# The Very Latest

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## Fossils and old bones

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## Contents



## Introduction

This issue focusses on fossils and old bones. No, it is not alluding to anything to do with the membership profile of CSS, which in any case is probably inappropriate, given the recent flush of younger members who have joined CSS. Rather, it is about the fabulous storehouses of information that are tucked away in dusty corners of caves or hidden away in rugged outcrops of limestone.

We have an article on the Naracoorte area by Liz Reed and Lee Arnold, who recently won an Australian Research Council grant of almost $700,000, which when linked to support from other sources, brings the total value of the multi-disciplinary research project at Naracoorte to $2 million.

Alex Watt has followed up on his recent talk to CSS with an article on the amazing Placoderm fish fossils at Wee Jasper. And while he was in creative mode, Alex also whipped off a fascinating piece on biological (?) science observations at Bungonia.

And to continue with this issue's old bone theme, however tenuous, there is a report on the recent ACKMA meeting in Te Anau New Zealand, where on one of the field trips, Moa bones were seen in a cave. The ACKMA meeting also saw a few fossils come out of the woodwork, including several CSS members – no, this does not mean you Steve, Regina or Lilly.

Finally there is a brief report on a recent CSS trip to Narrangullen Cave. The trip in April was CSS's first visit to the cave in more than a decade. And the link to the theme for this issue is once again tenuous in that the party had to detour around some old sheep bones as it meandered through the paddocks of the Narrangullen property while looking for the new vehicle route to the cave.

John Brush

*Front Cover: Lilly Petrovic in the vast main chamber in Narrangullen Cave (Dirk Stoffels photo).*

*Back Cover: John Ash passing falls on the way to The Goldmine, Aurora Cave, New Zealand (John Brush photo).*

# Placoderms at Wee Jasper

**Alex Watt**

*This article is based Alex's talk at the February 2017 CSS Meeting*

Placoderms are an ancient species of fish—one of the most ancient—and they are related to our own fishy ancestors, all of whom were swimming together in the warm tropical seas of what is now South Eastern Australia about 400 million years ago. This was long before the time of the dinosaurs, when plants were only beginning to extend onto land, and all the remaining complex life on earth was in the oceans, evolving like crazy.

The limestone in which most caves in this part of Australia are formed is from this time period, which covers about 100 million years during what are called the Silurian and Devonian Periods of geological time. Like most limestones, these rocks are composed of the calcium carbonate skeletons of ancient animals such as corals, crinoids (a kind of starfish perched on a stalk), and shelly creatures which lived in these warm shallow waters. The continent of Gondwana was then further to the west, the coastline perhaps about where Broken Hill is now, and an enormous reef was growing up and down the coast around volcanic islands arcs which erupted violently from time to time, burying large areas of nearby ocean with thick ash deposits.

*A generic image of a placoderm fish (public domain image sourced from Wikipedia by the author).*

We know that there were placoderms swimming in these seas, because we can discover their bones in some of the Devonian limestones that make up some of South East Australia's caving areas, such as at Wee Jasper, Wellington, and Buchan.

Silurian limestones which make up most other caving areas in this area are a bit too old for placoderms in Australia, as far as we know, although there are Silurian placoderms in other places around the world. The evolution of bony animals or vertebrates was going through a critical time – Placoderms are among the first jawed vertebrates, and the development of the skeleton that all vertebrates have, including us, was largely set in place during these few tens of millions of years. This development culminates in the first vertebrate footprints on land which occurred at the end of the Devonian – a fossil trackway of this age has been found in Victoria (the slab of rock is now in the Museum Victoria).

The placoderm bones we most often find are the plates that formed an exoskeleton on these fish, encasing their body – particularly the front half – like a suit of armour, ornately decorated with long spines and little bumps similar to the bumps on the surface of a basketball. The exoskeleton is no longer a part of living vertebrates' anatomy, and perhaps the reason the Placoderms suddenly

became extinct at the end of the Devonian was due to the shortcomings of having to wear a heavy exoskeleton. Their extinction certainly was an abrupt event, and coincided with environmental catastrophes at the end of the Devonian, such when the oceans became starved of oxygen due to climate change. At around the same time the South Eastern part of Australia was becoming dry land and cooling down so reef building, and the formation of limestone for us to go caving in, stopped.

The Wee Jasper region, including large areas of limestone on private land around Burrinjuck Dam, remains as a record of this geological period , in fact it is one of the world's best preserved early Devonian reefs. Even though all the species of coral were different to the kinds we have now, and there were numerous strange Devonian reef creatures like crinoids, and the balance of corals to other reef builders like sponges was different to now, on the whole the reef would have been broadly similar to a modern coral reef. We can assume it was a lively, colourful place, and on it the bony placoderms occupied all the niches occupied in modern coral reefs by modern fish.

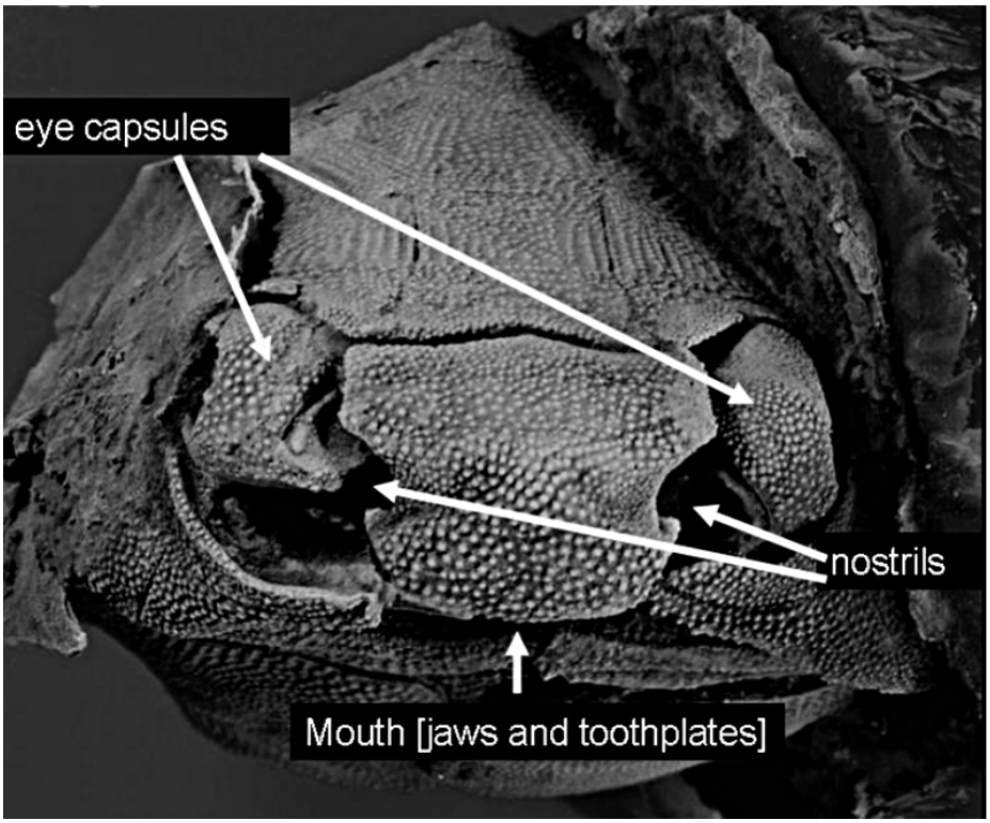
The Wee Jasper region is actually one of the most important sites in the world for placoderm bones, and has a diversity that is higher than any other Devonian fossil fish site in the world; at least 70 fish species and 64 genera have been identified to date. This is even more species than at the other famous Australian Devonian reef at Gogo in Western Australia. Unlike Gogo though, the beds of the Wee Jasper reef have been folded quite spectacularly, in subsequent mountain building episodes which affected large parts of Eastern Australia, and this has destroyed much of its original shape. Despite the folding, the fish fossils have fortunately survived, and as well as placoderms, many important lungfish specimens have been found in the area. Lungfish lived in the open sea and were much more common in the Devonian than they are now, and they also had beautifully patterned hard bony skulls, and like the placoderm bones, these can be preserved well. Lungfish can still be found alive in Australia today.

The largest collection of fossil fish material from the Wee Jasper area is at the Australian National University (ANU), in the care of Dr Gaven Young. Under the supervision of Dr Young, I have been using formic acid to remove several placoderm bone specimens from the limestone rock that encases them. The fish bones in limestone at Wee Jasper are usually black (*see left*), and are slightly more resistant to weathering than the host rock, so they tend to poke out quite noticeably. Many specimens have been found in loose blocks of scree that are scattered all over the sheep paddocks in the area.


*A placoderm bone in limestone from Wee Jasper, before acid treatment (Alex Watt pic).*

The now widely practised use of acid to remove bones from limestone was actually first developed by scientists at the British Museum using acetic acid and fish fossil specimens from Wee Jasper, back in the 1930s.

The process is that the exposed bit of bone is coated with a polymer, then it and its rock host are placed in a bath of acid for several hours, during which time the acid eats away a few millimetres of the rock. Then the rock is removed, dried, and the newly exposed bone is coated with more polymer, before repeating the process numerous times until all the rock is eaten away and the bone comes out. After the acid treatment is finished, the process of identification and further study can begin.




*Complete placoderm skull (front view), from Wee Jasper region (Gavin Young photo).*

Many of the fish fossils at Wee Jasper have been described in scientific publications, beginning with a visit by the Rev. W.B. Clarke 'the father of Australian Geology' in 1878 who noted the 'fish plates'. A fossil lungfish skull from near Taemas Bridge in 1906 was the oldest lungfish bone ever discovered at the time, and it eventually became the holotype for entire *Dipnorhynchus* genus. As for the placoderm specimens which were given acid treatment at the British Museum, they were subsequently described and noted for their intricate braincase structures, and this led to further collecting trips from the Museum, which perhaps unfortunately means that many specimens left the country before Australian palaeontologists could see them. In more recent years, Dr Gavin Young has become the local authority of the unique fish fauna at Wee Jasper, publishing many papers, as well as assembling in 2011 a significant scientific submission in support of a national heritage nomination for the area.

If you think you have found a suspected fossil fish bone while out caving, be sure to get in touch with Dr Young or myself, as these bones are precious, and each new discovery can open up a new window on the life of our ancient vertebrate cousins!

*Placoderm bones poking out of rock - midway through acid treatment (Alex Watt photo).*

# Naracoorte Caves to be focus of $2m research project

## University of Adelaide statement

Wednesday, 31 May 2017

A University of Adelaide-led research project will focus on the rich fossil history of Naracoorte Caves and cement its place on the world science stage.

Announced today, the project has been awarded $669,000 by the Australian Government through the Australian Research Council (ARC)'s Linkage Projects scheme which promotes collaborative projects between universities, industry, government and other partners.

Further cash and in-kind support is being provided by the Naracoorte Lucindale Council, the Department for Environment, Water and Natural Resources (DEWNR), the South Australian Museum, Terre à Terre, Wrattonbully Wine Regions Association and the DST Group, bringing the total value of the project to about $2 million. Researchers from the University of Melbourne and the University of Queensland will also share their expertise.

The project, led by Dr Lee Arnold and Dr Liz Reed in the University's Environment Institute and School of Physical Sciences, will provide a unique window into a key period of global climate change, animal extinctions and evolution of the modern Australian environment at the World Heritage-listed Naracoorte Caves.

"The Naracoorte Caves have preserved records of the local climate, flora and fauna for more than half a million years," says Co-lead Chief Investigator Dr Reed. "Although scientists have been investigating these deposits for over 40 years, new multi-disciplinary studies and technological advances are now allowing us to look at these records in new ways. We have literally just scratched the surface."

The project will integrate all aspects of the cave deposits, employing new approaches in geochronology, palaeontology and geochemistry to produce comprehensive ancient ecological and climate histories.

"This project will have significant implications for understanding megafauna extinctions and will inform future conservation and climate change adaptation strategies," says Co-lead Chief Investigator Dr Arnold. "It will also transform the scientific profile of Naracoorte Caves, ensuring socioeconomic benefits to regional communities through education, ecotourism and knowledge marketing."

The time span and exceptional preservation of the fossils make the Naracoorte deposits significant on a global scale.

Naracoorte Lucindale Council Chief Executive Officer Dr Helen Macdonald says: "This is fantastic news and a potential economic game changer for the community of Naracoorte. The value of the partnership to the Naracoorte Lucindale Council is the ongoing interest the research work will create in the World Heritage-listed megafauna fossil site, and the opportunity it provides for the community to create a science tourism hub."

DEWNR Group Executive Director Science Sandy Carruthers says DEWNR had actively sought to partner with this team of internationally recognised experts whose objectives align with the state government's strategies to address climate change and biodiversity conservation. "The project will greatly advance our scientific understanding of the fossil sites at the World Heritage Naracoorte Caves and will provide benefits to both the broader community and visitors to the site," she says.

South Australian Museum Senior Research Scientist Dr Mark Hutchinson says: "With this funding the Museum will work alongside its research partners to increase understanding of South Australia's globally significant natural heritage. The Museum outreach program will then take this new understanding out of our laboratories and into the hearts and minds of regional and remote communities in South Australia."

# Naracoorte, where half a million years of biodiversity and climate history are trapped in caves

**by**

**Dr Liz Reed[1] and Dr Lee Arnold[2]**

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*Enormous sediment cones in a cave (Sand Cave - Ed) at Naracoorte. Two people show the scale of the area.*

In 1857, guided by the flickering light of a candle deep in a cave at Naracoorte in South Australia, the Reverend Julian Tenison-Woods stumbled across thousands of tiny bones of rodents and small marsupials buried at the base of crystal columns.

Without knowing it, Woods had found a time machine of sorts – a record of biodiversity and environment spanning more than half a million years.

Now Naracoorte Caves are known as one of the world's best fossil sites, a place where marsupial lions, enormous kangaroos and giant monitor lizards met their deaths and were preserved by layers of sand.

But the caves captured more than just giants. Clues to Naracoorte's past environment are also preserved in plant fossils, sediments and calcite formations.

**Big marsupials with bite: Australia's megafauna**

Global scientific attention first focused on Naracoorte after 1969, when cave explorers entered relatively inaccessible limestone chambers. After squeezing their way through an impossibly tight gap in Victoria Cave, they discovered the palaeontological equivalent of King Tutankhamen's tomb.

Scattered across the red sediment floor of a vast chamber were countless skulls and jaws of Australia's lost giants, the megafauna.

The find created a buzz worldwide and set the stage for a scientific journey of discovery that has unfolded over the past four decades.

*Pitfall megafauna fossil assemblage, Upper Ossuary, Victoria Fossil Cave Naracoorte.*

Preserved within the deposits are fossils from a suite of megafauna species including heavyweight plant eaters such as *Zygomaturus trilobus*, short-faced leaf-eating kangaroos such as *Procoptodon goliah*, and the five-metre snake *Wonambi naracoortensis*. The most famous of these is the marsupial lion *Thylacoleo carnifex*. The most spectacular fossils from this king of the Pleistocene forests have come from Naracoorte.

The reign of these amazing animals came to an end around 45,000 years ago, with the precise cause for their extinction still a hot topic for debate.

*Fossilised skull from* Thylacoleo- *a carnivorous marsupial that lived in Australia around 50,000-1.5 million years ago.*

**How the underground archives formed**

The Naracoorte Caves formed around one million years ago within the Gambier Limestone, itself dated to around 37 million to 12 million years old and formed during the late Eocene or Miocene epochs.

Overlying the limestone, a series of ancient sand dunes preserve records of the changing coastline over the past few million years.

Over time, holes opened up in the limestone, connecting the caves to the land surface. Sand and soil was transported into these cave entrances by water and wind, forming deep layered deposits spanning at least the last 500,000 years of the Quaternary period (2.6 million years to present).

At the same time as the sediments were deposited, many types of animals lived in the landscape surrounding the caves. The remains of these animals accumulated in the caves and became buried and preserved in the sediment layers.

*Deep, layered fossil deposits in Blanche Cave, Naracoorte. Each layer represents a window in time. The tags mark individual layers.*

Some species, such as bats and possums, lived and died in the caves. Predators used the caves as roosts and dens, leaving behind the bones of their prey. Owls accumulated vast deposits of small vertebrates, such as the ones discovered by Woods in 1857.

Larger species fell victim to concealed cave entrances that acted as pitfall traps for the unwary. Kangaroos were particularly susceptible to entrapment, being fast-moving and active at night, dusk or dawn. Even the gigantic megafauna species succumbed to these traps.

With all of these ways for animals to accumulate, it is unsurprising that the caves preserve many deposits and tens of thousands of individual animals.

**Why are these deposits so significant?**

The fossil deposits preserve diverse vertebrate species, including more than 135 different examples of amphibians, reptiles, birds and mammals.

Nearly 20 species of megafauna are preserved, including nine species of extinct kangaroos. The preservation of the fossils is exceptional, with the finest details retained.

Naracoorte's record is relatively young geologically (around 500,000 years to less than 1,000 years before now), making it representative of modern ecosystems. This is why it offers value in addressing questions relevant to present and future conservation such as extinctions and adaptation to climate change and human impacts.

Unlike most localities where single sites are preserved, the Naracoorte Caves have multiple sites in many adjacent caves. This provides a unique opportunity to compare and correlate observations across related sites over a long, continuous time span.

*It's a little bit squeezy in here. A film crew working with researchers at Naracoorte.*

Recent research has revealed that the deposits contain much more than bones, with fossil plant material, pollen, fossilised algae and even DNA. This allows scientists to build a comprehensive picture of the environment during this time period. It is this incredible wealth of preserved materials that makes Naracoorte stand out.

Associated calcite formations (such as stalagmites) have preserved critical information on past climate. For example, past rainfall can be determined by studying the fine growth layers within the formations.

*Alexandra Cave, Naracoorte Caves National Park.*

**World heritage significance**

International recognition came to Naracoorte in December 1994, when the caves were World Heritage listed as part of the Australian Fossil Mammal Sites (along with Riversleigh in northwestern Queensland).

The fossil records of Naracoorte and Riversleigh reveal the evolutionary history of Australia's unique mammals over much of the past 25 million years. The Naracoorte deposits encompass the

latter part of this record, covering important events such as megafauna extinction and the arrival of humans in Australia.

The caves are managed by the South Australian government, which oversees tourism, conservation and research. The park is an established visitor attraction, and vital to the economy and culture of the Naracoorte district. The caves add to the wealth of other geological attractions in the Limestone Coast region, including volcanoes and some of the world's largest sinkholes.

Moving forwards, new funding has just been announced on a project to establish benchmark data on past ecological and environmental change that is trapped in the structures at Naracoorte Caves.

*Large roof-window entrance in the spectacular Blanche Cave, Naracoorte. It is in this cave that the first fossil bones were discovered by Woods in 1857.*

Working with colleagues at University of Adelaide and other Australian universities, museums, government and industry partners, we expect our next phase of research will have applications for biodiversity conservation, climate change, and building capacity for regional communities to share the stories of their unique heritage.

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# Hairy Traverse Possibly Spotted

**Alex Watt**

During a recent caving expedition to Bungonia B-4-5, a small party was unexpectedly surprised by an encounter with the fabled 'hairy traverse'—a monster that lives in the cave. The three children who were in charge of leading the group confirmed the sighting.

"It was really, really hairy" said Rowan Watt, (aged 9) "It *must* have been the traverse."

"We saw it near the entrance; in fact I think there were three or four of them."

More experienced cavers have their doubts about the sighting, which contradicts the location of the traverse as indicated by annotations on early maps of the cave.

"All the information we have about the traverse is that it is quite a hairy creature, and it definitely lives in the deeper interior of the cave, near the cement bag," says experienced caver John Brush.

"The children claim to have made a sighting but I think we need independent verification before we can change all the maps. Anyway, the children can't even agree on how many legs it has."

Others have cautioned that unnamed persons in the expedition may have given misleading advice about the nature of traverses, leading to wild and fantastic speculation by the children. Whatever it was, all members of the trip survived their brush with the hairy traverse, and have returned safely to the surface.

*The Hairy Traverse Party, minus the Author (Alex Watt pic).*

# Caving in the Te Anau area, New Zealand

## The 2017 ACKMA AGM week

**John Brush**

In early May, around 65 people came together in Te Anau in the South Island of New Zealand for the 2017 AGM of the Australasian Cave and Karst Management Association (ACKMA). However, the gathering was much more than just a meeting. There was a comprehensive program of cave visits, walks with an interpretive theme and a range of networking opportunities organised by Neil Collinson and his team (headed by Laura Dawson). In fact, Laura took on the key co-ordination role at the last minute after Neil managed to smash his ankle while carrying out inspection work in the Te Anau Glowworm Cave.

CSS was very well represented in Te Anau with 7 members in attendance: Steve Bourne, Andy Spate, Regina Roach, Marjorie Coggan, Lilly Petrovic, Dirk Stoffels and John Brush.

*Breaking out of the forest and into sunshine on the walk to Key Summit.*

*Near Key Summit.*

For the first full day of the program, we split into 3 groups to undertake our chosen activities, all based around the theme of enhancing interpretive skills: a walk along part of the Hollyford Track; a walk to Key Summit that is a side trip from the Milford end of the Routeburn Track; and a walk along part of the Kepler track beside Lake Te Anau. Most of the CSS people chose the Key Summit option. The weather was a bit miserable as our bus approached the area. It was cold and drizzling. However, as we made our way up hill along the walking track, the rain stopped and before long there were glimpses of blue sky through the beech trees. By the time we broke through the tree line, it was sunny and, as the lingering mist around the peaks slowly dispersed, a fresh dusting of snow was revealed. Magic. That evening we had a convivial evening in a pub, swapping stories about our day's adventures.

The plan for the following day was to focus on two cave areas south of Te Anau. One party was to go to the rarely visited St Peters Cave that is approached through the Jericho grazing property and then across the Waiau River, which drains Lake Manapouri. However, recent rains upset the plans as the Waiau was deemed to be too high to wade or paddle across, but it was not sufficiently high for safe use of a jet boat. So, practically everyone opted for the other trip on offer, a visit to Clifden Caves. We split into 2 groups, with one group first going to The Dean Forest Conservation area for a walk through an area of Totara forest that has never been logged. Some of the Totara trees (*Podocarpos hallii*) are thought to be about 1000 years old *(see at right).*

Clifden Cave has several entrances and an active stream level. As the walk-in entrances are only a few metres from a sealed road, access is dead easy and as a consequence, the cave has been attracting many visitors over a very long period of time. The cave is on private property, but the landowner has handed over responsibilities for day-to-day management to the Department of Conservation (DOC), which currently promotes the cave as a fun place to visit.

*Regina in Clifden Cave.*

DOC has facilitated access by publishing access information online and in brochure, erecting signs near the entrances and fixing ladders on three (3-5m) pitches to make it easy to do a through trip. Not surprisingly, the cave has suffered from all the visitation over the years. In addition to the normal wear and tear (eg mud tracking, rock polishing, speleothem breakages) expected in such a cave, there is a lot of graffiti. Some graffiti is quite old, but much of it is recent. In fact, the main purpose of our visit was to discuss the feasibility of, and also reasons for, cleaning the cave and to undertake some small-scale trials and demonstrations of graffiti removal. Neil Collinson had asked me to lead the discussions and the subsequent cleaning trials. Most of the cleaning equipment was provided by Neil, based on a list I had sent to him.

*Lucy Collinson in Clifden Cave.*

*Clifden Cave graffiti, old and new.*

The graffiti ranges from historic pencil (lead and indelible) and smoked signatures up to 130 years old to more modern markings using whatever material happened to be at hand, including mud, marking pen, crayon, charcoal, lipstick and spray paint. Some walls in the cave are covered with scratched, or deeply carved, 'engravings'. I talked to groups throughout the day and some very good ideas came forward. In our cleaning trials we used clean cave water (from pressurised spray bottles) and scrubbing brushes and focussed on the modern spray paint, mud markings and mud balls.

*Lilly with the group near the entrance to the Te Anau Glowworm Cave.*

Our next trip was into the Te Anau Glowworm Cave, a show cave operated by Real Journeys, the company Neil works for. The stream outflow cave is on the western shores of Lake Te Anau about 15km by boat from the Te Anau township. The company no longer allows visitors to take photos in the cave, but our group was permitted to snap away in the lower level – ie in as far as the waterfall. Above the falls, lighting is subdued to allow visitors' eyes to adjust to the almost complete darkness in the glowworm section where we all floated in punts along a dammed section of the cave stream with the glowworms hanging just above us. The glowworm displays are impressive and go close to rivalling some of the best known at Waitomo. Te Anau Cave is only about 200m long and the time spent underground on a normal tour is quite short.

*Regina in a low section of the Glowworm Cave.*

That evening Dr Paul Williams gave an after-dinner talk on his geomorphological and glacial studies in Aurora Cave, which many of us were to visit the following day.

The next morning, most of our group returned on the boat to the show cave site. Here we split into four groups, one to do a walk over the karst and the other three to go into Aurora Cave, a complex 8km, 260m deep system that feeds water into the Glowworm Cave. The two caves are separated by a sump. The main entrance to Aurora is about an hour's up-hill walk through Red Beech forest from the lake level. Access to the whole area is restricted under a permit system to protect the habitat for the Takahe, a critically endangered species of flightless bird. During our walk we did not see any of the 150 or so Takahe that inhabit the area, however we were later able to observe several Takahe *(see next page)* in a special breeding facility at Te Anau.

*Dirk, Lilly, George Bradford and friends above the entrance to Aurora Cave.*

Each underground party of about 10 people changed into caving gear on a mossy shelf (*see above*) near the main 40m-wide Aurora entrance and after dropping down into the cave, headed for a specific site under the guidance of the locals. Each group then rotated through several sections of the cave, including the huge entrance chamber, the Twin Falls, the Goldmine, the Bunkroom and the Hall of Silence.

*The main entrance to Aurora Cave.*

Paul Williams stationed himself in the Hall of Silence at one of his study sites (*see at right*). He explained to each group in turn, the methodology he had used to work out a chronology for Pleistocene glacial events and cave development phases by dating in-situ speleothem remnants interbedded with glacial fill. A more detailed description of Paul William's work and also an outline of passages further into the cave can be found in *The Very Latest* Vol 19(2), Oct 2014.

Most parts of cave that we visited were quite spacious, had walls of pale cream bedrock and the floor was either breakdown slabs or glacial debris, ranging in size from fine silt to rounded boulders up to 2m in diameter. There were also remnant deposits of glacial fill on ledges high in the roof indicating that at times in its past, the cave must have been completely filled with these sediments. Other impressive features that we saw included the 5m high Twin Falls where the stream has cut right through the limestone to the more resistant underlying sandstone layer. In the passage leading to the Goldmine, the stream has also run out of limestone and flows down the steeply inclined upper surface of the sandstone.

*Takahe pair at Te Anau.*

*Marj & Lucy near the Riverview Passage.*


*Dirk passing beneath The Rock of Death.*

*Jodie Anderson at Twin Falls.*

All too soon, it was time to return to the surface. Some of us politely declined the offer of exiting the cave along the Knee Wrecker Passage, a long crawl passage that comes out about half way down the hill. Unfortunately for the four who opted for the trip, a key passage to the other entrance could not be located and so they had to turn around and endure the Knee Wrecker a second time and return via the main entrance. That night there were more stories to swap, but this time in a different pub.

For the final day of the program, we visited caves in the Mt Luxmore karst. The Mt Luxmore area is on the route of the popular Kepler Track. From the centre of Te Anau, it is just a 5-6 hour walk (and an altitude gain 1000m) to the karst. However, most ACKMA members opted instead for a 5 minute trip by helicopter. The only catch was acclimatisation – not to the altitude as such, but to the lower temperatures and stronger winds that often come with increased altitudes. Note to self: next time, remember to take more layers.

Two 6-seat helicopters *(above right)* were used to ferry us up to the landing platform at Luxmore Hut *(above left)*. From there it was a 10 minute walk on a well formed track to the entrance to Luxmore Cave. To make things easy for visitors, DOC had even installed a huge wooden staircase into the cave *(right)*. Hmmm, not sure about the impact of all that treated pine on the cave biota. The cave is an active stream inflow and at first glance appeared to be a mini version of Aurora, with a steeply inclined passage in pale limestone and the stream flowing along a broad floor of sandstone bedrock. In other words, this cave was also running out of limestone. About 50m into the cave there were some Moa bones on a ledge above the stream (thus providing the link in this narrative to the theme for this TVL issue). Luxmore has some attractive decoration, but as to be expected in a public access cave with easy access, it has suffered from mud tracking, minor breakages, abrasion and rock polishing.

*Luxmore Cave: Marj and Dave Smith near the entrance (left); Anne Musser and Moa bones (right).*

We also visited Luxless Cave *(see below)*. It only 50m from Luxmore Cave and the track to Luxmore goes right past its entrance doline –it is actually a short blind valley. However, the cave is not signposted and appears to attract fewer visitors. After a constriction just inside the entrance the passage opens out and is similar in form to the other cave. It has more decoration which is in pretty good condition apart from superficial muddying from careless hands.

After visiting the caves, it was back to the relative warmth of Luxmore Hut for a bite to eat before we all headed down the mountain, either on foot and then water taxi across the lake, or by helicopter.

That evening we all attended the official dinner in a fancy hotel. The highlight of the evening was an auction to raise funds for the new ACKMA Ken Grimes Award. More than $700 was raised and much of that came from the sale of books that had belonged to Brett Farquharson, a member of ACKMA, and also CSS, who passed away last year, as noted in the last issue of *The Very Latest.*

*Decoration in Luxless Cave.*

# CSS trip to Narrangullen Cave

**23 April 2017**

**John Brush**

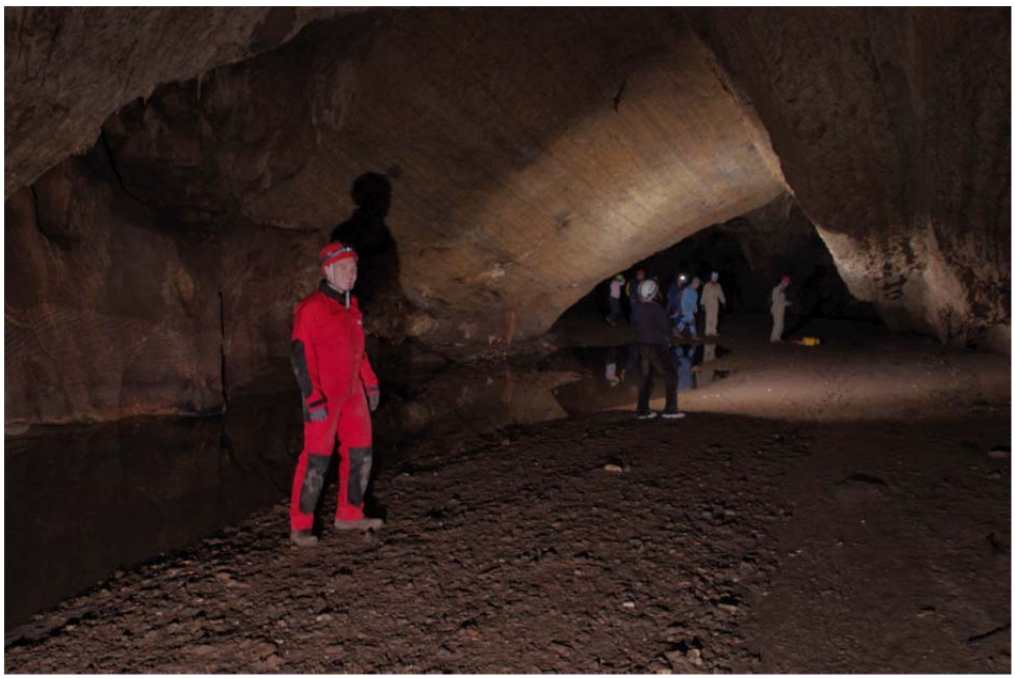
On 23 April 2017, CSS visited Narrangullen Cave for the first time since 2006. In the interim, there had been a change of Manager and an apparent relaxing in the requirement that all vehicles entering the property had to be diesel-engined to avoid, we were told, the risk of hot catalytic converters of petrol-engined cars setting fire to the paddocks. In discussions with the Manager when we arrived, it also became apparent that the overland vehicle route to the vicinity of the cave had changed and instead of trying to drive along a farm track that had not been maintained in more than 30 years, the best route was now, in part, across trackless paddocks and then right down into the Cave Creek Valley. Using this route it would be possible to drive to within 100m of the upstream entrance of the cave. However, we chose to park near a fence about 300m away.

*En route to the cave (Dirk Stoffels pic).*

For CSS, this was a big trip. We had about 20 starters in 7 or 8 vehicles, but for the trip through the property, we all crammed into five 4WDs. After we changed into caving gear, we separated into 2 groups and most people visited both ends of the cave. The middle section was sumped off and we did not go to the inner end of the upstream end to minimise disturbance to the bats.

In the stream of the upstream end, we saw the usual collection of yabbies, both coloured and white. However, some of our eagle-eyed youngsters, like Rohan Watt, also spotted a couple of small catfish. They were about 100mm long and on doing some research, it appears they were probably eel-tailed catfish (*Tandanus tandanus*) that is native to the Murray-Darling system.

After leaving the cave, the trip back across the paddocks was easy and we headed home about 4pm.



*Daniel in his brand new, but already dirty, caving suit (John Brush pic).*

*The assembling multitude (Dirk Stoffels pic).*

*Alex and the boys (John Brush pic).*

*The upstream end of Narrangullen Cave (Dirk Stoffels pic).*