October 2013

COMMITTEE MEMBERS

PRESIDENT:	Committee members take turns on a two monthly basis		
Secretary	Diane Toole	5402240	wanderweg@xtra.co.nz
Treasurer	Hub op den Buysch	5432337	hub.opdenbuysch@xtra.co.nz
Newsletter	Tez Hardwick	5447814	thardwick@slingshot.co.nz
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	Mike Blowers	5486299	m.h.blowers@gmail.com
	Ian Ladds	5471466	thefossilhunter@gmail.co.nz

NON-COMMITTEE ROLES

Club MC	Alan Mathews
Club Library	Marion Mathews
Sales table	Clyde Nicholson

Club Mail Address 28 Selbourne Avenue, Richmond, NELSON

Club Email address wanderweg@xtra.co.nz

GENERAL NEWS

Please note that payments can be paid straight into our SBS bank account. If you wish to make a payment direct to our bank account please contact the treasurer hub.opdenbuysch@xtra.co.nz

If you wish to have the newsletters of other rock/mineral/fossil/geology/lapidiary clubs around New Zealand, please let Diane Toole know by emailing wanderweg@xtra.co.nz

Since the last AGM the club has received two substantial donations of rocks and minerals for the sales table.

The first donation was received from Don and Margaret Kivell (members)

The second donation was received from Toby and Kathleen Page (past members)

On behalf of the club we would like to thank them for their generosity. The rocks and minerals donated are welcome additions to the sales table and will help raise funds for the club.

Clyde Nicholson. Sales Table Convenor

August 2013 meeting:

Sam's Creek by Mark McCulloch
August 15th 2013

Mark works for Golder, who holds the licence to mine Sam's Creek and who has spent some years now looking into the viability of mining this area.

Golder is owned by MOD Resources, an Australian company, who has put up the finances for Golder to look into mining Sam's Creek. Sam's Creek leads off to the west of the Cobb Valley in the midst of Kahurangi National Park, on an ancient sea washed peneplain. The only ways in are on foot or by helicopter; both these methods are used by Golder employees.

There is a group of people doing the work; several in the field, but the bulk of Mark's work is in the office with computers, analysing data and creating computer models showing the best concentrations of gold.

Sam's Creek is situated within the Takaka Terrane, a sedimentary belt formed in the lower Palaeozoic Wangapeka Sequence. The sediments show multiple folding. Sam's Creek is a Triassic intrusion – a peralkaline granite dyke that consists of interbedded quartzofeldpathic sandstones, quartzite and shales. Sam's Creek itself cuts around the dyke. The dyke moves along the strike for 7kms, possibly all the way to Mt Snowden in the west. It's vertical extent is 1 km. The quartz is rich and its massive nature makes it tend to outcrop extensively. The granite contains phenocrysts of alkali feldspar, quartz, arfvedsonite and riebeckite set in a groundmass of quartz abbite and alkali feldspar. The mineralisation is always sulphides. The gold deposit is igneous related. There are three stages of alteration – biotite, then quartz pyrite veins, then sulphides with pervasive silification. The sulphide veins are comprised of arsensopyrite, pyrite, galena, sphalerite, gold, chalcopyrite, pyrrhotite, rutile and graphite. There are lamprophyre hornfels on the contact.

There is confusion in the dipping with mineralisation material dipping in a different direction to other material. The drilling of cores happens at a low angle – almost vertical to cross dyke.

There is a magnetic anomaly in the region – this has been found in flyovers.
There are several sites that are being explored - Barrons Flat, Anvil, Main Zone, Bobby Dazzler, Carapace, Doyles (600m), Western Outcrop and Riordans.

Rio Tinto was one of the first to explore Sam's Creek. In 1974 CRAE geologists undertook a range of exploration types including geological mapping, soil samples, grassroots exploration, rock chip and channel sampling, geophysical surveys and diamond drilling. CRAE completed 42 diamond drill holes using a total of 5850 drills. Thirty of the holes were into the Main Zone and Bobby Dazzler and twelve were out towards Riordans.

Oceanagold Corporation acquired the Sam's Creek project in 1995-6. They undertook more testing and studies and began putting all the data so far collected into computers and a database was built.

At this point it became a joint venture between Oceanagold and MOD. MOD started with a 40% ownership which has already increased to 60%; as further milestones are reached they will own 80%.

There are drilling rigs for the drilling cores – we saw some photos of these.
Barrons Flat is a more recent acquisition; after obtaining a permit work was done which was added to computer models, using rock samples, soil samples (dug with a spade), arsenic samples and channel sampling using a saw. Positioning of drilling was decided upon from the computer models.

They began with one drilling rig; this was ramped up to three. These were all heli-supported into position. The rigs run 24 hours a day – with about 12 metres drilled per shift. It costs $1000.00 per metre to drill. The diamond drill heads sometimes only last for two metres – but 30 – 60 metres is more usual. The drilling is pushed down to intercept the mineralisation at a higher angle.

The pads for drilling were built in consultation with DOC. They are extremely well built from an engineering perspective so there's no chance of failure.

Drill size are about 100 mm in diameter. A lot of water is poured down and recycled so there's no spillage and wastage. On the West Coast it gets dumped back in the bush.

At Carapace and Hercules a man portable rig was used – with water drums to hold it down as it would lift easily due to its lightness.

The point of Mark's computer models are to map out the density of gold in the area. We saw a diagram at this point with various colours – each colour signifying a different density. We also saw a diagram of aeromagnetic imaging which showed up power lines and outcrops.

Will future mining in the area be open cast or underground? The answer to this is not yet known and there will be consultation – hui – with local iwi.

There is silver in the area too.

Only the Main Zone and Carapace have been properly and systematically explored – via 95 diamond drill holes. There has only been very limited drilling outside the Main Zone. Now is a very good time to explore as gold prices are fairly low – the exploration might mean mining is ready to go ahead when the price of gold goes back up.

Question time raised some interesting points:

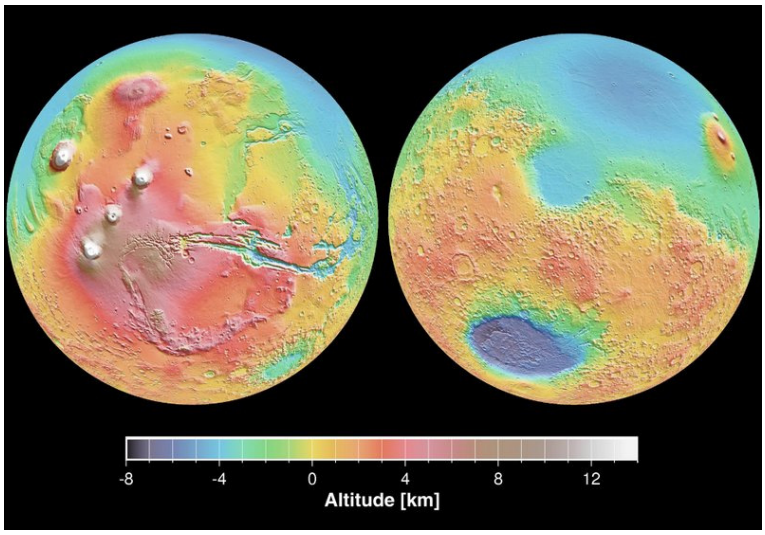
There is a desire to drill the anomaly and see what's there – the anomaly is a tease.
The way the gold occurs in Sam's Creek is similar to Yukon and somewhere in Russia – that's why there's so much interest as lots of gold has been found in Yukon. Our magnetic anomaly fits the bigger picture of these other areas of exploration.
There are serpentines in the ultramafics, but no platinum.
Macraes provides a quarter of Otago's income.
Only 5% of exploration projects actually end up in mining.
Waihi is where all gold samples go – all samples that are tested in New Zealand at least. Other gold samples go to Australia, and rock samples go to Russia.
The drill cores are split along the centre – one is tested straight away and one is kept for future testing.
Gold is all in the dyke. Mineralisation came up through the dyke; it didn't like the sandstone so came up through to the limestone instead. There could well be skarns etc down below.

For further information and some diagrams, see: Petrology of the Sams Creek peralkaline granite dike, Takaka, New Zealand. A. J. Tulloch DSIR Geology &Geophysics , P.O. Box 30 368, Lower Hutt, New Zealand. Published online: 23 Mar 2010.

This write up was written by Mary Davis Bourne helped by Ian Ladds

Gold Mine, Reefton

September 2013 meeting:



The Geology of Mars by Cliff Bacon of the Motueka U3A group.

On 12th September, Cliff gave us a most interesting talk on the geology of Mars. Anyone expecting this to be too high brow were mistaken as it was quite down to earth !

The physiography of Mars - Western and Eastern Hemispheres

Almost everything on Mars is not only big but gigantic. Impact shaped about half the surface; the largest crater is about twice the size of the largest crater on the Moon. Other areas have been formed by volcanic activity, with some volcanic shields reaching more than 20 kilometres above the surrounding surface. The largest volcano on Mars has ten times more volume than the largest volcano on Earth. Mars even has a tenuous atmosphere and bright polar caps. Photographs show the details of advancing and retreating frost shrouds. Wind action is a major geologic process, and moving sand and dust altered many features on the planet. To the surprise of all, ancient channels are found on the surface; these appear to have been formed by running water. Tectonic movements fractured parts of the planet and produced a great canyon system which has been enlarged by erosion. It is apparent that the geologic agents operating on Mars not only differed from place to place, but also varied throughout the planet's long history.

The surface of Mars can be divided into two major regions:

The southern hemisphere is an old, densely cratered highland with a crater distribution more like Mercury's intercrater plains than like the lunar highlands. This hemisphere is furrowed by small, dendritic valley systems.

The northern hemisphere is dominated by younger, relatively smooth plains, apparently composed of sedimentary deposits and vast lava flows. A well-defined escarpment separates the two provinces, except where it is buried by younger lavas of the Tharsis region. Several distinctive terrain types have been formed by erosion and slope retreat along the escarpment. Major flood channels cross the escarpment and empty into the northern lowlands.

The largest of the volcanoes in the Tharsis Montes region, as well as all known volcanoes in the solar system, is Olympus Mons. Olympus Mons is a shield volcano 624 km (374 mi) in diameter (approximately the same size as the state of Arizona), 25 km (16 mi) high, and is rimmed by a 6 km (4 mi) high scarp. A caldera 80 km (50 mi) wide is located at the summit of Olympus Mons. To compare, the largest volcano on Earth is Mauna Loa. Mauna Loa is a shield volcano 10 km (6.3 mi) high and 120 km (75 mi) across. The volume of Olympus Mons is about 100 times larger than that of Mauna Loa. In fact, the entire chain of Hawaiian islands (from Kauai to Hawaii) would fit inside Olympus Mons!

A reason why the volcanoes on Mars are so massive is because the crust on Mars doesn't move the way it does on Earth. On Earth, the hot spots remain stationary but crustal plates are moving above them. The Hawaiian islands result from the northwesterly movement of the Pacific plate over a stationary hotspot producing lava. As the plate moves over the hotspot, new volcanoes are formed and the existing ones become extinct. This distributes the total volume of lava among many volcanoes rather than one large volcano. On Mars, the crust remains stationary and the lava piles up in one, very large volcano.

Three generations of Mars rovers

There have been three generations of NASA's Mars rovers, all of which were designed, built, and managed at the Jet Propulsion Laboratory (JPL) in southern California. The microwave oven-sized Sojourner, from the 1997 Pathfinder mission, appears in the lower left foreground. The Mars Exploration Rover model – Spirit and Opportunity – about the size of a golf cart is up and to the left moving counterclockwise. The Mars Science Laboratory / Curiosity, which landed in Gale Crater in August 2012, and which celebrated its first birthday this August, is hard to miss on the right. It's the largest, most heavily equipped Mars rover to date, and is about the size of a VW bug.

Cliff then gave us a brief run of each of the explorer's activities and then concentrated mainly on Opportunity and Curiosity with their ongoing scientific activities. The images and results continued to be returned to earth on a regular basis. Since time and space do not permit writing up the whole talk you can be encouraged to look further at the web or contact Cliff for more information.

Write up by Diane Toole.

Childrens Fossicking Day

Continuing the club's commitment to holding workshops to educate interested children about rocks and minerals, Ian Ladds organised our latest contribution on October 1st 2013.

This comprised of an hour or so in the Richmond Library room introducing the children to fossicking for fossils and safety requirements.

As stipulated all children were accompanied by a legal guardian, and all trouped off to 88 valley hopeful of finding fossils.

Luckily for the children, some of the best fossickers from the club were on hand to show them the ropes. These were Ian, Paul, Greta, Mike Blowers and Mary.

Everyone managed to find decent fossils and the whole day was a great success.

A big thank you to the members who made this happen.

Lee Valley field trip - 17th August

An afternoon trip to the Lee Valley serpentine quarry .

17 people enjoyed a short winter outing with good finds of Hydromagnesite, Aragonite, and other minerals .

A very enjoyable time was had by all who attended .

Ian Ladds—Trip Leader

Trip to Golden Bay with the Otago Rock and Mineral Club, at Easter 2013

This was an additional field trip (open to all club members) at the request of the Otago Rock and Mineral Club who were visiting the area.

Chris Fraser led the trip, assisted by Clyde Nicholson.

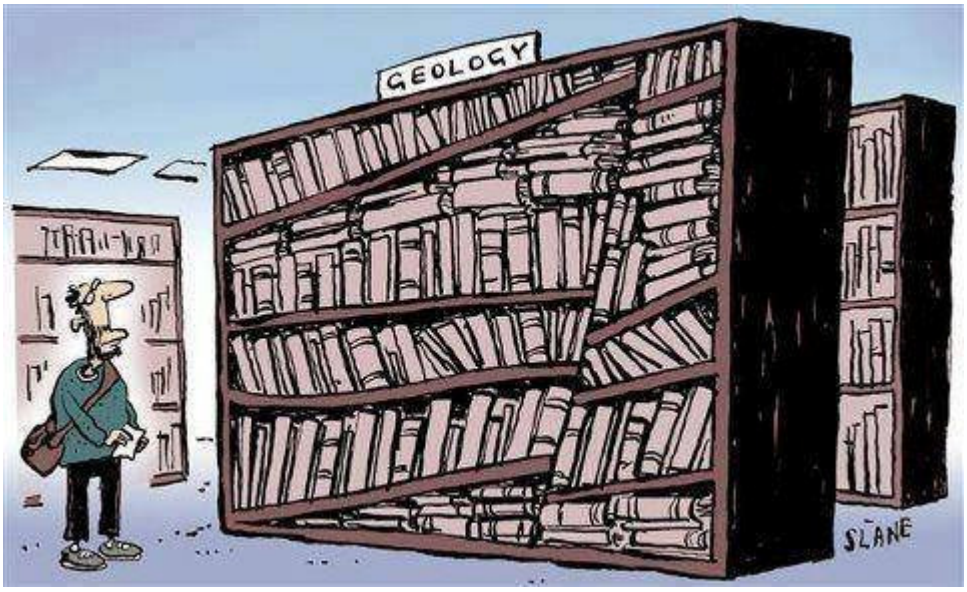
They were joined by nine people at Kohatu, then onward to a number of mineral collecting areas mainly in Golden Bay. Places visited were Thompson Hill, Rameka Creek, Johnsons United Mine, Copperstain Creek, Solly's limestone quarry and Canaan.

Minerals collected were fluorite, barite, calcite, epidote, andradite, thulite, sphalerite, tourmaline, malachite, pyrite, limonite and quartz.

These inter club excursions are a great way of meeting others with similar interests and sharing knowledge.

Thank you Chris and Clyde for making this happen..

Library: There are a great selection of books to be had from the club Library. Please see Marion at the meeting for further details.



The next club night is on October 17, Richmond Library 7:30pm

Mike Blowers has been travelling the world for the last few months. One of the countries that he visited was Scotland, in many respects the birthplace of geology. Whist he was there he gathered a lot of information and has offered to share this knowledge with us:

Scotland Rocks

This is a random journey through the geology of Scotland, with some of the highlights that have excited me over my last three or four visits. To set the scene, we will follow the blocks of crust that make up Scotland in their journey from the south pole to their present position. We will consider the mountain building and erosion that has occurred and draw parallels with what has happened in our own country. We will explore some of the techniques used to understand the degree and timing of multiple metamorphic events that have occurred in Scotland. We will search for minerals associated with mines worked in the 18^{th,} ,19th and 20th centuries and see how the geology has shaped the development of both the countryside and the cities themselves. We will also encounter in passing, some of the movers and shakers of Scottish Geology.

GARNETS

To complement this talk we would ask members to bring samples of garnets for the mineral display table

Garnets are a group of silicate minerals that have been used since the Bronze Age as gemstones and abrasives.

Garnets possess similar physical properties and crystal forms but different chemical compositions. The different species are pyrope, almandine, spessartine, grossular (varieties of which are hessonite or cinnamon-stone and tsavorite), uvarovite and andradite. The garnets make up two solid solution series: pyrope-almandine-spessarite and uvarovite-grossular-andradite.

This is what gemstone quality Garnets can look like when cut:

Trip Report, 29th September 2013

Breaker Bay and Honeymoon Bay (Kaiteriteri) to visit orbicular granite sites by Diane Toole

The objective of the field trip was to visit a site with orbicular granite, in place. In the past we have seen large and beautiful specimens at Karamea, Murchison and Whangapeka, but never from the source. After some research and reading, I did some reccy trips to collect and photograph. Amazingly, I found I had been walking over it many times on the Abel Tasman Track and not noticing it. I now have the location photographed so if you're out walking on the track between Coquille Bay and Apple Tree Bay, keep your eyes open. It's actually quite easy to spot.

A really low tide is a must to visit the coastal sites as a high low tide does not allow easy access to some of the sites along the coast from Kaiteriteri north to Apple Tree Bay on the Abel Tasman Track. One of the more accessible sites is at Coquille Bay about one hours walk in but for this trip we decided to stay at the Kaiteriteri site where the granites are close and accessible.

Seven of us, me, Tom, Paul, Les, Tim, Tez and Sheila met at Motueka at 10.00 and onto Kaiteriteri for the 11.30 low tide. There are three sites for orbiculite in this area, at Kaka Point, Breaker Bay and Honeymoon Bay. At Breaker Bay we found some very good examples of orbiculite, some with large orbs and many with small orbs. With a heavy hammer and a bit of care you can break the orbs off the main rock. Inside is usually a feldspar centre surrounded by radiating crystals towards the outer of the orb as well as concentric circles around the centre usually of a darker mineral like mica or hornblende. I have cut and polished faces of the orbs in the past and they make very fine specimens. To that end, we collected several orbs for cutting and polishing so that others in the club can have some for their collections. Collecting a number of specimens from the sites is difficult because the granites are extremely hard and the rocks are huge.

We clambered over the point to Honeymoon Bay where the orbiculite is noticeable by the lumpy look but the specimens are not good. At Kaka Point the tide was not low enough to explore. Perhaps another time.

Now, a little background on the orbiculite. It is an uncommon plutonic rock type which is granitic in composition. These rocks have a unique appearance due to *orbicules* – concentrically layered, spheroidal structures formed through nucleation around a grain in a cooling magma chamber. There are eleven occurrences of orbiculite in the (mostly) coastal exposures of the Separation Point Granite in the Motueka region. Alkali-feldspar phenocrysts, biotite clusters, and orbicules may be concentrated locally. The orbicules are from 3 cm to over 20 cm in diameter.

Cores of the orbicules are essentially plagioclase (often radiating mosaics), whereas shells are either coarse alkali-feldspar (with quartz) or concentrations of magnetite and biotite arranged concentrically or tangentially through the persisting plagioclase, and usually of increasing abundance towards the edges of the orbicules. The orbicules may be elliptically deformed, or even fragmented, indicating a dynamic environment of formation and accumulation in the magma during its consolidation. Aplitic and pegmatitic dikes which crosscut the orbicules are late features.

Orbicular granite in Westport Coal Museum

COMING UP

October 17, club night talk by Mike Blowers on Geology of Scotland. Bring garnet specimens for the mineral table display. Also bring your best find since the last meeting and enter it in the Find of the Month competition. Everyone who attends the meeting to vote for the best entry please.

Labour weekend: Golden bay trip to various collecting sites.

Mary and Kevin (email davies_bourne@clear.net.nz or Phone 5456075.) will be the trip leaders for the weekend, please contact them for up to date information.

The trip will be to the NW Nelson West Coast from the 26th to the 28th October (Saturday midday to Monday).
The accommodation will be a backpacker lodge near the Anatori River at $25 per night.
The program will be a trip to see a fossilized whale skeleton (not sure of the exact location).
Sunday will be along the coast past Turimawiwi River to see bryozoan beds.
Home Monday.

November 21, club night and AGM. Mike Johnston our club patron will be giving a talk, the subject of which has yet to be finalised.

November 24th Field Trip: Mineral trip to Courthouse Flat. Leader: Chris Dave or Clyde

December 15th Christmas BBQ: Lee Valley (there will be no club evening in December)

We would like more members for the committee so if you would like to give it a go please contact one of the current committee members

2014 Calendar

We wish to make a Club calendar for sale for 2014 and ask members to submit their best photos of rocks, minerals, fossils, club activities, localities, micromounts etc to Diane for possible inclusion in the calender. (No suggestions that we strip for naked shots please)