in 2018 to improve understanding of volcanoes around the Taupō Volcanic Zone, which is one of Aotearoa New Zealand's largest volcanoes. One of ECLIPSE's objectives involves developing new education approaches and materials to implement mitigation strategies for future eruptions.

In 2019, ECLIPSE researchers, in collaboration with EQC New Zealand and Core Education, conducted a bicultural LEARNZ field trip around the Taupō Volcanic Zone. This field trip was part of the development of a bicultural digital educational LEARNZ resource, "Taupō, Our Supervolcano", and targets primary and secondary students. During the trip, kaupapa Māori researchers and iwi representatives from the Bay of Plenty region, geologists and educators from the ECLIPSE programme, the University of Canterbury, GNS Science, and Core Education contributed unique insights about the landscape around the Taupō Volcanic Zone. These were filmed by the LEARNZ team and posted online on the LEARNZ website in conjunction with the virtual field trip (VFT) resource (https://www.learnz.org.nz/naturalhazards193/videos).

During the filming of the resource, kaupapa Māori researchers, kaumatua (Māori elders), and cultural advisers Pouroto Ngaropo (Ngāti Awa), Rita Tupe (Ngai Tūhoe), Kiharoa Milroy (Ngāti Whakaue), Bubs Smith (Ngāti Tūwharetoa), and Hoani Taoho

Figure 1: Experts on the LEARNZ VFT (from right to left): Pouroto Ngaropo; Sylvia Tapuke, Shelley Hersey; Kiharoa Milroy; Rita Tupe; Ben Kennedy & Graham Leonard.

(Ngāti Tūwharetoa) provided live narration of the stories. These narratives were braided together with Western scientific knowledge of the volcanic landscape from Graham Leonard (GNS Science) and Ben Kennedy (University of Canterbury), to provide insights on how we can prepare for an eruption.

This approach of co-creating educational resources by interweaving worldviews from the Indigenous Science of Mātauranga Māori and Geology is a modern approach towards understanding volcanic landscapes that has community outreach and engagement with the local iwi (tribe) at its forefront. However, engagement that translates into authentic partnerships require an immense amount of work, trust, patience and flexibility, as revealed through conversations with the partners in the LEARNZ project.

What allowed this trust to develop?

The science team knew that the sites of geothermal and volcanic activity within the Taupō Volcanic Zone hold cultural significance for local iwi such as Ngāti Awa and Ngāti Tūwharetoa, who are the kaitiaki (guardians) of the Taupō region. It was thus essential for the science team to engage with local iwi at the earliest stage of the planning, to establish relations and share a vision for the anticipated educational resource.

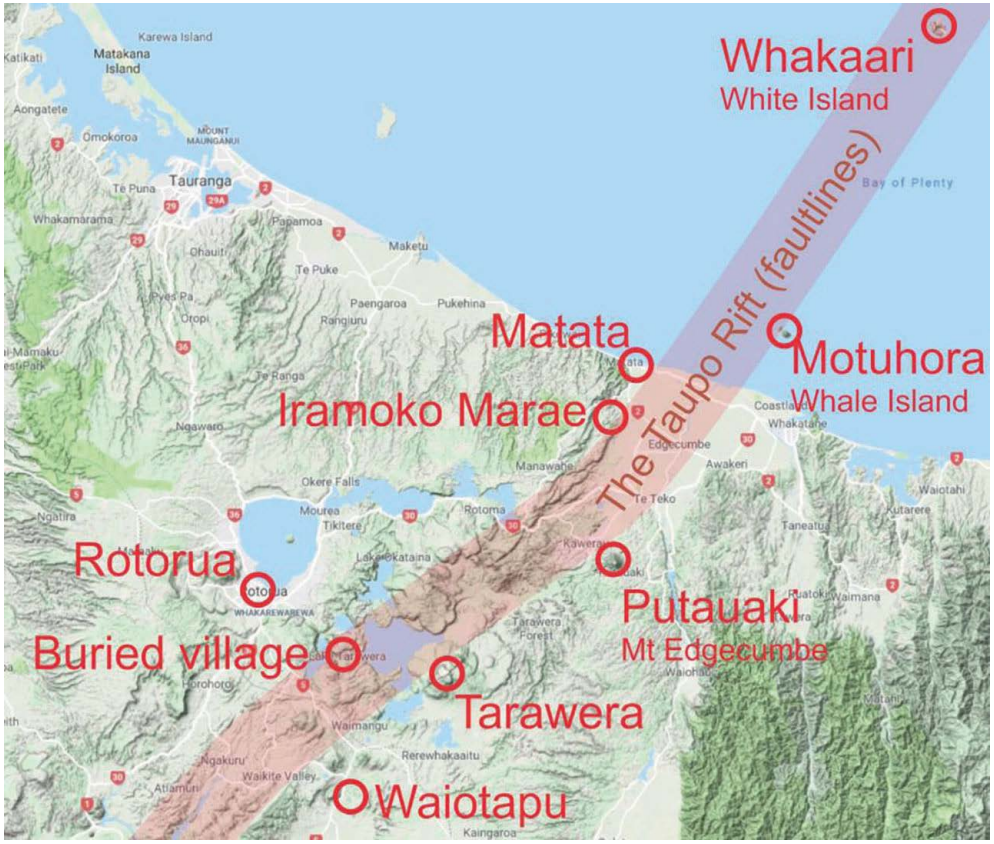

Figure 2: Map showing locations covered in the LEARNZ VFT resource.

The initial engagement with local iwi was led by Māori researchers Sylvia Tapuke, Kelvin Tapuke and Bubs Smith, as part of the ECLIPSE program. Early on in this collaboration, all project partners participated in a shared values wānanga (workshop) at the Tangatarua Marae (traditional Māori meeting place). The Tangatarua Marae is an institutional marae open for bicultural experiences, where the science team and the Māori team came together to examine shared values behind the development of the VFT resource. Following this, two pōhiri (welcoming ceremony) were held by Pouroto Ngaropo at Iramoko Marae. The first one was with Sylvia Tapuke and Rita Tupe, where principles of engagement and ethics were established, and the second one was for the LEARNZ field trip itself.

This collaboration represents an authentic partnership between local iwi, scientists and educators who wanted to educate school students about the geothermal and volcanic activity of the landscape around Lake Taupō. The bicultural education deliverable for the ECLIPSE project eventually evolved into a road trip of science discovery between a diverse group of like-minded scientists and friends. Conversations with the project partners revealed that three things were crucial to the success of this engagement: **relations, values** and **space for sharing**. Our recent work[1] describes the implications of these for teachers and educators, while our upcoming work[2] will describe the interplay of these elements and their influence on the collaboration.

The co-creation approach to the design of educational resources for disaster preparedness is relevant not only for scientists intending to engage with local iwi (or Indigenous communities elsewhere) but also for teachers and educators with an interest in bicultural (or culturally relevant) curriculum. That being said, it is crucial to understand that although not every iwi that surrounds Taupō is represented in the LEARNZ resource (for example, Ngāti Tūwharetoa, Ngāti Uenuku, Ngāti Haua, Ngāti Rangi), they are still acknowledged and these pūrākau stay with the iwi concerned. ■

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S H WILSON PRIZE 2021

AWARDEE: KEVIN BROWN (GEOKEM, UNIVERSITY OF CANTERBURY)

Sebastian Naeher: Geochemistry SIG convenor

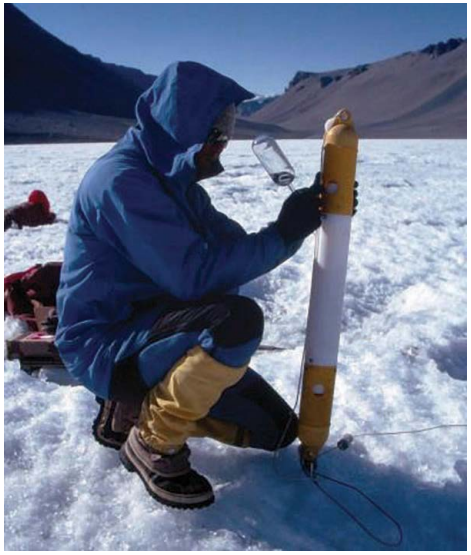
Kevin has been an active, long serving member of the NZ Geochemical Group, and later the NZ Geochemical & Mineralogical Society until it was merged into the New Zealand Geoscience Society, of which he remains a member. He also served on the Board of Directors for the International Geothermal Association for 6 years, and has taught many short courses on the environmental impacts of geothermal development, and on scaling in geothermal pipelines; in New Zealand, Italy, Mexico and Australia.

He has over 50 publications, mainly in international journals and books, and has supported the NZ Geothermal Workshop for several decades with regular invited or keynote speaking slots. He also serves on peer review panels for geothermal developments in New Zealand and Kenya. Semi-retired now, Kevin is retained as an Adjunct Professor in the School of Geological Sciences at the University of Canterbury, and has co-supervised several PhD and Masters students.

You can view Kevin's acceptance speech here: https://youtu.be/AzKncN0111U

Kevin was nominated for the S.H. Wilson award in 2021 by Stuart Simmons. The nomination letter from Stuart is attached below. Further support for Kevin's nomination comes from James Pope who says: 'Kevin delivers his geochemistry with a lightness, humour and generosity that only true experts can manage. He is a great mentor, collaborator and colleague, is thoroughly deserving of this award, and I am sure Stuart and I both look forward to projects where we have the opportunity to continue to work with Kevin'.

As the editor of the Geochemistry newsletter, I thought I would share the following reply I got from Kevin when contacting him about this award. ▶



> *When I first moved up to Wairakei from Gracefield, I actually met 'SH' a few times. He used to wander through the corridors at Wairakei with his walking stick, which made a characteristic "clomp clomp" noise. He had a famous saying that "one measurement is a data point - two measurements always produces an anomaly"- or something like that. A grand old geochemist.*

NOMINATION LETTER FROM STUART F SIMMONS
(Hot Solutions and University of Utah):

In his 52-year career as a as a scientist, academic, consultant, manager and company director, Kevin L. Brown has made and continues to make outstanding contributions to NZ geochemistry, and for this reason Pat Browne and I are nominating him for the S.H. Wilson prize. Kevin's work has been primarily focused hydrothermal and low temperature aqueous geochemistry, mineral scaling, colloid chemistry, and metal transport-deposition to address a range of problems dealing with geothermal development, ore deposit formation, and environmental management. He also spent four seasons in Antarctica studying the Dry Valley lakes and ice cores. He is one of the foremost international experts on hydrothermal amorphous silica deposition, which has enormous implications for the design and management of geothermal power stations. As a result, he has worked on every geothermal project in New Zealand, as well as many overseas developments, including ones in Australia, China, El Salvador, Iceland, Indonesia, Japan, Kenya, Mexico, Nicaragua, Papua New Guinea, Philippines, Tibet, and USA.

Notably, Kevin was a key player in the development acid dosing methods to mitigate silica scaling, which led to substantially increased energy production at the bottom end of the power cycle. His two patents

Lake Vida, Antarctica

are entitled "Inhibiting Deposition of Silica from Geothermal Brine" and "Manufacture and Recovery of Monodisperse Silica Sols from a Geothermal Brine", and his lecture notes on Mineral Scaling in Geothermal Power Production (https://orkustofnun.is/gogn/unu-gtp-report/UNU-GTP-2013-39.pdf) represents an authoritative summary of the subject.

Academically, the results of his research with co-workers have appeared in the highest echelon of peer-reviewed journals, including Science, Nature Geoscience, Geology, Geothermics, Economic Geology, Journal of Volcanology and Geothermal Research, Journal of the American Chemical Society and Antarctic Science. Along with his technical contributions, Kevin has been dedicated to sharing his understanding through formal post-graduate student research projects, and delivery of many professional development short courses, university classroom teaching, supervision of post-graduate student research projects, and delivery of many professional development short courses.

For background, Kevin completed all his advanced degrees (BSc, 1968; MSc, 1969; PhD, 1972) in Chemistry from the University of Auckland, having turned down a PhD scholarship at Oxford because he had a young family. He was initially employed by DSIR Chemistry Division where for the first 12 years of his career he applied x-ray crystallography to solve the structures involved with organic reaction intermediates that are short-lived and highly reactive; for a short time, he also investigated hydrogenation of coal to produce synthetic crude oil. It was during this period too that he was awarded an 18-month sabbatical at ETH Zurich. From 1981-1991, he worked at the Wairakei Research Centre, marking a sharp turn in his career path that became almost entirely directed at geothermal-related problems, and eventually led to an appointment as a Group Leader, in which he was responsible for ~60 scientists.

In 1991-1992, he had a short stint at NECAL in Auckland, and he also had a 9-month sabbatical at the US Geological Survey in Denver, Colorado. Between 1992 and 2003, he was appointed Associate Professor in the Geology Dept and Geothermal Institute at the University of Auckland,

Silica polymerisation tests, Kawerau.

which he served in a part-time capacity while retaining half-time employment with IGNS through 1997, then after that with GEOKEM, a consulting company that he set up with his partner and wife, Dr Jenny Webster-Brown. In addition to a long client list of private companies, he has also performed work for UNDP and the World Bank.

Sampling at Lihir Island, Papua New Guinea.

Since 2010, Kevin has been adjunct Professor in the Department of Geological Sciences at the University of Canterbury. Kevin served on the board and as treasurer for the International Geothermal Association (2001-2007) and on the editorial board of Geothermics (2002-2011). He also served as President of the NZ Geochemical Group (1987-89).

Kevin's breadth of experience reflects on his ability and interest in working across a wide range of problems. A short list of significant research studies includes: effect of aeration on silica scaling; polymerization rates of colloidal silica; analyses of long time series data of production fluid geochemistry of geothermal reservoirs in NZ (Wairakei, Kawerau) and Japan (Kakkonda); reaction kinetics of hydrothermal gold-silver deposition; oxidation of H2S in aerosols; construction and use of pilot plants to test schemes for the extraction of colloidal silica, gold-silver, and arsenic from geothermal waste waters in various fields; controls on stibnite solubility and deposition to mitigate scaling in geothermal plants; inhibition of calcite scaling by downhole injection of anti-scalant; chemistry of Dry Valley Lakes Antarctica; role of thermophyllic bacteria in hydrothermal silica deposition; trace metal concentrations of deep geothermal fluids in NZ, Iceland, Indonesia and PNG; and hydrodynamics factors influencing amorphous silica deposition and scaling.

During his time at the University of Auckland, I worked closely with Kevin, and this included collaboration on a FRST (now MBIE) funded project to characterise the trace metal concentrations of deep hydrothermal fluids. The key tool required the deployment of a novel downhole sampler constructed of titanium to obtain samples of hydrothermal fluids at >250°C from geothermal production fields at 950-1600m depth. Kevin had earlier worked on modifying existing downhole samplers to do the job, but there was always a concern with contamination from the carbon steel in the sampler.

The titanium sampler, which Kevin designed and built, was step-changing and combined with the availability of relatively new ICP-MS analytical techniques, we were able to determine trace metal concentrations down to when we started, project funding was sustained for a 6-year period over which time we were able to sample every producing field in New Zealand.

This allowed repeat sampling of some wells, particularly high temperature ones, which because of high pressures required upgrades to the seals that were used in the Ti-sampler. In the end, a state-of-the-art dataset was obtained that provides key insights about the nature and variability of trace metal transport in deep hydrothermal fluids. It also contributed significantly to advances in understanding hydrothermal metal deposition, which has relevance to knowledge of ore formation as well as environmental geochemistry. Several important papers were published as a result, including one in Science on hydrothermal metal-transport deposition at Ladolam (PNG), the site of a geologically very young super giant gold deposit and a still active hydrothermal system almost completely dominated by magmatic, but near neutral pH, high-temperature fluids. This work was entirely based on a key dataset that Kevin collected in 2003. I share this as but one example of the caliber of Kevin's skill, and really but one facet of his focus and overall contribution to hydrothermal geochemistry, as reflected in the appended list of significant publications. Over the last 10 years, he has helped co-supervise Mechanical Engineering PhD students at the University of Canterbury on the hydrodynamics of colloidal silica deposition.

Nagqu Power Station, Tibet

That Kevin has had such a diverse career reflects as much on his outgoing and generous personality as it does his broad knowledge and expertise. He is the consummate team player and independent thinker with important practical targets. ■

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HISTORICAL STUDIES

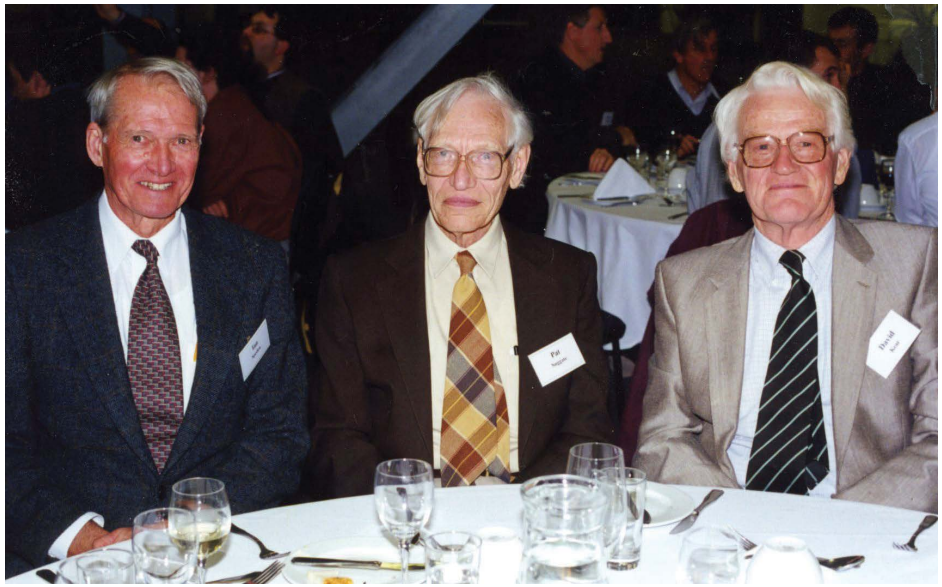
FROM THE ARCHIVES

Simon Nathan: Historical Studies convenor

In 1990 the New Zealand Geological Survey celebrated its 125th anniversary. Set up by James Hector in 1865, it was the oldest scientific organization in New Zealand – and in fact older than many similar geological surveys elsewhere in the world. There was an anniversary conference, a gathering of retired NZGS staff and an anniversary dinner. But it was a bitter-sweet anniversary because the Geological Survey was soon to go out of existence. The country was in the middle of a wave of Government restructuring and NZGS to be replaced by DSIR Geology & Geophysics. No sooner had that started when there was a change of government, more restructuring, and GNS Science appeared.

Retired Geological Survey staff at the 1990 meeting. From left: George Grindley, Graham Mansergh, Les Oborn, Norcott Hornibrook, Jim Healy, Pat Suggate, Max Gage, David Kear, Rudi Katz, Gerrit van der Lingen and Bruce Thompson. Jim Healy and Max Gage had joined the Survey in the late 1930s, and many of the others had started in the late 1940s during a rebuilding phase after World War 2. ▼

Photo: Lloyd Homer, NZ Geological Survey



▲ The last three Directors of the New Zealand Geological Survey. From left: Ian Speden (1975-90), Pat Suggate (1974-84) and David Kear (1967-83). Ian Speden became the first (and only) Director of DSIR Geology & Geophysics (1980-82). Photo: Simon Nathan.

*Editor's note: This historical snippet foreshadows another 'trip down memory lane' article Simon has contributed for the Geophotography section of the November 2022 issue (38) of the GSNZ Newsletter.

These archives contain a wealth of information and provide us with a reminder of the incredible intellectual legacy left to us by giants in our country's geoscientific community.

In these photographs, we are reminded that the names, behind the works that may be cited hundreds of times or more, belong to people with faces, stories, personalities, and families. For me, personally, I am grateful to be able to see tangible images that identify, and bring to life, some truly legendary geoscientists here in Aotearoa / New Zealand. They embody a pioneering spirit, in that ruggedly practical sense, and will continue provide inspiration, for generations of young geoscientists to come, partly through the historical articles submitted to the GSNZ Newsletter. I look forward to presenting Simon's other article, in November, in the hope that it rekindles fond memories for many of our older members and provides insight, into our shared history, for our younger ones.

NEW COMMITTEE MEMBERS

ELECTED AT THE 2021 ONLINE AGM

Three new members have been elected to the national committee.

Nicola Litchfield, GNS Science

I'm a paleoseismologist/tectonic geomorphologist at GNS Science, Lower Hutt. I joined the GSNZ in 1996 and started working at GNS in 2001. My research focuses on using landforms (e.g., marine terraces) to study past earthquakes on active faults or the Hikurangi Subduction Zone. I also map and characterise active faults for seismic hazard assessments. I am an Associate Editor of the Bulletin of Seismological Society of America and am the science leader of the It's Our Fault research programme.

Steph Coursey,

Kia ora, I'm a PhD student at Massey University. I joined the Society in 2019 as an undergrad student, and joined the GSNZ National Committee in 2021 as the Student Representative. My PhD research, a joint project between Massey University and NIWA, focuses on the post-glacial geomorphic development of the Lake Wakatipu basin and the landslide-related hazards within dynamic alpine lake environments. As student rep, I'm keen to help increase student engagement with the Society.

Michael Rowe, University of Auckland

I have been a resident of New Zealand since 2013 working as a geochemist for the University of Auckland, School of Environment in the Earth Sciences. Although my PhD is in igneous/high-temp geochemistry and petrology, nowadays, my research and supervision really focuses on the whole-Earth system, primarily looking at the space where fluids and minerals overlap. However, my specialty really is in finding new ways to problem-solve with geochemistry, so I have collaborations crossing over into archaeology, engineering, environmental science, and planetary sciences.

The full list of committee members and other contacts is listed on the inside front cover of the Newsletter.

CONGRATULATIONS CAM NELSON!

WINNER OF THE NEWSLETTER PRIZE DRAW

In issue 35, we welcomed suggestions for a new name GSNZ Newsletter. All those who made suggestions and/or provided feedback by 31st January, went in the draw to win a mystery prize to the value of $50.

Cam, and his wife Margaret (taking the photo), are about to enjoy a couple of cold drinks from the pair of GSNZ branded Zealandia glasses he received as his prize.

GSNZ ZEALANDIA GLASSWARE IS AVAILABLE FROM THE GSNZ PUBLICATIONS WEBSITE

Discount for members

https://www.gsnz.org.nz/publications-and-webstore/category/14

GEOPHOTOGRAPHY

NOVEMBER 2022 ISSUE: CALL FOR ARTICLES

Do you have a story to tell?

It's not too late!

Each issue of the GSNZ Newsletter will feature a set of articles on a theme.

Interesting articles on this topic have already been promised for November 2022 but there is still time for you to to prepare another!

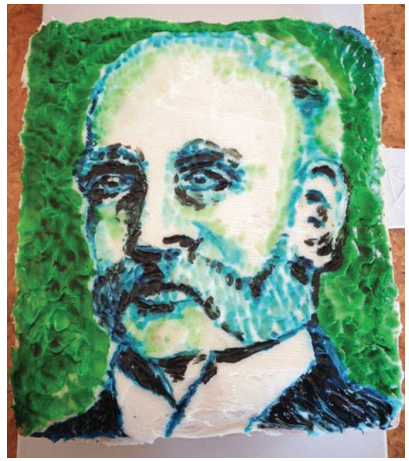
Articles on any aspect of geophotography including technical, experiential, artistic, historical, biographical and others, will be welcome.

GEOCRYPTIC CROSSWORD ANSWERS (FROM PAGE 32):

Across
1. mesosphere, 5. adit, 8. Runanga, 9. shield, 12. relict, 15. tomography, 17. cirque, 18. leuco, 20. thermohaline, 22. orchid, 23. isocline, 24. STEM, 25. lenad, 26. rake

Down
1. mass extinctions, 2. sericite, 3. shale, 4. rank, 6. diapir, 7. en, 10. stratotype, 11. circulation, 13. echelon, 14. botryoidal, 16. vug, 19. seiche, 21. Euler

GEOBAKE 2022



It's that time of year again so dust off your aprons, gather up your rock flour, and find your apatite! It's the 2022 GSNZ Geobake competition!

Every year, the GSNZ recognises March 16 as Hector Day—New Zealand's annual national geosciences day held to honour pioneering Aotearoa NZ geoscientist, James Hector. We at GSNZ like to celebrate by holding an online geoscience-themed baking competition!

Entering is easy! Just design and bake something tasty that has a geoscience theme and take a photo of your finished creation before sharing it with people in your bubble on Wednesday 16 March (or just scoffing it all yourself!). Then enter the competition by emailing your photo(s) to events@gsnz.org.nz by **Friday 18 March.**

Be sure to include:

- The baker's name
- A geoscientific explanation of the baked item (50 word max.)
- The baker's contact details (email address & phone number)

National judging will take place the following week, with anonymised entries judged by the GSNZ committee. Winners will be announced in a GSNZ Newsflash and the overall winner will receive a **free 1-year GSNZ membership for 2022-2023**. This year, we're also encouraging people to post their creations on social media. Tag the GSNZ and be in to win some great spot prizes!

So rattle those pots and pans and join the fun!

(If you need some inspiration, the Great British Bake-off starts this week!).

Last year's winner: 'Sourdough Eruption' by Jamie Delano

HAAST200 SYMPOSIUM 2022

CELEBRATION OF THE LIFE OF JULIUS VON HAAST

This symposium will be held in Christchurch 30th April- 1st May to mark the 200th anniversary of Haast's birth.

There will be presentations on different aspects of Haast's life and career as well as his longer-term impact on Canterbury Museum and in other spheres. The symposium is organised by Canterbury Museum and interested researchers from other institutions. It will be live-streamed and recorded so that people from New Zealand and overseas can participate if they are unable to travel to Christchurch, or if the Covid-19 situation makes it necessary to have a completely online conference.

There are several ways to participate:

- Attend in person at the symposium in Christchurch
- Attend the symposium virtually during the weekend event
- Watch and listen to recorded presentations after the symposium
- Present in person at the symposium in Christchurch
- Present a paper live via video conference and engage in a Q&A session (optional)
- Contribute a pre-recorded presentation to be made available from the date of the event
- Submit a paper for peer-reviewed publication in Records of the Canterbury Museum or a similar publication

The symposium is an opportunity to look critically at Haast's life and discuss what he did (or didn't) achieve, as well as the impact of colonial attitudes on museums, collecting and exploring as they relate to Haast. We welcome mana whenua perspectives on Haast's geographical "discoveries", naming and collecting. Broad themes of the symposium include:

- Biography – Haast's life, achievements, family and contemporaries, etc.
- Museology – Haast and the founding and development of Canterbury Museum
- Natural History – Haast and natural history research and collections, exchanges, nomenclature, etc.
- Exploration – Haast's explorations and travels, e.g. surveys and fieldwork
- Academia – Haast and the establishment of learned societies and institutions, e.g. the founding of the Canterbury Philosophical Society and Canterbury College/University, etc.
- Correspondence – manuscripts and archives, exploring the history of science and Haast's scientific networking based on research utilising the UNESCO Memory of the World inscribed Sir Julius von Haast Collection held in the Alexander Turnbull Library, Wellington

Submissions and Enquiries to: haast200@canterburymuseum.com

Please note: deadline for abstracts closed on 27th February 2022

EARTH FUTURES FESTIVAL

NEEDS YOUR GEOSCIENCE FILMS OR VIDEOS

Earth Futures Festival connects geoscience and the arts.

It is an international film and video festival showcasing the role of geoscience in our sustainable future.

The Festival seeks films or artistic works in video format on the topic of geoscience, within the following themes and categories:

DYNAMIC EARTH

FUTURE EARTH

HUMAN CONNECTION

FREE TO ENTER

SUBMISSIONS: 1 APRIL 2022 - 15 MAY 2022

Professionals and students in the realms of Earth Science, the Arts and Science Communication along with community associations, school students and First Nations peoples are encouraged to submit works in video format to the Festival.

The work of short-listed finalists will be presented during the festival.

Works can range from feature length documentaries, to short video pieces and spoken stories, through to visual and musical performances.

The Festival is organised in collaboration with the United Nations Educational, Scientific and Cultural Organization (UNESCO), International Geoscience Programme (IGCP) Project 685: Geology for Sustainable Development and with the International Union of Geological Sciences (IUGS).

https://www.earthfuturesfestival.com/

September-October 2022: New York + Paris + Sydney + Online

IMWA 2022 RECONNECT

Call for Abstracts

Dear Mine Water Professional,

The local organizing committee and the International Mine Water Association call for abstracts to the IMWA 2022 Symposium in Christchurch New Zealand 6—10 November.

We have called our conference 'Reconnect' and plan to run a standard full attendance conference assuming relatively free movement by this time next year. And we can't wait to see you all in New Zealand!

We will accept your abstracts until the 25th of March 2022 with full papers by 15th of July.

The programmme committee for this event will consider papers that link the common theme of 'Mine Water' to many aspects of science and engineering within mine sites and down the hydrologic gradient from mine sites. This is broad territory and we have identified the following topics into which we will collect and collate your submissions but at this early stage we would welcome your perspectives and thoughts on other topics we might cover.

1 Mine Drainage Chemistry
2 Passive Treatment Innovation
3 Bio-geochemical Systems
4 Waste Rock Storage
5 Tailings Storage
6 Rehabilitation
7 Conventional Water Treatment
8 Aquatic Ecology Studies
9 Mine Closure
10 Mine Hydrogeology
11 Legacy Mine Impacts and Clean Up
12 Mine Catchment Assessments
13 Underground Mine Hydrogeology
14 Pit Lakes
15 Cultural Perspectives on Mine Water

We look for novelty and innovation when we assess your submissions and we value interpretations with regional or global significance. We value case studies that demonstrate new insights into topical or challenging aspects of mine water science and engineering. We welcome student, industry, service provider or academic contributions equally and look forward to putting together a programme with you that will reflect the rich expertise that focuses on mine water science and engineering globally.

We encourage you to consider paper preparation for IMWA 2022 as a stepping stone to publication in Mine Water and the Environment.

We welcome minerals sector service providers and technology suppliers to promote their business offerings through sponsorship or trade display options. We anticipate strong representation by professionals that work for mining companies and we will ensure that our congress will contribute certified professional training credits for chartered professionals.

Best wishes from the IMWA 2022 organizing committee as we farewell 2021 and welcome 2022

On behalf
Dr James Pope
Convener - IMWA 2022
CEO Verum Group

http://imwa2022.info/

The Geoscience Society of New Zealand gratefully accepts donations and bequests. These can be applied to specific funds or awards (see full list at http://gsnz.org.nz) or can go into the growing Legacy Fund, interest from which is used for general purposes. All donations and bequests will be acknowledged and a receipt sent.

DONATIONS

Donations enable those 'extra' things to be achieved. They are always gratefully received and can be sent upon membership renewals online at www.gsnz.org.nz. Donations of more than NZ$5 can qualify for a 33% tax credit from Inland Revenue (you will need to keep the receipt you get from us and fill in an IRD tax credit claim form at the end of the tax year). See the IRD website for more details.

BEQUESTS

The Society is committed to supporting the geosciences. We are especially keen to encourage young people to pursue a career in the earth sciences and enable them to take advantage of learning opportunities.
Many of our awards and prizes have been made possible by the generosity of family members or friends to commemorate a loved one. We are extremely grateful for their thoughtfulness to assist future generations.

A GIFT IN YOUR WILL

Bequests are a wonderful way to extend your giving and continue to be part of the Society far into the future. Once you have made provision for your loved ones, a gift in your will can be the perfect way to support students, geoeducation and research for generations to come.
All gifts, whether modest or significant, are highly valued. We strongly recommend you discuss your wishes with your loved ones and consult a legal adviser when making provision for a gift to the Society.

SUGGESTED WORDING FOR A BEQUEST:

I give and bequeath to the Geoscience Society of New Zealand (Incorporated)
the residue of my estate

OR _____% of my residuary estate

OR the sum of _____

as an untied gift

OR for the principal purpose of: _____

for which a receipt from the Secretary, Treasurer or Administrator of the Geoscience Society of New Zealand (Incorporated) shall be a full and sufficient discharge to my trustees.
If you are considering a gift in your will please get in touch. We would welcome the chance to speak with you about your gift plans and how you can truly make a difference to the geoscience community. Contact President@gsnz.org.nz in complete confidence.

The Geoscience Society of New Zealand is a registered charity (CC41125).

EDITOR: Janis Russell
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Editor@gsnz.org.nz

DEADLINES:	**MARCH ISSUE**	**FEBRUARY 1**
	JULY ISSUE	**JUNE 1**
	NOVEMBER ISSUE	**OCTOBER 1**

GSNZ members can choose to receive the Newsletter in electronic form or posted as a hard copy. Electronic form has the advantage of full colour and hyperlinking. Should you wish to change the method by which you receive your Newsletter please contact admin@gsnz.org.nz. All GSNZ members will be sent an electronic version.

This is your newsletter and the editor seeks correspondence, news items, interim or preliminary reports of current research, reviews of books and of recent geological publications and other topical articles. Reviews of New Zealand geology, geochemistry and geophysics published overseas are particularly welcome. This publication is not a peer reviewed academic journal.

The newsletter is formatted for A5. Email copy in any text format is acceptable. We suggest a limit of 1000 words or one to four pages in the current format for most contributions with minimal but key referencing. Depending on space, longer articles suitable as feature articles with illustrations are often published. Attributed images and graphics are encouraged. The editor seeks to provide a high quality publication for our readership. Accompanying photos must be sent as email attachments at the highest resolution possible. Please do not embed images in a Word document as they are often rendered unsuitable for the printing process. Annotation of images (numbering and descriptions on photos) is discouraged. Any images supplied to be considered for front cover use must adhere to the following minimum specifications: For A5 front cover (portrait suits best but landscape can be accommodated) 2551 x 1819 px. For A4 (full cover landscape wraparound) 3579 x 2551 px.

The editor will reserve judgement on whether an image is suitable for A4 wraparound. Unless indicated otherwise, views expressed are those of the authors and are not the official views of the editor or the Geoscience Society of New Zealand. Although encouraging informed debate, the Society moreover gives no guarantee concerning the accuracy, completeness or suitability of any information provided and takes no responsibility for any loss or damage that use of information in this publication may cause to anyone. Use of any information contained in any issues of this publication is the responsibility of the user. Note that names are normally of the format “John Smith” or “Jane Smith”. We prefer not to use titles such as Mr, Dr or Professor, nor to worry about whether we should use Miss, Mrs, or Ms.

Front cover : *Trip to Sawcut Gorge, South Marlborough, 2011* *Photo: Bruce Hayward*