



## NELSON ROCK & MINERAL CLUB NEWSLETTER

# March 2018

### COMMITTEE MEMBERS

<b><u>PRESIDENT:</u></b>	Mike Blowers	5486299	m.h.blowers@gmail.com
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### GENERAL NEWS

**Website.** Dave Briggs runs the club website, check it out at [www.nelsonrmc.org](http://www.nelsonrmc.org), it is being continually updated.

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

**MEETINGS** Please check your emails for up to date information.

### Committee:

If any of you wish to become more active in the running of our club, please contact a member of the committee.

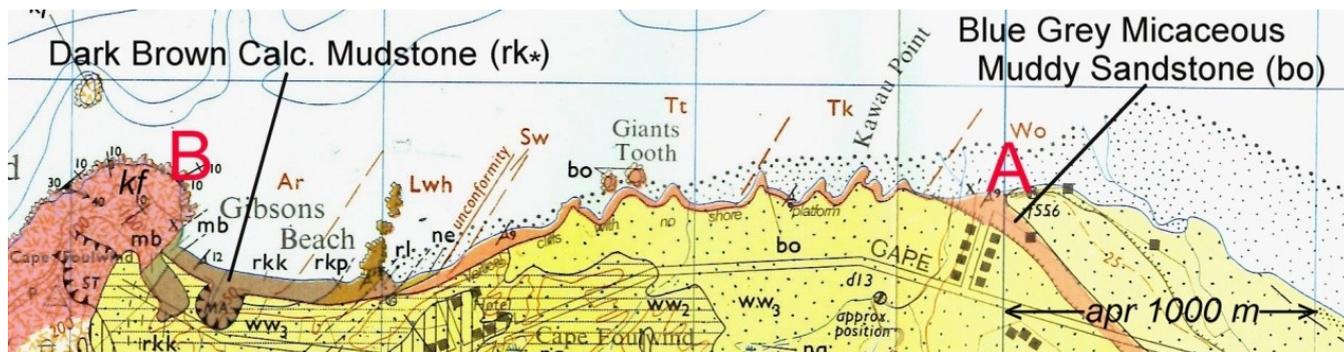
This edition contains a lot of photos. You can get a clearer view of them by zooming in. To do this just press Ctrl Shift +

To zoom back out it's Ctrl shift -

## REPORT ON FIELD TRIP TO WESTPORT AREA by Stephen Eagar

A group comprising Mike Blowers, John Taylor, John Barry, Ian Ladds Steve Cross Stephen Eagar, Tez Hardwick and Zac met at the Westport Holiday Park on the morning of 4<sup>th</sup> February

We then went to Cape Foulwind. Here there is a very interesting exposure of tertiary sequences along the coast. (see diagram and photos) Unfortunately the tide was on its way in, so this limited our access to this section of the East Cape, and we had to limit our time there.



### Legend

- kf Foulwind Granite – Grey, medium – coarse grained biotite granite with megacrystals of K feldspar.
- Regional Unconformity-----
- mb Brunner Coal Measures – Poorly sorted quartz sand, carbonaceous-highly carbonaceous mudstone and coal.
- rkk Kaiata Formation (Kaiata Mudstone Member – Massive, slightly calcareous, slightly carbonaceous mudstone)
- rkp Kaiata Formation (Point Elizabeth Member – as above with scattered beds of algal limestone)
- rl Little Totara Sand – White-yellowish brown, moderately sorted, micaceous, feldspar-quartz sandstone, loose.
- ne Waitakere Limestone – White-light grey, hard, algal limestone, thin beds of coarse sandstone at base.
- Unconformity-----
- bo O'Keefe Formation (Blue Bottom – Bluish-grey, muddy, slightly calcareous, micaceous fine sandstone and mudstone)
- Regional Unconformity-----
- Late Quaternary Superficial Deposits – Beach sands and fluvial gravels deposited during interglacial high sea levels

Access to the exposures of the Lower Tertiary beds was also made difficult due to the recent storms that had thrown up logs coupled with the slips. The beds dip gently to the east. However we managed to see the most of the strata commencing with the Brunner Coal Measures (Kaiatan). We found some pyritic nodules in the carbonaceous mud. Above are the deep water deposits of the Kaiatan Mudstone that contain only microfossils. Due to the high tide we abandoned this section and had lunch.

Following lunch we went north around the Cape itself. A large quarry had been dug in the granite to use for the Westport Breakwater. A tramway from the quarry to Westport had been constructed and a few industrial artifacts were seen. The Foulwind Granite is a hard, coarse grained biotite granite with large white tabular potash phenocrysts ideally suitable as rip rack compared to the weathered Separation Point Granite further north. The Foulwind Granite has an emplacement radiometric age of about 430 million years, but may have a Cretaceous metamorphic event imposed on it. We then proceeded to the upper part of the section further to the east. As we went down the track to the beach we saw the blue O'Keefe Formation (Miocene), that was a marker for the old gold miners. Some members collected some of the ilmenite sand that the tide had separated on the beach and looked for gold. It was found, but was very fine. Here we also saw the Waitakere Limestone (Oligocene) and collected fossils (scaphopods, bivalves and rhodolith algae). They were in a light grey limestone This is very similar to the algal limestone in Golden Bay.

The following day we went to Charleston. The exposure of the old mica mine was covered in scrub. Fortunately for us, John Barry had visited previously and cut a marked track through the gorse. Mica is found in a pegmatite and books of muscovite mica were collected. After lunch at Constant Bay we pushed our way through the bush to look for more mica. Then we retreated to the office of Geotech where Anthony Black kindly let us examine the old photographs of the area and John Barry gave us a brief history of gold mining in the area. He then led us through part of the Argyle Track to look at some of the workings in the Quaternary marine deposits. They seemed to hold up well to the deep pits and races as we went through the bush. Some of these must have been some 15 metres deep. The deepest channels were below the payable deposits, so that the mined material could be washed away from the area (to sea) and not interfere with the mining. (Unlikely this technique would be permitted today!)

Our thanks to Ian Ladds, John Taylor and particularly John Barry for their assistance in making this a most memorable trip.

# MINING METHODS

A number of mining methods were employed at Charleston:

**Ground Sluicing** - Where the sand was uncemented, water from a head race above was directed into the working face and the sand was washed through a screen on a wooden box and then onto the gold recovery tables. A tail race took the water away from the workings and stones from the gravel overlying the sand were hand-stacked into piles. A lot of labour was required for this method.

**Hydraulic Sluicing** - An advancement on simple sluicing, this method involved the application of a jet of water under pressure to mine the face and was less labour intensive.

**Cement Crushing** - Most of the cement was surface mined breaking out small blocks but in a few locations tunnels were driven. The blocks of cemented sand were crushed to sand size in a stamping battery. The majority of the stampers were water wheel powered although some had steam engines using local coal.

Most of the gold at Charleston was won by this method and some companies did very well e.g. In August 1868 the Nile Company sold 300oz of gold after just a fortnight's work. In 1869 the warden reported that there were 240 of these batteries operating and the noise must have been quite deafening.

**Fly Catching** - This involved placement of gold recovery tables in a creek bed downstream of active gold workings. As the gold recovery by sluicing or crushing generally only recovered about 50 percent of the gold, some of the flycatchers did very well.

**Blacksanding** - Blacksand along the beaches was dug out and washed across tables. This was the

method used by the Shetlanders at Nine Mile beach.

## GOLD RECOVERY

Two methods were used on the gold saving tables. The first involved catching the blacksand concentrate in fine blanketing. The concentrate was then mixed with mercury in an amalgamating barrel where the gold combined with the mercury.

The alternative method used mercury-coated copper plates and the gold combined with mercury. At intervals the amalgam was scraped off the copper plates. The amalgam was then placed in a retort to which heat was applied and the mercury evaporated off leaving the gold behind. The mercury was recovered by condensing in cold water and used again.

## WATER SUPPLY

Whatever mining method was used, water was an essential requirement. Water was necessary for sluicing, driving the water wheels, black sanding and for washing the sand over the gold saving tables.

Initially dams on nearby creeks and reservoirs sufficed but as the scale of mining rapidly increased much more water was required. Long water races were constructed and these were major engineering achievements.

The most significant were the 7km long Nile River water race which brought water to Darkies Terrace and the Argyle water race which was fed from a large dam at Deep Creek. The companies that controlled the main water races made good profits by selling water and often made more than from gold mining. However even with the water races, in periods of dry weather many claims could not work, and the miners and business people would be praying for rain.

Charleston in the 1870's



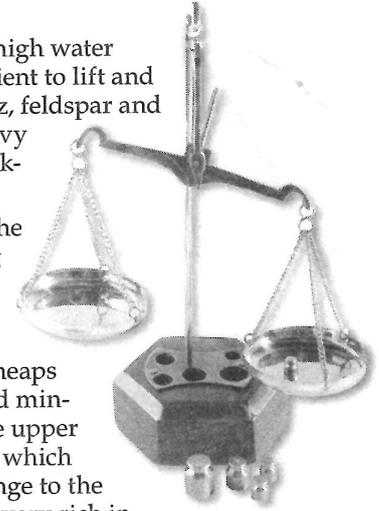
## THE GOLD DEPOSITS

The diggers coming to Charleston were used to mining deposits with gold particles ranging in size from small nuggets to flakes but at Charleston the gold was all of a very fine sand size ("flour gold") for which new methods of recovery were required.

At Charleston the gold was found in ancient beach sands preserved in a series of uplifted marine terraces. While there are traces of gold found throughout the sands, the diggers soon found that gold was concentrated within blacksand leads. Blacksand comprises mostly dark coloured, heavy minerals, mainly ilmenite, garnet and zircon, minor magnetite and monazite as well as gold, and the process that forms the blacksand layers can be observed today on many West Coast beaches e.g. Nine Mile Beach. During storms,

waves carry sand towards the high water mark with the backwash sufficient to lift and remove lighter minerals (quartz, feldspar and mica) and leave behind the heavy fraction – the gold bearing black-sand.

Over much of the goldfield, the marine sands had an overlying cover of gravel about 1 - 1.5 metres thick. During mining this gravel layer was removed and has been left as the many heaps of stones in the long abandoned mining areas. In some locations the upper part of the sand was cemented which provided an unfamiliar challenge to the miners. Often this cement was very rich in gold and stamping batteries were introduced to crush the cement.



Gold mining sluice at Butterworths Blow-Up Claim, Charleston, 1907.

Charleston Trip photos taken by Mike Blowers



1

- 1 John Barry describes layers in recent exposure - Site 1
- 2 Searching mudstone layer site 2
- 3 Fossils in mudstone (*Caryophyllia Clavus zelandiae*)
- 4 Echinoderm in with algal nodules
- 5 Mica Workings
- 6 Constant Bay lunch



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3



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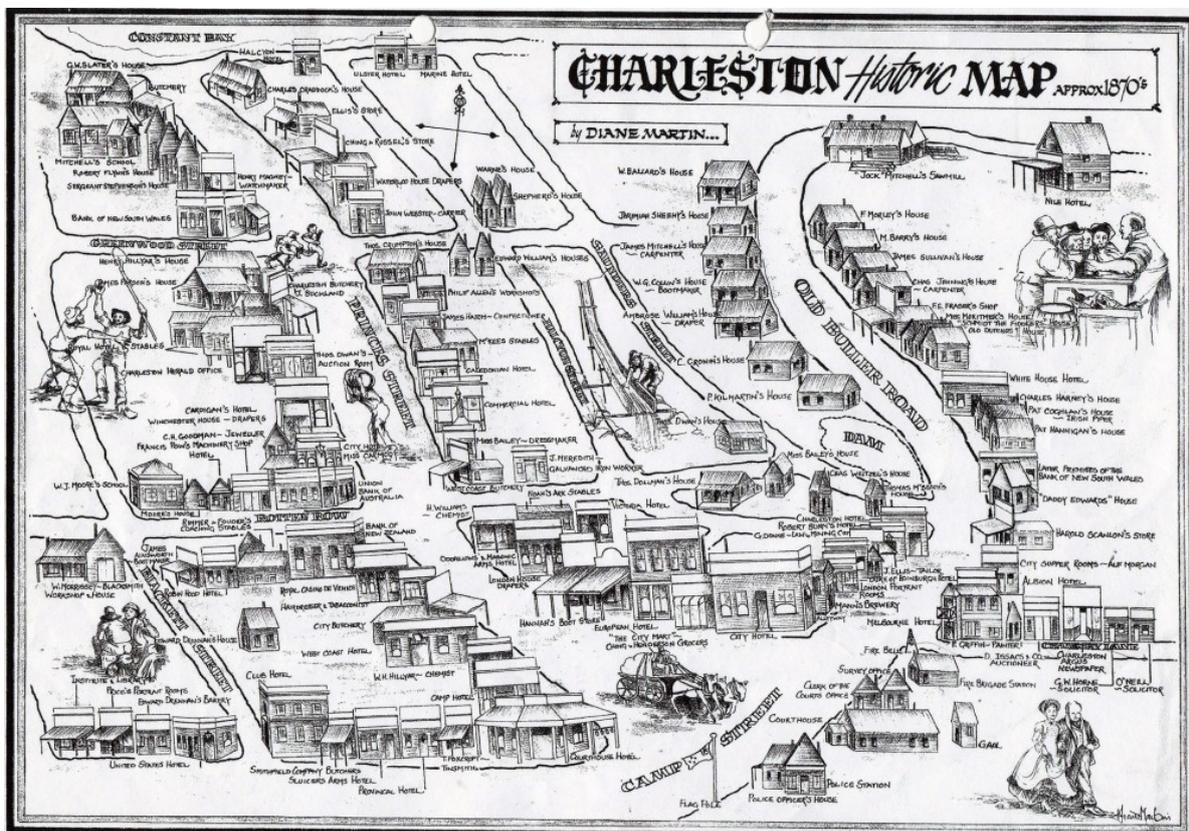
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We spent a few hours exploring the gold workings at the beginning of the walk to lake Argyle from Darkies Terrace. John Barrie is undertaking a project here, and part of that project was forming tracks around the various workings which were being reclaimed by the West Coast bush.

The workings were primarily tunnels and channels built in the 1870s to take large quantities of water to the sluicing areas. Some of these channels were over 10m deep, so you need to take care when walking this area. The photo on the right shows a cliff formed by the collapse of shafts and tunnels.



Photos by Tez Hardwick







WOLFE CREEK CRATER



SURFACE SEARING OF SANDSTONE

Next on the tour was a visit to the Devonian limestone deposits in Winjana Gorge and Geike Gorge, standing as grey and white cliffs above the Lennard River with a wide variety of Devonian shell and coral to be seen.



GEIKE GORGE THROUGH DEVONIAN LIMESTONE



DEVONIAN FOSSIL

Next visit was to the Pinnacles, an area of protruding ant-hill like structures, formed by the cementing of sandstone within the root mass of long disappeared trees.

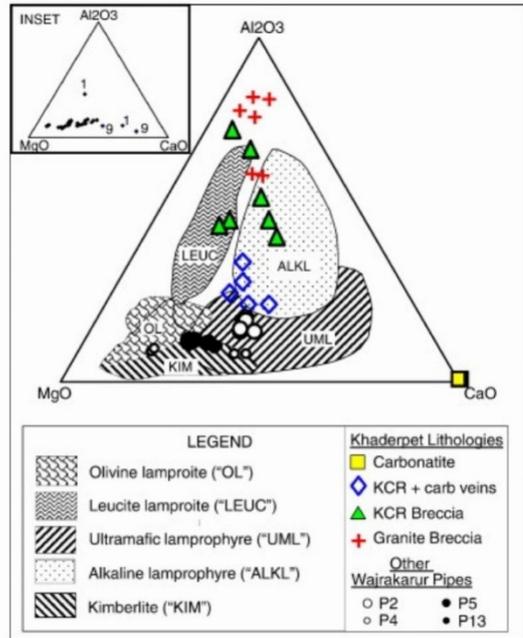
Further North at Shark bay we saw living descendants of Stromatolites in the warm shallow waters of the Peron Peninsula, where there was also a consolidated porous deposit of tiny seashells which was quarried for use as building blocks.



ARGYLL DIAMOND MINE



ARGYLL DIAMONDS



KIMBERLITE-LAMPROITE PHASES

Moving southwards to the distinctive Bungle Bungle Mountains, the formation of the yellow and blue banded hills was discussed. The yellow layers being more sandy and non water retentive while the blue layers were more water retentive clay, allowing the growth of blue-green cyanobacteria



**BUNGLE BUNGLE FORMATION - LAYERS OF OXIDISED SAND & BLUE CLAY LAYERS WITH CYANO-BACTERIA**

This was accompanied by a video showing the formations and some detail of the geology. Near the center of this formation are the traces of a meteor impact some 360 million years ago and this led the discussion on to other meteor craters that Mike had visited in the region, namely the Wolfe Creek Crater, the Dalganga Crater and the Hickman Crater.

Video footage showed the buckling of the sedimentary layers in the rim of the Wolfe Creek crater and there was a discussion about the blackened surface layers of the impacted material. Mike speculated that it could be a type of pseudotachelite, the black glassy mineral described by Rick Sibson in an earlier talk about earthquakes, but unfortunately Mike had taken no samples, so there was no resolution to that question.



SHARK BAY – LIVING “STROMATOLITES”

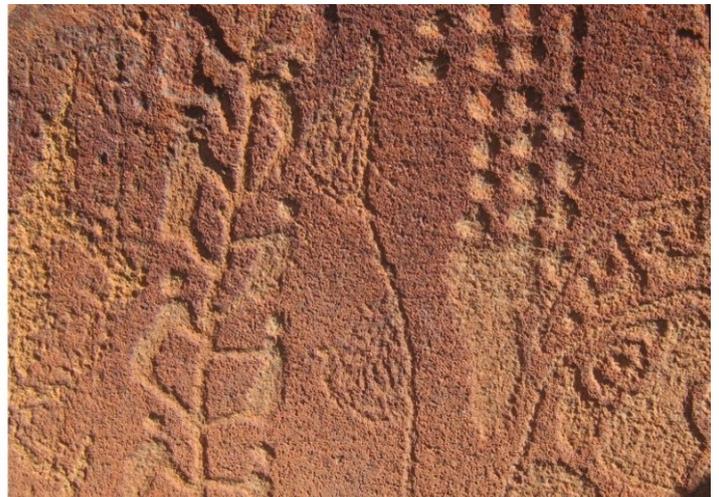


SHELL ROCK

Further north again at the Burrup peninsula we were introduced to weathered basalts, great ancient jumbled blocks, their surfaces weathered to a rust red over millenia. Here are to be found an amazing array of stone carvings, petroglyphs, by Aboriginal inhabitants, made some 30 – 50,000 years before. When the weathered surface is chipped away the pale colour of the unweathered basalt show through. More recent petroglyphs show brightly while the older ones are indicated by varying levels of re-weathering to red.



CHAOTIC JUMBLED BASALTS OF THE BURRUP



ABORIGINAL PICTOGRAPHS

Inland from here are the amazing Banded Iron Formations which provide so much wealth for the West of Australia. We explored these in the Karajini National Park, where rivers cut down through the formations affording views of a plethora of ripple marked rocks laid down some 1500 million years ago. Sandwiched here and there between layers are small asbestos stringers, reminding us of the once living town of Wittenoon, now no longer, abandoned because of the deadly results of mining asbestos there. Mt Newman mine was also visited.



LAYERS OF BANDED IRON FORMATION



ASBESTOS STRINGER

Finally moving southwards to Perth we passed through Mt Magnet and the surrounding gold mining area to finish the presentation.

Footnote If you want to see more about how the Cratons of Western Australia were emplaced and how the geologic formations developed, there is a good time lapse Geology Map through time at

<https://vimeo.com/214778561> it runs for about 4 minutes with loads of detail.

It would be interesting to see a similar sort of production for NZ



Winner February 2018

Charleston Mica

Collected by Tez Hardwick



March 2018

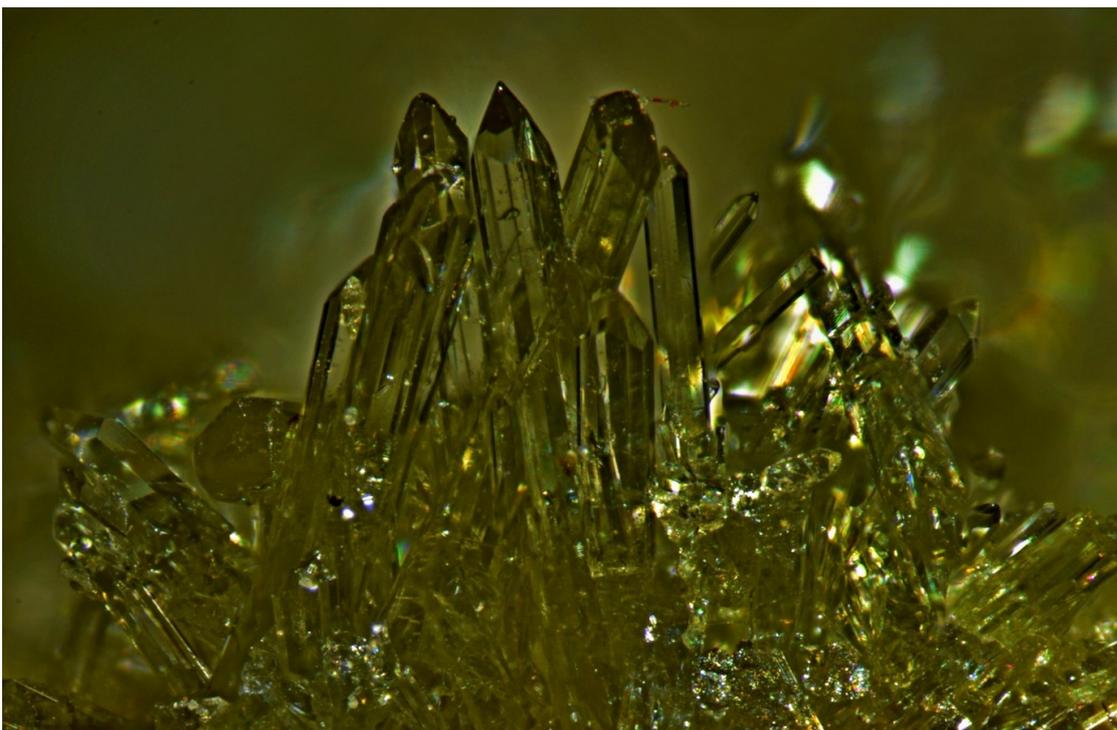
Tourmaline, Golden Bay

Winner Dave Buchan

(Photo is of tourmaline from same location,  
not the winning sample)

## **Champion Mine**

I am still working on my collection of microminerals from the Champion Mine. Here is a photo I took of Vesuvianite that I collected on Easter Monday. The width of view is 1.7mm. I also found a really nice sample of Atacamite. It was growing in a relatively deep pocket in cuprite so is really difficult to photograph. I will put a photo of it in the next newsletter if I can get a decent shot. You can zoom in on this photo quite a bit without loss of definition.



## Library Display

We were asked by Richmond Library to fill their display cabinets for a number of weeks in January and February.

We asked for input from club members and ended up with displays from Alan Mathews, Hubertus OpdenBuysch , Tez Hardwick, Sheila Hardwick and Mike Blowers. The displays were pretty stunning though I say so myself.

A big thank you to all the contributors, the feedback from the library was fantastic.

Zoom in on Mikes panorama photo for better detail



## We're on the move

We have stored our club equipment and collection at Mary and Kevins place for a number of years. They are now relocating to Rai Valley and we need to shift our belongings to a new site.

A huge thank you to Mary and Kevin for their generosity over the years.

Dave Briggs has kindly offered the club to use a bit of his section that he hopes to develop in the near future. It is located at Ruby Bay.



So, we organised a working bee, packed all the gear up and moved it to its new home.

Here is an action photo of Mary and David.

We put the contents on pallets at Ruby Bay, and the following day David and Mike erected a shed and moved the contents into it. All well and good we thought, until the very next day there was a huge storm surge unlike any in living memory. The section got flooded with sea water which unfortunately got into the shed.

David and Mike came to the rescue after the waters had receded, washed down any affected equipment and applied a liberal coating of WD40. They saved the day!



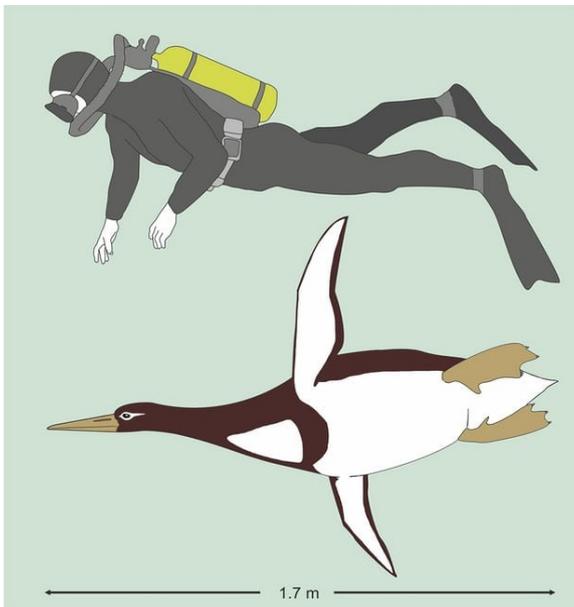
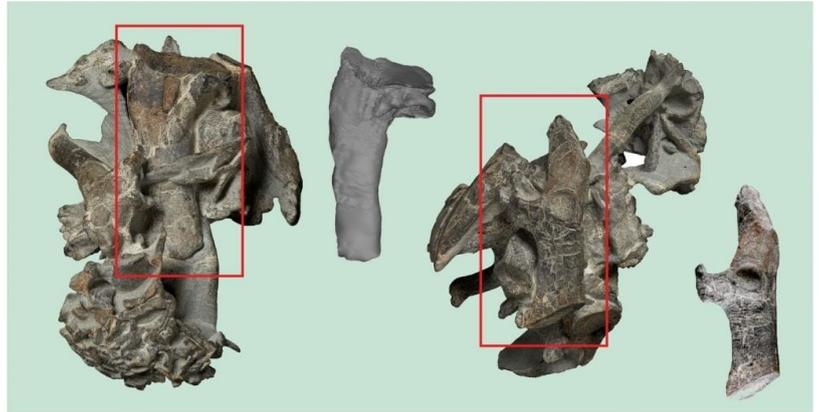
Here is a picture that Dave Briggs took of his flooded section .

## A Giant Kiwi Penguin

The remnants of an ancient penguin that stood as tall as a human have been found encased in rock on a beach in New Zealand.

Fossil hunters chanced upon the prehistoric bones in sedimentary rock that formed 55m to 60m years ago on what is now Hampden beach in Otago in the country's South Island.

Measurements of the partial skeleton show that the flightless bird weighed about 100kg and had a body length of 1.77 metres (5ft 10in), equal to the average height of an American man. Emperor penguins, the tallest penguin species alive today, reach only 1.2 metres when fully grown.



Penguins evolved from flying birds tens of millions of years ago, but lost the ability to get airborne and became accomplished swimmers instead. Once grounded, some penguin species became much larger, growing from about 80cm tall to twice the size.

The pieces of the latest skeleton, including wing, spine, breast and leg bones, were first discovered more than a decade ago, but the rock holding the fossilised bones was so hard that it has taken until now for researchers to prepare and study the remains.

The partly prepared skeleton of the Paleocene giant penguin *Kumimanu biceae*. The rectangles emphasise the humerus and a bone from the shoulder girdle (coracoid), which are shown separated from the original bone cluster. Photograph: Gerald Mayr/Senckenberg Research Institute

Rather than the usual black-and-white colouring, the ancient penguin was probably brownish and had a longer beak than its modern-day cousins. "It would most likely have been slimmer too and not so cute looking," said Gerald Mayr at the Senckenberg Research Institute and Natural History Museum in Frankfurt. "It's one of the tallest penguins that has ever been found."

Researchers named the new species *Kumimanu biceae*, after the Maori words "kumi", meaning a large mythological monster, and "manu" for bird. The second part of the name honours Beatrice Tennyson, known as "Bice", the mother of Alan Tennyson, a senior researcher on the team.

The fossilised remains of giant penguins have been found from 20m to 50m years ago, but older examples are extremely rare. The latest specimen, reported in [Nature Communications](#), suggests that some penguins became giants soon after penguins first evolved and switched from flight to diving. At the time the newly discovered species was alive it would have shared the warm subtropical environment with other sea birds, turtles and sharks.

Giant penguins went extinct about 20m years ago, when marine mammals arrived in the form of toothed whales, seals and other creatures. What spelled the end is unclear, but the big birds may have struggled to compete with marine mammals for food, or may have become the meal of choice for the new predators.

Another species of giant penguin, discovered in Antarctica in 2014, [may have been even taller](#) than *Kumimanu biceae*. Bones from the 37m-year-old "colossus penguin", or [Palaeudyptes klekowskii](#), suggest the animal stretched two metres from beak to foot and weighed 115kg.

<https://www.theguardian.com/science/2017/dec/12/fossil-hunters-find-man-sized-penguin-on-new-zealand-beach>

## UPCOMING EVENTS

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

April 19th	Short talks on a variety of subjects	Club members, Tom, David, Mike, Alan, Uta, Lis
April 22nd	Day field trip: <i>Highfield Farm</i>	Dave Briggs/Ian Ladds
May 17th	Club meeting: <i>Geological climate change</i>	Gerrit van der Lingen
May 20th	Day field trip: <i>Caanan Downs</i>	Chris Fraser
June 2nd - 6th	Weekend field trip: <i>Kaikoura Coast</i>	TBA
June 21st	Club meeting: <i>Collecting NZ Minerals and Micros</i>	Chris Fraser
June 24th	Day field trip: <i>Lea Valley limestones</i>	Tez Hardwick
July 19th	Club Meeting: <i>Hebredian exploration</i>	Rick Sibson
July 22nd	Day Field Trip: <i>TBA</i>	Value
Aug 16th	Club Meeting: <i>Geology and Landforms</i>	Paul Woperis
Aug 19th	Day Field Trip: <i>TBA</i>	Peter Ingram, Ian Ladds
Sept 20th	Club Meeting: <i>Minerals</i>	Steve Webb
Sept 23rd	Day Field Trip: <i>TBA</i>	TBA
Oct 18th	Club meeting: <i>Microscopes and minerals</i>	Dave Briggs/Stephen
Oct 20th - 22nd	Weekend field trip: <i>Canaan or Reeftonown</i>	TBA
Nov 15th	Club meeting and AGM	Mike Johnston
Nov 18th	Day field trip: <i>TBA</i>	
Dec	Xmas BBQ	TBA

### More information

Tim Saunderson as many members know, is a valued member of our club who has shifted to Auckland.

He is still very active with his interest, and if you would like to see what he is up to you may subscribe to his newsletter which he publishes on an ad-hoc basis.

This is free, all you need to do is email Tim and he will send you a copy whenever he publishes. His email is [saphesia@gmail.com](mailto:saphesia@gmail.com) and the 3rd issue of his Geonews was produced on 24th February 2018. A well presented and informative read.

**A large rock saw** is available for rock cutting at a reasonable price, TheRockFella 10 King Edward street Motueka. Call 022 137 4574 for details