



NELSON ROCK & MINERAL CLUB NEWSLETTER

September 2016

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GENERAL NEWS

Digital file storage for Club business is being stored on Diane's OneDrive. The directory is viewable but not editable for those granted sharing rights. If you want access, email Diane and she will email you the link .

Website. Dave Briggs is overseeing the construction of the club website, check it out at www.nelsonrmc.org, it is being continually updated

SUBS: If you have not yet paid your subs please contact Hub.

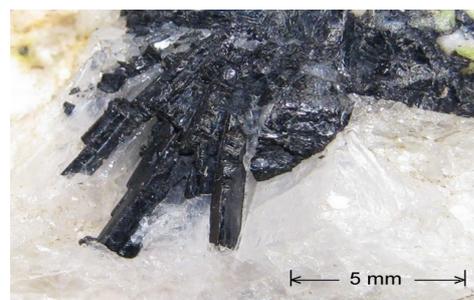
Canaan Downs Trip - Sunday 19th June by Mike Blowers

Participants - Peter Ingram, Mike Tocker, Dave Briggs, Diane Toole, Clyde Nicholson, Mike Blowers

We set off from the Motueka clock tower at 10 am and after a bit of back tracking on the Canaan road, we parked at the old magnetite skarn site, not far from the main road. Although the magnetite block seems to have been mined out, a bit of diligent searching around the site produced one or two bits of magnetic material and some bits of metamorphosed material. The magnetic material that I collected was a modest little piece that seemed to be a mass of tiny black crystalline pieces, with a few more or less cubic inclusions with a rusty looking surface. Back home I discovered the black crystallised material gave a grey/black streak which one would predict for magnetite, whilst the cubic material gave a yellow/orange streak, more indicative of haematite. Pressing onwards we noticed areas of “polje” terrain on both sides of the road, enclosed basins or depressions, where surface water and waterways disappear into swallow holes through to the porous limestone strata beneath - this was a new type of terrain for me, pointed out by Dave. We left the cars at the Canaan carpark and Clyde led us off along a walking track to the top of a ridge, where just off the track was a small outcrop with traces of copper mineralisation. We spent a half hour or so chipping away at several weathered surface blocks and debris nearby to glean a few samples with green to blue copper colouring and small chalcopyrite crystals. The rocks here seemed to be composed of a mixture of broken quartzite together with a weathered mix of iron oxides, red and yellow ochre together with the traces of copper mineralisation.

Leaving the copper occurrence behind, we dropped down to the Canaan valley road and headed for the DOC hut for our lunch. On the way we speculated on the numerous white quartzite boulders of varying sizes scattered all over the otherwise bare grassy pastures around us. How could they have ended up there? It seemed impossible that they were water-borne and they didn't appear to be associated with any likely reef or intrusion. Best guess is that they are remnants of reef or sheet deposits that were once extensive in or on higher layers of softer limestones or sediments, which have long since been dissolved or eroded, leaving the harder quartzite material behind.

After lunch we fossicked in the stream bed just to the north of the DOC hut. Finds here consisted of epidote and horn-blende, small quartz crystals, titanite, micas and garnets and an interesting pink metamorphic feldspar, which seems to occur in an (intrusive?) quartz close to its contact with granite. Our collecting was cut short by a darkening sky, heralding the approach of rain. We hurried back to the cars and managed to pack everything away before the rain hit, satisfied by an interesting day and promising ourselves that on our next trip there, we would overnight at the Doc hut to give ourselves more fossicking time.



- 1 Haematite inclusion on magnetite
- 2 Pink K-Feldspar in quartzite adjacent to granite contact
3. Small tourmaline in quartzite
4. Malachite with iron oxides and quartz
5. Small vug with stained quartz crystals

(you can zoom in on these photos for a better look)

At the June Monthly meeting, Peter Ingram presented us with an interesting look at the life cycle of the Kauri tree, about Kauri Gum and its older brother amber. There were so many interesting tidbits of information that it is worth reproducing his talk with only minor omissions.

Kauri Gum by Peter Ingram.

It is difficult to talk about Kauri Gum without talking about the Kauri Tree and the circumstances that lead to the production of Kauri Gum and that is where I propose to begin.

The Kauri Tree, *Agathisaustralis*, grows naturally only in NZ and only north of a line from Katikati to Raglan. However when transplanted it grows and thrives everywhere in NZ; there is a good specimen growing in the Dunedin Botanic Gardens. In the past it probably did grow further south naturally, leaf fossils found in lignite from Gore are very similar to modern Kauri leaves.

There are 21 different members of the genus *Agathis*, confined to NZ, Australia, Indonesia and Southern Malaysia. It was much more widespread in former times, fossil remains of *A.zamunerae* dating back to the early Eocene have been found in Patagonia. There is a Queensland Kauri Pine, *A.robusta*, growing in Parnell, Auckland, at the bottom of the main street where it forks.

The genus *Agathis* is a member of the plant family *Auricaceae* of which there are 41 species. *Auricaceae* fossils have been dated back to the Jurassic Period.

Also within that family is the genus *Auricularia* which is Monkey Puzzle Tree and the Bunya Pine which are widely planted as decorative trees. There is a good example of the Bunya Pine growing in front of St Andrews Church in Motueka. There are probably others around here and in Nelson. However the closest relation to the genus *auricaceae* is the Wollemi Pine.

The Kauri tree is a NZ icon, if we ever decided to put a tree on our national flag, admittedly unlikely, it would be either a kauri tree or a totara. However the tree does have a couple of problems. One is that it doesn't have a very effective control over the production of kauri gum. When the tree is injured it produces resin to seal the leak.

Many trees do this and I will come back to this later. However sometimes the kauri seems to lose control of resin production and produces very large quantities of resin or gum. While this is inefficient it doesn't seem to hurt the tree.

But there is another problem which eventually kills the tree. When the leaves of the kauri fall to the ground and decay they become extremely acidic and so in turn does the soil under the tree, a pH as low as 4 is not unknown. That is 1000 times more

acidic than neutral water. What this does is to dissolve and mobilize the minerals in the soil, the minerals that the tree needs to thrive.

These soak down in the soil for about 50-100 mm and then they set solid, very solid. They form a hard, impenetrable layer, we would call it a hard pan, but soil scientists call it a podsol. When I was digging holes, fencing for instance, I used to call it a bloody nuisance. Before I learnt how to deal with it, it could take as long as 4hrs to dig a single post hole.

Often erosion removes the topsoil, leaving the hard pan very close to the surface. It is called gum land and is easily recognizable because what plants do grow on it, mainly gorse and manuka, are small and stunted. There is often kauri gum lying around on the surface.

But it does eventually kill the kauri tree. And it can take up to several thousand years for the ground to recover. Then another kauri forest grows. And so it goes on. The cycle repeating itself.

The wood from the kauri tree is straight grained, free of knots and durable. Old piles on Paihia Wharf have spent decades exposed to a very harsh environment and were still absolutely sound. Kauri is easy and satisfying to work, good for small artifacts and large structures. There was a saying that in the early days they cut down a kauri tree and built a village from it. An ideal tree for a young colony and they were cut down in their thousands, maybe millions.

But as a wood to work with I find it dead boring. Perfect grain, a bit inclined to split but generally very reliable and predictable. Takes a good finish and always looks good. As I said, boring.

But there is another source of kauri wood - Swamp kauri. Buried in wet, anaerobic conditions kauri wood lasts for ever. Come to that, even lying on the surface in damp conditions, it's good for several hundred years. Swamp kauri is impregnated with kauri gum, indeed, you can see the gum running through its texture. It is impervious to everything except fire. Not only that but the grain pattern is complex and it is a dark rich brown colour.

Lovely stuff. That is why the people up at Awanui can sell it at \$100,000 for a good sized log. I was visiting there about 20 years ago when they unloaded a one of these logs, somehow they just dropped it off the truck. The jolt when it hit the ground was worse than any earthquake I have experienced since we came down here.

But the semi fossilized kauri wood is not easy to work. The kauri gum in it clogs the tools very quickly. If you try to use power tools it clogs up even faster. I had to use lapidary techniques, to keep it cool I had to keep it wet, which with a wood lathe could mean water flying everywhere. However polishing it was easy. I just used a bit of cloth and let it warm up a bit with the lathe turning slowly.

Okay. Enough about the tree and its wood. I am meant to be talking about Kauri

Gum.

How do I come to have so much? I never particularly went looking for it and I certainly never went digging for kauri gum. Basically it came to me. Let me explain

We arrived in NZ in 1975 and went straight to Kaikohe in Northland. Two years later we bought a small 50 acre farm just south of Kaikohe. It was, is, a long narrow property with a road on one side and the railway on the other. Beyond the end of our land was a swamp which went on for another three kilometres, as far as the watershed. Surrounding the farm and the swamp were bare gumland hills. And being gum land they had a lot of kauri gum in them. So did the swamp. And draining the swamp was a small stream. So to find kauri gum all I had to do was to amble up the creek. And this I did, for 23 years.

Displayed is one of the bigger bits I found, as you can see it is not particularly attractive when first picked up. The weathered layer is easily scraped off. Sometimes that is all there is.

Usually though the weathering is only around 5mm thick and you can begin to see the resin inside. The colour varies from a very pale yellow to deep brown. And you can usually see quite quickly how translucent it is. Similarly any fractures quickly become obvious. From my experience there are no short cuts that can be taken in polishing it. It must be kept cold because as soon as it gets warm it starts to melt and flow. Do it slowly by hand and keep it wet. For rounded pieces I do it by hand with wet emery paper. To polish a flat surface I use a sheet of glass and carborundum powder. A final touch up with metal polish and it usually looks good.

However it does have a huge advantage over polishing agates- a hardness of only 1-2. Polishing is much quicker and it looks good.

And it is useful, well slightly useful. The Maori made a chewing gum with it.

“Keep the gum in boiling water until it is plastic, then mix it with thepuha juice till it is soft and plastic.”

They also used it for illumination and as a fire starter. The European settlers had other ideas. The first ship load of kauri gum left Auckland in 1850 and between then and 1950, 450 000 tons of Kauri Gum was exported through Auckland. Until 1914 it was NZ largest “mineral” export. And at some stage in the late 1800’s it was written that “the value of the gum export trade was half that of the gold exported from the three major gold fields”.

The good quality gum was used for making varnish and the poorer quality for linoleum.

However the trade in Kauri Gum ended during the 1950’s when artificial alternatives gave better results.

I have found one use for kauri gum. For the last 30 years I have used it to light the

fire. From polishing the gum I have a lot of gum dust. Put a pinch of powdered gum on a flat surface, touch it with a match and pile the kindling on. If I do it properly it never fails.

And you can still buy NZ kauri gum overseas, Fischer Chemicals offer it for sale dissolved in butanol. "1 quart, 0.95 litres, for \$815.00" A rival chemical company offers the same product for \$615 per quart.

During this period there was something of a "gold rush" to collect the gum. At one stage it was reckoned that up 5000 people were working the gum lands. Once all the gum fields had been claimed and the easy stuff had been found the gum diggers looked at the living trees. They began bleeding them, deliberately wounding the tree and then collecting the fresh gum. A lot of trees died. They also began to search the branches and forks of the living trees and this was, briefly, quite productive.

There is a story that a few years back some forestry workers found a previously unknown kauri tree and lying beneath it was a pile of rotting rope. Upon searching up into the tree they spotted a human skeleton jammed into the fork of a branch. The gum collector had, apparently, dropped his rope and stayed up there till he died. Hmmm - I think I would have handled the situation differently.

I have often seen pictures of insects buried in kauri gum, I expect you have too. I have never found one. Preparing for this talk I examined every piece of polished gum I had under the microscope. Nothing. I did find what I think is a pollen grain. A shape I saw quite frequently was probably the half formed seed of the kauri tree. The kauri seed is the same shape as this but significantly larger. How come we don't have flies in our kauri gum when Baltic Amber seems to have an insect in every other piece? Well that is when I found out that the amber for sale with a fly in it comes from a factory in Taiwan. While the fly may be genuine the amber usually isn't.

I tried to make an insect in amber, I started with a plastic cockroach from the joke shop but it was exactly the same colour as the gum solution, so I used a key instead!

So what is the relationship between kauri gum and amber? They are both formed from the hydrophobic resin of trees. Not the sap. Amber is older, millions of years older while kauri gum belongs to the Holocene period.

Also there are closely related are other substances you will have heard of, such as copal, myrrh, frankincense, dammar and gum Arabic. They are all derived from the resin of trees. Dammar gum come from another member of the Agathis genus, *A. Dammara*.

And finally, to finish off with, something I had never heard of until I started preparing this talk— there is a blue amber, from the Dominican Republic.

Peter Ingram

Here are a few pictures of Peter's collection and the Baltic amber colours shown by the necklace below.



Kauri Logging.....back in the day



There are still a few of these magnificent trees left.



Field Trip – a Tour of Members collections – Sunday 24th July by Mike Blowers

It was a cold winter's morning as members gathered outside the Motueka Museum in preparation to view the Ed Sixtus collection of rocks and minerals held by the museum. The club had arranged with the new curator of the museum to lay out the collection which was kept out of sight in storage and Peter Ingram was already there helping to lay them out. The specimens were all in individual plastic cliplock bags, individually numbered and listed in a catalog sheet, but a lot of the samples had no descriptive labels or locality given. Amongst the 100 or so samples, there were a number of interesting fossils, a variety of rocks and some attractive minerals, mainly we felt from the Canaan area and members were soon opening bags and examining the contents. One sample that puzzled us at first was a pale lump labeled "Fossil Tree" with what looked like a seam of gravel conglomerate in the centre. We eventually decided it was part of a root or stump with a captive residue of the soil originally surrounding the tree. Peter has agreed to help the curator, Jen Calder, to identify and permanently label the samples for the future. Our thanks to Jen for letting us view the samples, she is keen to learn more about the collection and its contents.



Part of Peters display

Next we moved on to view Peter Ingram's collection, which he had taken out of storage and laid out in his garage for us to examine. Here we could see samples Peter had collected in his travels since the early sixties. Stunning crystals and rocks, many quite rarely found nowadays, as far apart as Scotland, the Oman, Australia, South Africa, Canada and New Zealand. My favourite pieces of his were exquisite crystals of brewsterite and harmatome, collected at historic Strontian, Scotland, collected in the sixties before mineral collectors mopped up all the best materials, leaving poor pickings for me when I visited a few years ago. We took our lunch in the warmth of Peter's dining room and then set off to see the next collection at Diane Tool's home.

Diane has been smart enough to snap up several sets of card index drawers, which line one side of her garage and make very convenient storage for her range of samples. In my youth I was transfixed by just such drawers in our traditionally organised museum, which held in its drawers samples of gold, copper, nickel, iron and other minerals, allowing me to peek in and explore the variety of mineral form. I am very jealous of Diane's drawers! Another great range of minerals, many of which I had not viewed before. Largely specimens of New Zealand minerals, but some great overseas samples - too many to describe individually, but the pictures might give you some idea of the range. We loved her apophyllite from Poona, India.



Part of Diances collection

Our final visit was to Clyde Nicholson's Museum,



It is wonderfully housed in a garage set out as his personal museum to his hunting and mineral collecting. Hunting trophies adorn the higher levels of the walls, whilst all around the lower level are glass fronted cabinets and drawers full of specimens and in the central area two large specimen cabinets and a sitting area to enable a contemplative look at the surrounding displays. Club members happily Oo'd and Ahh'd as they wandered about opening drawers and studying the specimens. Again too many to describe, so just a few photos will have to suffice. Hopefully we will be able to visit again sometime soon, with more time to ponder and examine this comprehensive collection.

Our thanks to Clyde, Diane, Peter and Jen for a very satisfactory wintery Sunday

As ever, it is not just about Rocks and Minerals, here is a photo of Lindseys much admired beer mat collection displayed next to Dianas rocks.



Five and a half club members (Diane was only there for the morning) took part in a lively and interesting trip across the Waimea Basin (aka the Moutere Depression) on Sunday 21st August, led by Ian Ladds. A change from the usual fossicking expedition, this one was aimed at trying to understand the geological history of the area, and to sort out some of its puzzles. Much time was therefore spent in debating and arguing about the evidence and – whenever anyone proposed an answer – finding lots more questions to keep the arguments going.

The first stop was at Max's Bush, on the Wairoa River. Here, on the east side of the basin, the Waimea Fault forms a boundary between the Triassic rocks of the Richmond Hills and the Tertiary sediments of the Basin. The fault is a reverse fault, downthrown to the west. The fault itself is not exposed, though it has been proved by excavations in the past and its position can be pinned down to within a dozen metres or so from the changes in rock type seen in the river bank.

The Triassic rocks are not clearly visible in situ (though they can be seen about 100 metre upstream), but large blocks can be found on the river bed and in the banks, none of which have clearly moved very far from their source. Several contain layers of *Manticulaproblematica* – one of the type species for the Otamitan stage. West of the fault there is a sequence of well-bedded sands, muds and carbonaceous layers, which contain abundant fossils – mainly gastropods and bivalves. These are clearly much younger, because they are unconsolidated, but dip steeply to the east, more-or-less parallel to the reported dip and strike of the fault. This suggests that the beds were folded or tilted during fault formation. Everyone seems to agree that these deposits are Eocene, but they have been previously mapped as either Jenkins Formation or Brunner Coal Measures – a disagreement that gave the group material for lengthy debate. In either case, the evidence shows that the main faulting and folding in this area must have occurred some time after the mid-Eocene (ca. 25 million years ago).

The second stop was on the ridge south of Wakefield, at the end of Totara View Road, where we tried to get to grips with the bigger picture. From here, there is a good view into the Richmond Hills, showing the parallel waves of the hills, rising towards Mount Starveall and Rintoul. It doesn't take much imagination to see these as the result of folding and uplift caused by the huge compressional forces along the Waimea fault zone, as the Pacific Plate pushes its way beneath the Australian Plate. Again, the group found plenty to talk about – especially, how all this activity related to the Moutere Gravels which have clearly escaped the upheaval. In the process, we learned that seismic reflection studies have shown that the gravels filling the Moutere Depression are probably not one suite of deposits, but several different sets of gravels, formed at different times, and in different sub-basins and faulted depressions (grabens).

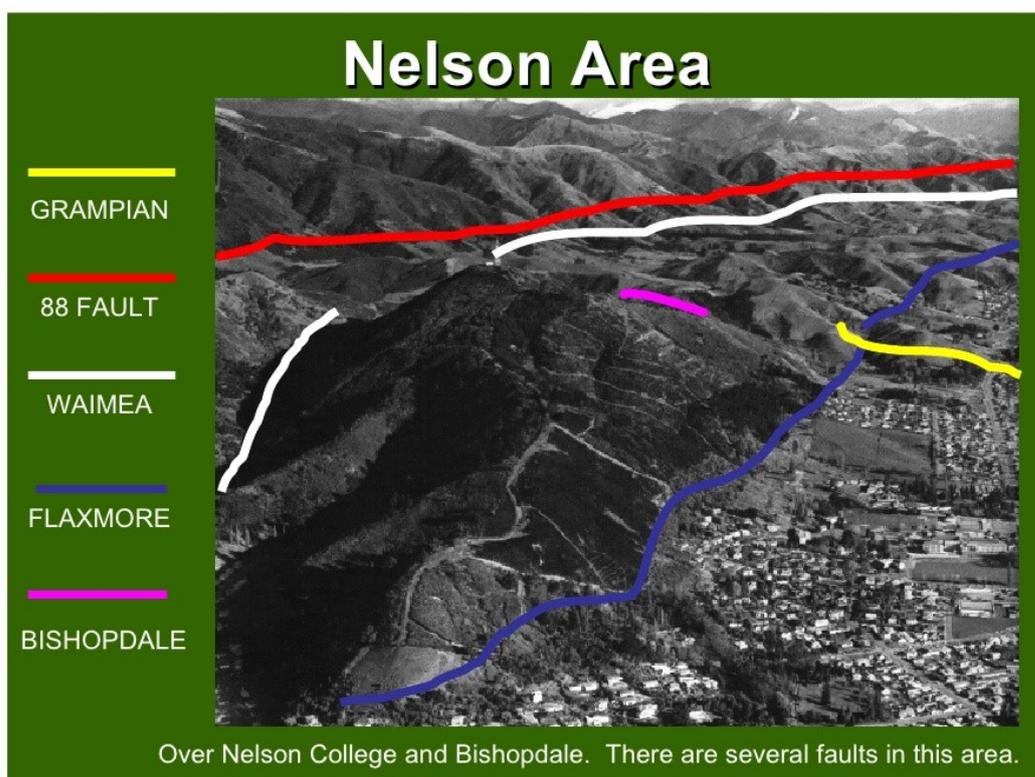
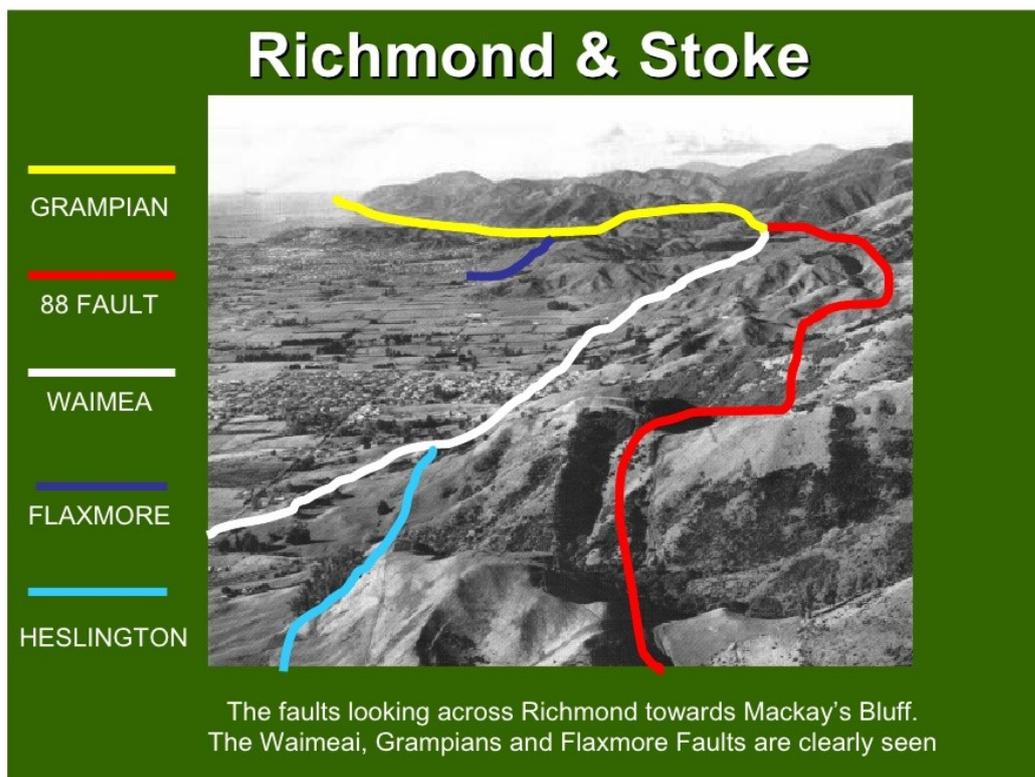
Our third stop was at Hiwipango Corner, to wave goodbye to the Waimea Fault as it swung eastwards towards Lake Rotoiti, where it abuts against the Wairau Fault. We then drove to the top of Spooner's Saddle, where we examined the Moutere Gravels from close up. Discussion focused on how the gravels were formed, and what the bedding features tell us about conditions at the time. Pollen evidence and the lack of any periglacial features in the gravels argue that they were not a result of glacial outwash, and the generally accepted age is late Pliocene-early Pleistocene (ca. 2.3 – 1.65 million years ago), before the main period of Quaternary glaciation. The consensus of the group was that they were laid down in a braided river environment, on a wide gravel plain, fed by erosion from the uplifting area of Torlesse rocks to the south. Cross-bedding, channel cuts and the imbrication of the gravels (i.e. the way the pebbles stack up against each other) show the general direction of the currents (here, towards the north), and the alternating bedding suggests that discharge varied considerably as is typical in such environments. The larger pebbles suggest a flow velocity of at least 4 metres/second during flood episodes.

After a lengthy and relaxed lunch at Kohatu, in the company of a large posse of motorbike riders, we crossed the Moutere Depression to Tadmor, reminiscing on the way about life in the area in decades gone by. At Tadmor, we leaned over the river bridge to gaze at the Lower Blue Bottom series (Oligocene) which is exposed in the bank and beds, but from that distance could not see any fossils – or any of the gold for which the deposits are locally known. We then followed the Sherry River upstream, stopping to examine an exposure of carbonaceous sands and muds not unlike the beds we'd seen at our first stop. These, too, dipped steeply eastwards and seem to have been dragged down by faulting or folding associated with formation of the Moutere Depression. Again, they have been mapped by GNS as Brunner Coal Measures. They were unfossiliferous except for an abundance of channels, which we deduced to be wormholes (though may be roots).

Our final stop was at a somewhat dank and wet exposure in an old gravel pit, in what are mapped as Glenhope Gravels. These are one of the Pliocene gravel suites that are believed to predate the Moutere Gravels and may underlie them in the Moutere Depression. They were distinctive here in being composed of a very different mix of rock types,

with granite and quartz from the Cretaceous batholith, a few hundred metres to the west, as well as mudstone, sandstones and limestone. High sections of what are presumably the same formation were visible across the Sherry River as we then turned north again, and headed home.

The trip made for a fascinating day, with an abundance of good discussion, leavened with plenty of personal reminiscences and humour. The weather managed to stay kind just long enough to see us through and we all enjoyed ourselves and learned from the experience. So our thanks to Ian for organising it all – and when the trip is next repeated, more Club members might like to consider joining in the fun.



UPCOMING EVENTS

If you have done anything of interest relating to Rocks and Minerals, why not submit a short article for possible inclusion in the next newsletter, as the other members would love to hear about it. This newsletter is great forum for sharing ideas and activities.

Large tumbler for hire: Takes two drums. Operates off main. Size: 1m x 300depth x 900high.including table. Grit available. Cost: \$10/month plus the cost of grit. Contact Kevin.

Future program (possible, but definitely not finalised– Check your emails for updates)

September 15 Club Night	Richmond Library 7:30pm	Lis Martins, South Island Geology, a photographic journey
September 18 Field Trip	Kevin and Marys place	Club collection cataloguing
October 20 Club night	Richmond Library 7:30pm	Dave Briggs, Geological mapping
October 22 to 24 Field trip	Golden bay (house booked, \$15 per person per night)	Diane is trip leader. Programme to be advised.
November 17 Club Night AGM	Richmond Library 7:30pm	Mike Johnson, topic TBA
November 20 Field trip	Champion Mine	Tez Hardwick is trip leader.
December 10 BBQ	Kina Domain	
28 Sept to 2 Oct	Blenheim	National Show