

Journal of the

Australasian Cave and Karst Management Association



The ACKMA Journal

Official Publication of the Australasian Cave and Karst Management Association Incorporated.

Published quarterly in March, June, September and December.

The opinions expressed in the ACKMA Journal are those of the individual authors and not necessarily those of ACKMA Inc or its officers.

EDITOR: Tim Moore

SUB EDITORS: Tony Culberg, Andy Spate

Photos taken by the authors or editor unless otherwise acknowledged.

PRINTER: Hansen Print, Smith Street, Naracoorte, South Australia 5271.

Ph: +61 8 8762 3699

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FRONT COVER: The entrance stairs to Paradise Cave

PHOTO: Steve Bourne - Article page 5

ACKMA Inc OFFICE BEARERS 2018-2019

President

Andy Spate Email: president@ackma.org

New Zealand Vice President

Neil Collinson Email: nz.vice.president@ackma.org

Australian Vice President

Dale Calnin Email: aus.vice.president@ackma.org

Executive Officer

John Brush Email: executive.officer@ackma.org

Treasurer

Tony Culberg Email: treasurer@ackma.org

Publications Officer

Tim Moore Email: publications@ackma.org

Committee Member

Ann Augusteyn Email: committee@ackma.org

Committee Member

Scott Melton Email: committee@ackma.org

Committee Member

Cathie Plowman Email: committee@ackma.org

Webmaster

Rauleigh Webb Email: webmaster@ackma.org

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EDITORIAL

It is with pleasure that the major article in my second edition is one by Steve Bourne, my predecessor. Steve's caving travels in Vietnam and Laos, earlier this year, will provide the major article in this edition of the Journal and an anchoring article, as his description of his travels continues, in each of the next two editions. I have complemented, in a minor way only, Steve's recounting of caving in Vietnam in a piece I have written following my visit to Vietnam's Ha Long Bay with my 14-year-old son in July this year – a piece about what is happening to the caves dotted amongst many hundred limestone islands. At the President's suggestion, I invited Neil Kell to provide comments on my experience, particularly with respect to environmental cave impacts in this World Heritage Area. Neil's comments follow from my contribution.

As can be seen below (and as is noted in the President's report), the Association has been extremely fortunate in obtaining a grant from the Naracoorte Lucindale Council to assist underwriting the costs of the 2019 Guides' School and of the Association's Annual General Meeting.

On another front, your committee has agreed to make a contribution to the installation of interpretive signage at the Moa Bone Point and Moncks Caves near Christchurch. As the article in the December edition will explain, these caves are of Maori cultural and of paleontological significance. Discussions continue on how to achieve the appropriate outcomes and these will be reported (hopefully) in the December edition.

A publication I now have the privilege to read, as your editor, is the monthly newsletter of the US National

Caves Association, what might broadly be regarded as this ACKMA's equivalent for show caves in the United States. Some thoughts inspired by a recent edition concerning National Caves Day in the United States appear later in this edition.

I am pleased that I have received a strong response to requests for material to be published in the "Around the show caves" section that I trialled in the last edition.

Finally, I am delighted that I have received an unsolicited mystery shopper contribution concerning a visit to Wellington Caves.

I have been promised several more – for the next edition and for March 2019.

Although our first mystery shopper wrote of the shopper's family visit to Waitomo in New Zealand, the Wellington Caves contribution and those that I have in the pipeline are all from the eastern states.

For those of you who make visits to any of our cave systems without letting on that you are a member of the Association, I would welcome future mystery hopper contributions – particularly from visits elsewhere in New Zealand or from South Australia, Western Australia or the Northern Territory. As I indicated in the prologue to the first mystery shopper segment, anonymity is guaranteed!

Tim Moore

NOTE THE DATES!

The 2019 Guides' School

and

ACKMA's 2019 Annual General Meeting

will be held in Naracoorte, South Australia in May 2019

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- ◇ **Guides' School - Wednesday 15 to Friday 17 May**
- ◇ **AGM and associated field trips - Saturday 18 and Sunday 19 May**

Further details in the December Journal

President's Report

Several things have happened since Tim's first successful foray in Journal editing which seems to have had a successful response – no complaints anyway. Thanks, Tim.

We seem to be settling down to our next AGMs and conferences. Naracoorte next year for the AGM and Guide School. Thanks Nick, Cathie and colleagues.

ACKMA has been successful with an application to the Naracoorte Lucindale Council's Community Chest Fund. This fund provides support to organizations to undertake small projects within their sporting or community facilities, or to support events that bring an economic benefit to the Council district. ACKMA was awarded a grant of \$2,000 at the August Council meeting. The funds can be used for any expenses that support the objectives of hosting the meeting in Naracoorte. The grant will assist the organizing committee keep costs down for those attending the ACKMA AGM in May 2019.

And also very exciting: Jenolan for our conference in 2020. Thanks Jodie and team. This will be great! And I hear whispers for Waitomo Conference in 2022. Also wonderful. But you all need to think about the AGM in 2021. Equally important – who is going to put up their hand?

On a more personal front, once again, Neil Kell and I have been retained to provide advice on the lighting, infrastructure and ventilation of Seongryugul show cave on the east coast of Korea. More on this elsewhere in this edition of the Journal.

But, this serves as a reminder – our new editor, Tim Moore - continuously needs material for our quarterly Journal. Even a few lines and an image are great.

Many members will have met Moira Lipyeat who has argued for some time for better interpretation of two caves at Redcliffs in suburban Christchurch. Both are Maori heritage sites. The Committee, following on discussions largely involving Moira, Neil C, Mary T, Deb C and John B, has decided that ACKMA will support interpretive signs proposed for both Moa Bone Point and Moncks Caves. ACKMA is prepared to contribute up to \$NZ1000 for the design, production and installation of the signs on condition that:

- A) Ngai Tahu and CCC each agree to contribute a similar amount;
- B) It is understood (by Ngai Tahu and CCC) that ACKMA is not in a position to offer additional assistance for any ongoing maintenance and repair issues that arise; and
- C) ACKMA is acknowledged on the signs.

A plea to longer-term members ... Some time ago I sent a plea to the ACKMA mailing list asking for old ACKMA documents – minutes, treasurers' reports, etc. So far the response has not been at all dramatic – quite the opposite. So please help John and me as we try to build an administrative history of our Association.

But, maybe even more importantly, I have received a letter for the USA National Conference of Bar Examiners for a comment on an applicant. Addressed to me at ACKMA! I immediately emailed my close colleague, Steve Bourne, to see if he could assist me in this arduous task – checking out America's bars! Sadly, it turns out to be the bar of the legal profession in Washington DC. Sobs!

The EIS for the Snowy Hydro 2.0 'Exploratory Works'

John Brush and I have completed a not very substantial submission on behalf of ACKMA to the New South Wales government on the Snowy Hydro 2.0 proposal (see pages 37 to 39). First, we were concerned about the short time available for comment on a project of this enormous magnitude. Some six volumes with >3800 pages. Exhibited on 23 July for 28 days only! And an associated video clip that states that approval could be given so that "exploratory" works could start by the end of a year. There was just too much to absorb the complex document and 28 days meant about 135 pages to be read each day! Added to this is that neither John nor I knew the EIS had been exhibited until xxx days had passed.

In fact the whole document reads as if the project is a *fait accompli* – which it probably is given the fact that it is political stunt rather than an economic proposition. Unless the economic costs gets bigger than the political costs! Given the academic interest widely reported in the media recently, potential pumped storage schemes number in the hundreds, if not thousands, around this country. Perhaps these should have been looked at before the Snowy 2.0 'Exploratory Works' commenced – they have already had an impact on northern Kosciuszko National Park (KNP). To quote John in an email to me:

"But there must be plenty of small possibilities [pumped storage] that would in total equal the 2000 MW capacity of Snowy Hydro 2.0. Come to think of it, at just 2000 MW, it is less than the output of one of those 4x660 MW coal-fired stations that were the backbone of the NSW system back in the days (20 years ago) when power supply was cheap, reliable, and government owned."

The proposal is for an enormous amount of tunnelling, cavern excavation at a place called Ravine or Lobs Hole in KNP about 15 km down hydraulic gradient from Yarrangobilly. As well as cave bat roosts in old mine adits that the proposed project will cover, the significance from an ACKMA perspective is the extensive tufa deposits – certainly the most extensive in southern Australia – if not the whole country – which have created 'caves of construction' and tufa terraces. Some of these will be damaged by the proposed project. There are other environmental and social issues at this site.

Anyway – we at least waved the flag.

EDITOR'S INTRO

This article is the first in a series of three. It takes Steve Bourne's caving travels in Vietnam and Laos up to (and stopping before) his visit to Son Doong (Son Doong is the largest known cave in Vietnam).

Cave visits in Vietnam – some unusual adventures

Steve Bourne

After the UIS Congress in Sydney July 2017, Liz Reed and I hosted a post congress trip. One of our participants was Augusto Auler, a geologist from Brazil. Augusto and I discussed caving trips, as you do when with fellow cavers, including the possibility of a trip to Son Doong Cave in Vietnam, purportedly the largest cave in the world. Augusto booked our places as soon as bookings opened in October.

When I saw the price, 70,000,000 Vietnamese Dong (VND) or about A\$4000 I hesitated slightly, but reading the promotional material which states "more people have been on top of Mount Everest than in Son Doong", and the persistent rumours that the Vietnamese Government is still planning to install a cable car to and through the cave, I transferred my "hard-earned" to secure the booking and began planning my trip around the Son Doong expedition.

This was not my first attempt to visit Son Doong. ACKMA member Dan Cove invited me to join an expedition a few years ago, but we couldn't get a permit. Vietnamese company Oxalis Tours ("Oxalis") has exclusive rights to take visitors to Son Doong and was limited to 500 people per year until this year, when the permit was increased to 900 when a through trip was established. It would appear that the number of people willing to pay the price may be reaching a threshold too, as spaces are still available this year at the time of writing.

Augusto also made arrangements to visit Xe Bang Fei Cave in Laos as part of our trip and a few other caves in Vietnam.

During my travels over 3 weeks, I visited 12 caves operated by public institutions and private operators, spending approximately 120 hours underground during that time!

Phong Nha-Ke Bang National Park

Phong Nha Cave

I arrived in Son Trach, the village on the edge of Phong Nha KeBang National Park, two days before Augusto. I explored the village the first afternoon and found where boats departed to Phong Nha Cave, a very popular tourist cave close to the village. A boat to the cave if doing the two cave trip, Phong Nha and Tien Son is 400,000VND for up to 12 passengers.

I teamed up with a group of Germans and a couple from the US to share the boat cost and paid 250,000VND entry fees for the two caves. Phong Nha Cave is about 20

minutes by boat from the village. Motors are shut off once you reach the cave, the roof peeled back to allow viewing above and your boat is paddled through the cave.



Line up of boats at the entrance to Phong Nha Cave

There is no interpretation provided and the two ladies paddling our boat clearly had a lot of gossip to catch up on and spoke loudly for the whole time we were in the boat. This, combined with a Chinese group with a guide speaking through a megaphone made for a less than peaceful cave experience – but it was about to get a whole lot more interesting!

Phong Nha Cave is nearly 8km long with the tour visiting about 1km. On the return from the turn-around point, the boat docks and visitors step off to explore a high dry section of the cave. The number of people smoking was outrageous, with security stationed in cave taking no notice (and I suspect smoking as well). There are no bins that I saw so cigarette butts finish on the floor. I visited the cave 2 days later with Augusto early in the morning and cave floor was beautifully raked and swept. It appears that they accept the rubbish being dropped in the cave and simply clean each day.



Hundreds of people are in Phong Nha Cave at any one time

The cave has some very nice decoration - although getting good photos is a challenge with the number of visitors in the cave at any one time. It is a great cave and I am sure that the majority of visitors enjoy the spectacle. For those of us who have a deeper understanding and respect for the cave environment, it was a somewhat uncomfortable experience.



Visitors to Phong Nha Cave stand wherever they like for their photos. This appeared to be a professional photo shoot

Tien Son Cave (Fairy Cave)

This cave is a walk up around 600 steep steps from the Phong Nha Cave entrance which would explain why there was so few visitors in this cave. Aside from our group, I only saw two other people in the cave.

During the steep climb, I passed three vendors selling souvenirs and cold drinks. Each tried to sell me a beer on the way up but I resisted and said I would buy one on the way back down. The cave had incense burning at the entrance so I assumed some long-held religious significance to the cave, but then found information suggested the cave was found by a French explorer in 1930! I find it hard to believe the locals did not know about the cave given its proximity to Phong Nha.



Burning incense at the entrance to Tien Son Cave

Tien Son is heavily decorated and quite well lit, although, like Phong Nha, lampenflora is growing with lights on continuously throughout the day. The cave is accessed on a timber boardwalk which has had many repairs (with more needed) - in places this boardwalk was quite unstable. It was a peaceful experience after the masses in Phong Nha Cave.



Timber boardwalks and lighting cables in Tien Son

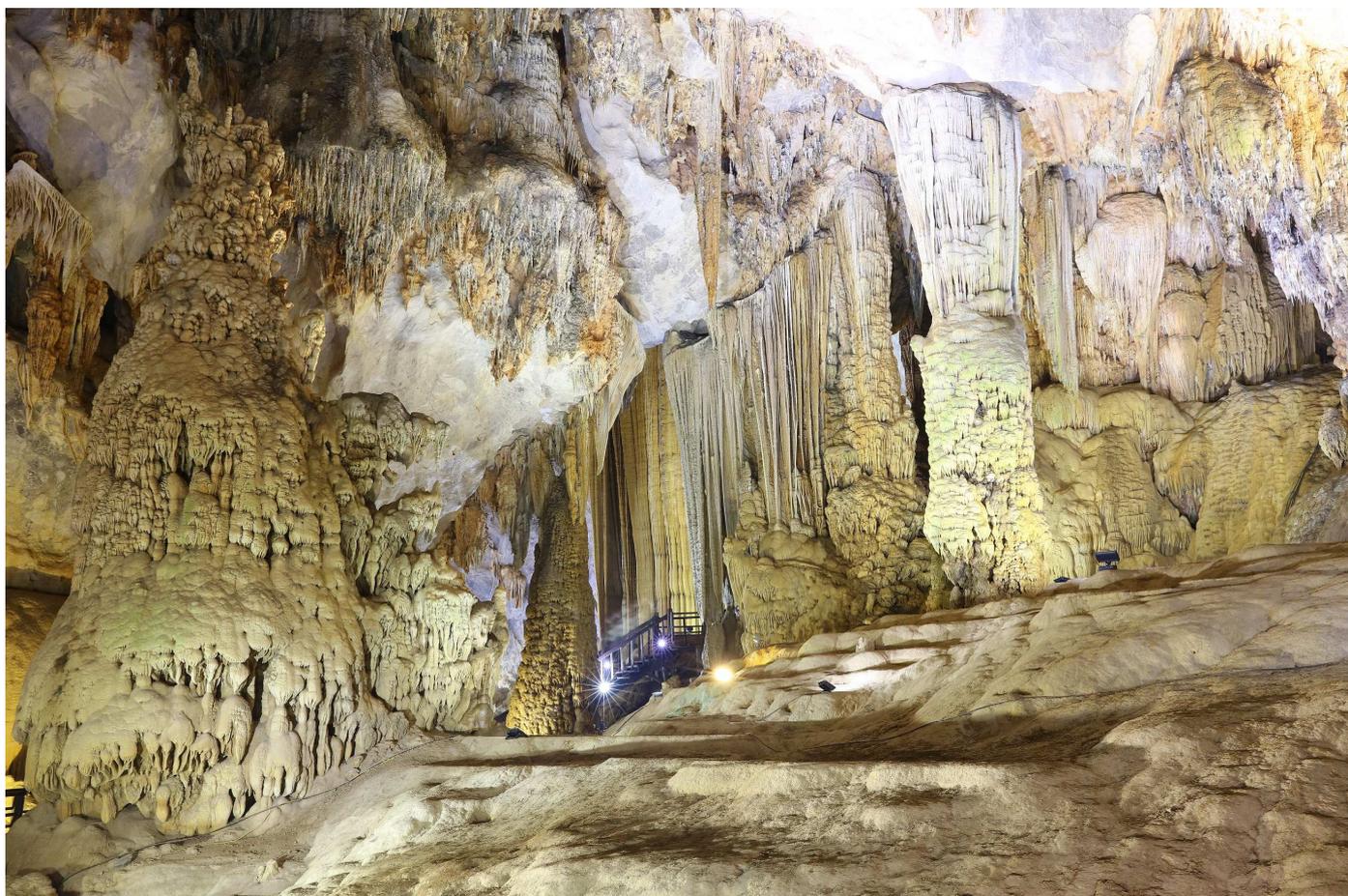
On the way down the hill, each of the ladies I had promised to buy a beer from had it ready so I had no choice but to drink three beers on the return journey. As would you expect, the further up the hill, the more expensive the beer! Still cheaper than water in Australia though!

Paradise Cave

Paradise Cave was discovered by a local man in 2005. Cavers from the British Cave Research Association explored and mapped its 31 km length. The cave is of impressive dimensions apart from length, with a height of up to 72 m and a width of up to 150 m.

I am aware that some ACKMA members were able to visit Paradise Cave prior to it being opened - Arthur Clarke and Brian Clark (and maybe others). I recall Arthur presenting images of this cave at an ACKMA conference.

The cave was opened to visitors 3 September 2010. An access road and internal road of this cave was built by a local company (Truong Think Group) and the cave has been opened to tourists since 3 September 2010. The car park is 1.6 km from the entry of the cave, and tourists can go by golf cart or walk on a paved road to the cave mouth. And only 1 km is open for tourists.



One of the many spectacular scenes in Paradise Cave

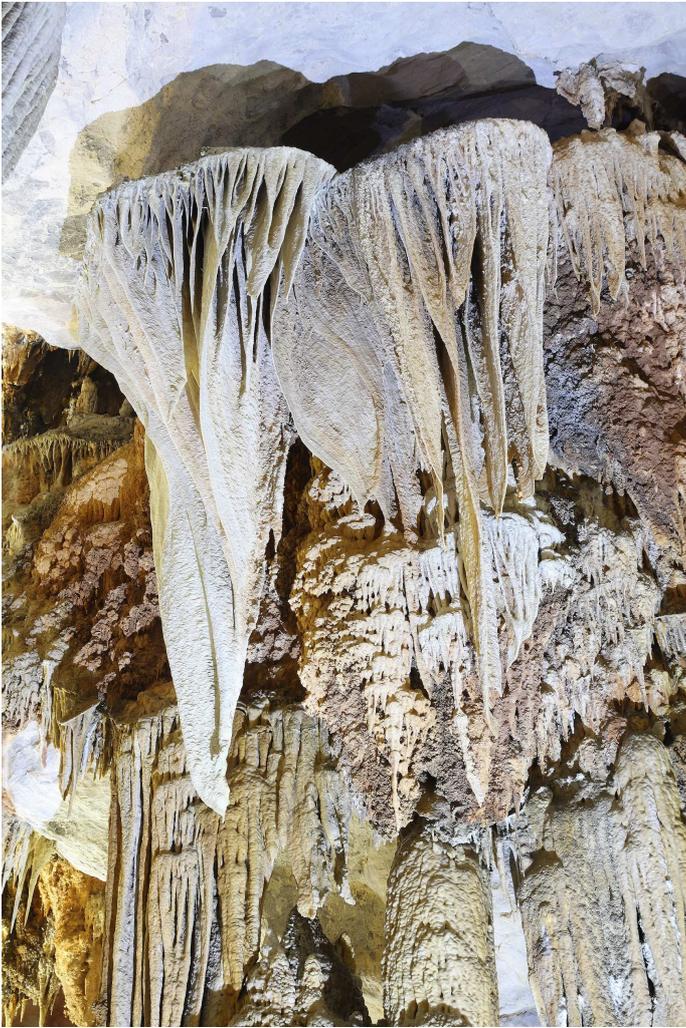
Paradise Cave is a spectacular cave – comparable to Postojna Cave in Slovenia for scale and sheer volume of speleothems.

An entry ticket is 250,000 VND although there did seem to be some flexibility in pricing if you happened to get to the ticket office at the same time as a tour group.

I visited the cave twice, once on a package tour and a second time with Augusto. On the second visit, a tour guide took our money and purchased tickets for us at 180,000 VND, presumably pocketing a small commission for the service.

Like Phong Nha, it is self guided, often with hundreds of visitors in the cave. I recommend visiting early or late in the day to avoid the masses. Tripods are allowed in the cave but with hundreds of people moving the timber boardwalks, obtaining quality photos is a mixture of patience and good fortune.

The cave has literally hundreds of cave shields. These are a less common type of speleothem, but in caves where you do find them, they often form in large numbers. Two that spring to mind are Dominca cave in Slovakia and Cango Cave in South Africa. **Editor** - for an image of these cave shields, see next page



Examples of cave shields in Paradise cave

The infrastructure is generally still in good condition as is the cave. Security cameras have been installed and guides/guards are located throughout the cave, but are fairly inconspicuous. A concern is the lighting system; very bright and left on all day. I saw few signs of lampenflora yet, but one suspects it is only a matter of time before it develops under the conditions found in this cave (**see example below**).



Dark Cave

I visited Dark Cave as part of a day long package that included the Botanic Gardens and Paradise Cave. When I purchased the day tour (1.3M VND) I was advised to bring bathing gear for Dark Cave. It was needed. Access to the cave was via a 400m zipline, this sounded like fun! When our group arrived for the tour, we were asked to change into our bathing gear and proceed to the zip line. Then the bad news – if you weighed more than 90kg, you couldn't go on the zipline for safety reasons. As much as I tried to make out I weighed far less than I looked, I was drafted out of the zipline queue (with three others) for the raft to the cave. Our group regathered near the zipline and entered the cave.

Dark Cave is so named for the black cave walls at the entrance. A river flows gently from the cave and we swam and waded upstream. The light supplied did not allow for a good look at the cave, but I soon learnt that this cave tour was not about the aesthetics nor understanding the cave environment, but having fun.

We were guided through a narrow slot passage winding its way off the main cave passage, to a mud filled pond, where we were encouraged to frolic as a group. Who could argue? Once in the pool, we quickly learnt why this was special. It was impossible to sink! In fact, if you became horizontal, it was extremely difficult to get your feet back on the ground.

After lolling in the mud for a while, we wound our way back to the main passage and washed off as we left the cave. It was not the most cave friendly activity I have ever done, but was probably low impact on cave values given the small section of cave used for the tour. After exiting the cave, we used rafts to make our way back to the main visitor centre. Except me. I decided I would swim the 400m as I had been swimming 1000m every morning for summer in Australia. The tour operators were not amused!

This ended our day tour and we were invited back to the visitor centre to enjoy a bottle of local rum. Our group excelled and we consumed 2 bottles of rum and a generous Australian bought the beers for the long drive (20 minutes) home.

Dark Cave is clearly targeted at the young backpacker market and does very well at that. For the young at heart though, the package that included the Botanic Gardens and Paradise Cave as well, I thought it was good value.

Right - Making “survival preparations”. With the anti-dehydration pack for the trip home from Dark Cave



Oxalis Tours

Hang Tien One Day Tour – US\$88

Augusto now joined me. The Hang Tien Caves are about 70km from Son Tranch. Oxalis staff collect you from your accommodation to transport you to the Oxalis centre at the village – the start of the cave tour. Augusto and I were joined by 11 others for the tour. As we were an oversized group, two guides were provided for the tour. The guides, Dong and Thi, made an exceptional effort to learn everyone’s name on the drive to the Oxalis centre - seemingly easily remembering a dozen names of multiple nationalities. Dong and Thi were really high energy, which I learnt was typical of Oxalis guides over my tours at Phong Nha.

The attention to detail with Oxalis tours is excellent. We were provided a briefing of what we could expect on the tour; footwear for those with unsuitable boots; and valuables safely locked away.

Our cave was a 20-minute drive from the centre along a 4 WD track - except we were in a mini bus! Half way into the journey, we had a flat tyre. This was only a minor issue as the flat was quickly removed and the spare.... nowhere to be found!!! An urgent radio call back to base had a spare van to us quickly and we made our way to the drop off point for the cave.

Then it started raining.

A light rain fell for the entire 6km walk to the cave, up and down very steep and slippery paths through Vietnamese jungle. When the jungle parted to reveal the cave entrance, we were rewarded with an amazing view. An 80 m high entrance disappearing into a mountain!



Approaching the 80m high entrance to Hang Tien

A light snack at the cave entrance and some photos, and then we entered the cave. Not far in, the cave roof went up considerably (remember the entrance is 80 m high!) with an enormous dome in the roof - 100m or so high (see below). At this point, I started to slow the group as I photographed the best scenes, which were plenty!



The cave had bats, great cave decoration, and some good scrambling to reach the end of the cave. Here we enjoyed lunch and some great daylight views from the cave exit.

The longer tours (there are Hang Tien 2, 3 and 4 day tours) continue on and explore more jungle and caves beyond where we turned around. We made our way back along the 6km path to meet the mini bus, fortunately without the rain of the morning walk. Dong and Thi sang most of the way while the rest of us huffed and puffed our way home.

With the delays of the flat tyre, it was about 12 hours from pick up to drop off, and I thought fair value for the price paid for the tour.

Hang Va Tour US\$353

This is another Oxalis activity- this time a two day trip visiting Nuoc Nut and Hang Va Caves, which are located within the Phong Nha National Park. This National Park was just a short 15-20 minute drive from our accommodation but still time for the guides and group to learn each other's names. This time, the 10 member group comprised German, South African, Canadian, Brazilian, English, Belgian and of course Australian.

The walk to the cave was much easier than to the Hang Tien caves and we were quickly into the darkness and wetness. The tour information does warn you that your feet will be wet for most of the time and that good foot hygiene is important. I was well armed with powder and dry socks and didn't have any issues, but I did see several examples of "footrot" during my time in Phong Nha. If you ever tour here, take seriously warnings about looking after your feet!

Nuoc Nut Cave was mostly walking passage with some good photographic opportunities. As soon as I extracted my Canon 5DSR from my bag, I was the designated trip photographer. This was great as I had willing models for each shot.



Our guide, Annetta, was brilliant, excellent knowledge of the cave and jungle plus a good eye for where photos could be taken. I enjoyed the tale of the king cobra in the cave and lamented our group was not so lucky. It's difficult to judge the length of the cave we explored that day, but suggest it was more than 2 km to the end (and then a 2 km return trip if needed). Nuoc Nut and Hang Va Caves are very close together, but groups would need to exit one to enter the other. However, a guide had recently found a connection which Annetta was keen to try, as was our group, so we donned our life jackets and swam through a passage - quite narrow in places - and exited through the Hang Va Cave entrance to our campsite in the cave doline.

On this tour, participants are required to carry all of their clothes, cameras and any other personal items. The great thing is porters carry the tents, water and food - plus a chef is at the camp site to cook your food! We had a great night of food and the local rice "wine" (= whisky - a potent brew similar to what some ACKMA members would have tried at the 2010 Mulu ACKMA AGM). The English girl was particularly enthusiastic on the rice wine (and spent numerous trips during the night outside her tent restoring fluid balances to the appropriate levels).

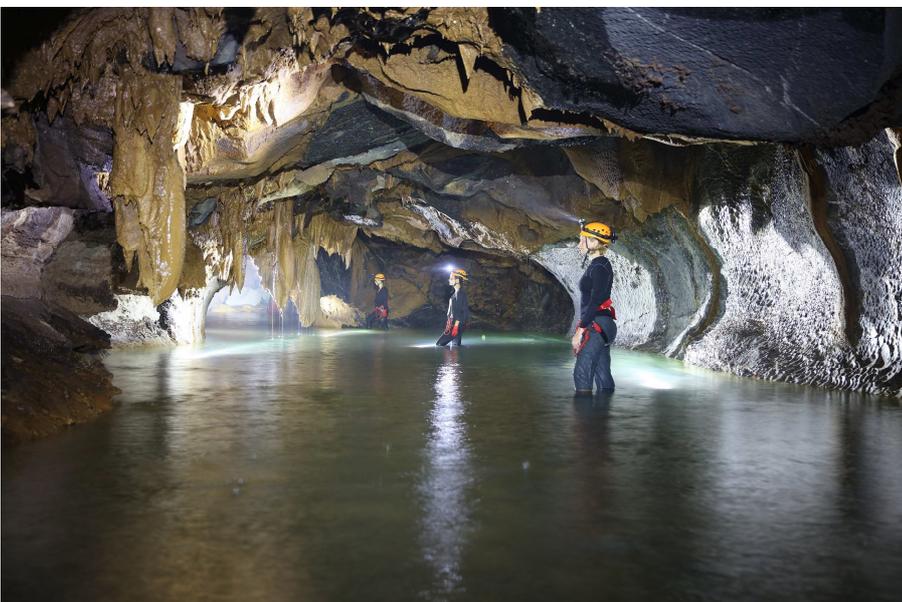
I awoke at about 5 am the next morning and explored the jungle near the camp, spying monkeys, pygmy squirrels and other wildlife. By the time the rest of the group crawled from their tents, the best wildlife viewing was over. The chef and porters also woke early and prepared a breakfast feast. Caving trips have never been like this before!

Hang Va Cave

We set off into Hang Va Cave at around 9 am. I was very keen to see the calcite towers that this cave is famous for and feature on many promotions. We were instantly wet again, so no point in starting with dry clothes. As designated photographer, I was in high demand with some excellent scenes in the stream passage and at a small waterfall. Enthusiasm waned when we reached the end of the main passage and I wanted someone to pose under a shower from the roof so I had to do that one myself.



Nouc Nut had water most of the trip, which made for some excellent photos



Stream passage in Hang Va

Part of the way back along the trip, we donned harnesses for the climb to the site I was so keen to see. It was a reasonably easy traverse for which many cavers would be more than happy simply to have a hand line (or not) but Oxalis has set these trips up to cater for all levels of experience. We had some on their first ever caving trip and a couple of us who had seen a few caves before. One of the German girls became quite nauseous and needed to be taken from the cave. This is where the quality of training of the Oxalis staff came to the fore again as she was quickly provided some medication to settle the problem and quietly escorted from the cave by one of the assistants. I felt very sorry for her as she still had to do the trek out to the meeting point with the bus.

The upper level of Hang Va is extraordinary. Massive gour pools that you need a ladder to climb up and down the other side, crossing what are large pools in the wet season, to reach the calcite towers. When Annetta, the guide, announced these were the only example of such a cave formation anywhere in the world, she was slightly deflated when I quietly explained that I had seen the

same formation (albeit smaller in Gastonia Cave on Rodrigues - which few people would have seen) and Augusto mentioned examples from Brazil.

We all agreed that what we were looking at was absolutely outstanding. I was slightly disappointed that the water level was low and the fabulous colours generated in promotional images could not be replicated. I would love to go back in the wet season and see this cave! We were allowed a good deal of time to take photos but could easily spend a whole day just in this section of the cave.

Infrastructure in the form of individual steel platforms just over foot size are placed on the floor for protection with ladders in place to scale the gour pool walls - yes, you need a ladder to get over them!! All of this infrastructure is removed from the cave at the end of the season as it floods. This must be quite a logistical and physical challenge but this infrastructure ensures the cave is well protected.



The extraordinary calcite towers and gour pools in Hang Va

Tu Lan (Rat Cave) One Day - US\$79

Augusto's friends Lobo, Ezio and Lilia joined us after we had completed the Hang Va trip. We joined a Tu Lan one day tour, back to the same area where we had taken the Hang Tien tour. Tu Lan is offered as 1,2,3 and 4 day experiences, exploring more caves and more of the jungle

in this area. Our guide was once again Dong, who had led our first trip. The promotions for Tu Lan use the movie Kong - Skull Island, as many scenes of the movie were shot here. We got to walk in the footsteps of Kong but he did not make an appearance.

When I got home, I watched the film and could make out the location of some scenes and compared them to my photos. Kong's home in the movie was a cave with a rather uninspiring name – Rat Cave. It was a fairly gentle walk to the cave, most of it on the concrete road constructed by Hollywood moviemakers with a couple of small river crossings just near the cave entrance. Rat Cave is modest by Vietnam standards but with some nice decoration and a few hundred metres of passage to the exit point. We checked this out and retraced our steps. Of the tours we did with Oxalis, this one had the fewest restrictions within the cave and the cave is showing signs of wear and tear. This could be from locals as much as paying tourists too.



Preparing to cross the river to Rat Cave, visible in the background

Toon Cave

We then walked to Toon Cave where the trip became a lot more interesting. Everyone was provided with a life jacket and we swam 150m into the cave to reach a dry point. The water is very pleasant and very clean so it was great fun floating through the cave. A green viper was spotted on the cave wall, but unfortunately no decent holds to stop and get a photo. I then realised that the only way the viper could have got there was also by swimming, so that gave us something to focus on.

Lunch was provided at the most exquisite camp site imaginable. A small waterfall as the cave exit falls into a crystal clear blue lake, with jungle 100m across the other side. Another swim and we reached our food. Yet another delicious spread of local delicacies - again with plenty of pork. The return trip through the dry section of the cave required the scaling of a 15m ladder. Once again, safety was a priority and everyone had a safety line.

On the return walk to the village, locals were feeding their water buffalo. I found it interesting that the people living within the Tu Lan Valley speak a language so different that our guides could not converse with them. An interesting custom is burying their dead in unmarked graves, although the grave site is carefully maintained. After around 15 years, the bones are excavated and placed in a small box with a concrete memorial and headstone.

Of the tours I did with Oxalis, this was the easiest and somewhat lacked the wow factor generated by the other trips. It probably would have been fine if I had done this trip first, but after Hang Va and Hang Tien, it was a second tier experience. On the other hand, Dong, our guide, said the 4 day Tu Lan tour is his favourite and has lots to offer.



After the swim through Toon Cave

To be continued

Ha Long Bay - environmentalism and “sacrifice caves”

Tim Moore

In 2010, the older of my two sons was to complete his secondary schooling. In order to stimulate his study habits, I made him an offer. The offer was this:

If you apply yourself diligently, next year I'll take you for a week to anywhere you choose within about 11 hours flying time from Sydney.

His response was to say:

You're on! I'd like to go to Hanoi.

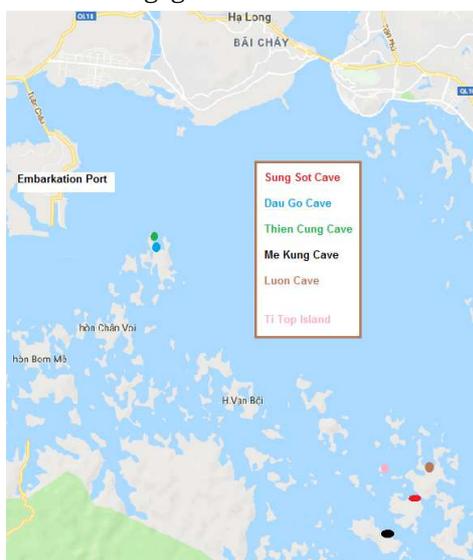
Anticipating that he would keep his end of the bargain (as he subsequently did), I set about preparation for the trip. One element I was determined to build into the itinerary was an overnight cruise on Ha Long Bay. This I arranged through the hotel in Hanoi which had been recommended to me by my brother (who had visited Hanoi on a number of occasions as part of Australia's foreign aid program in supporting judicial capacity building within the Vietnamese judicial system).

Our father/son bonding holiday went off without a hitch, including the arrangements for the overnight cruise on Ha Long Bay.

Fast forward to 2018.

My wife and I have been taking our teenage children to language school on Bali for the past five years during their midyear school vacation (they attend a school where studying Bahasa is compulsory until the end of Year 8). I thought it would be a good idea to continue on for a father/son bonding week with my younger son. I asked him if he, too, would like to visit Hanoi (with us retracing my steps with his brother – including an overnight cruise on Ha Long Bay). Unsurprisingly, he went for it like the proverbial rat up the proverbial drainpipe!

Ha Long Bay was inscribed on the World Heritage Register in 1994. It encompasses 755 islands over 434 square kilometres. In 2014, the Cat Ba Archipelago was added but is not engaged for this article.



The map gives an idea of the size and distribution of the many islands in the portion of Ha Long Bay closest to the embarkation harbour and used for tourist cruising.

However, by the time you reach this point in my travelogue, dear reader, you may be wondering what in heaven's name does this have to do with caves?

For now, it is sufficient to note that there are, as our guide on our cruise junk advised me, significantly more than 400 individual, substantive known caves spread across the Ha Long Bay islands with some of the larger islands having multiple significant caves located on them. The vast majority of these caves are, at best, only partially explored. A small number of these caves have been made accessible for use as guided caves for the tourism industry. It is these guided caves (and the pressures on them) that triggered me to write this article about environmental management changes now mandated for the tourism industry operating on Ha Long Bay.

The trip was a success, but there was a marked contrast between the two visits to Ha Long Bay, including the visit, on each occasion, to Sung Sot Cave on Bo Hon island. This article discusses the environmental changes adopted by the Vietnamese government in managing the tourism industry impacts on Ha Long Bay and the contemporary understanding of the role that Sung Sot Cave (and the other tourist caves on islands within Ha Long Bay) play as “sacrifice caves”, serving the increasing demands of the tourism industry.

On both occasions, the visit to Ha Long Bay commenced with a four hour bus trip through the Vietnamese countryside. There had been significant improvements to parts of the road network during the period between the two visits. However, there was no improvement in the apparently suicidal driving habits of the riders of the many thousand motor scooters we observed both in the towns and villages and on the open road.

Unlike during my first visit, the guide on the bus (who turned out not to be the guide accompanying us on the cruise) spoke of the need that had been identified in recent years to take steps to protect the environment of Ha Long Bay from the increasing pressures of the rising demand of the tourism industry. Although he did not give any comparative figures, the information about contemporary cruising demand was extraordinary. At the present time, there are over 500 cruise boats operating on the Bay and out amongst the limestone outcrops that are its attraction.

These boats are in two quite distinct and differing configurations. First, there are smaller boats designed to accommodate single day visitation. My observation was that these appeared to have capacities ranging from 20 to 40 visitors. From what was able to be seen on the water, a very high proportion of these visitors appeared to be local tourists (perhaps as a result of increasing Vietnamese affluence from the now more open national economy).

The second class of vessels were those such as the junk upon which we were to embark. These vessels had two or three decks of accommodation. They had indoor and outdoor observation areas; dining and kitchen facilities; and crew accommodation spaces. These vessels ranged in size from our comparatively modest one (with 12 cabins across two levels) to quite large vessels that appeared to have 40 or more cabins across three levels. Unsurprisingly, all prices for foreign tourists were in US dollars and ranged from the US\$160 per head for an overnight cruise (on a more humble vessel such as our own) to cruises of two or three nights with prices of up to US\$1000 per head on the more swanky vessels.

The more than 500 vessels in total are plying this trade out of a port on Tuan Chau Island connected to the mainland by a causeway and located some 15 kilometres away from Ha Long City proper. This embarkation port itself showed the nature of the increasing tourism pressures as there were at least 10 multi-storey hotels under construction along the road which ran around the shores of this harbour.

The guide on our junk informed us that, at the present time, there were about 500,000 tourists per year cruising on Ha Long Bay and that this number continued to increase. This, he said, had given rise to an understanding in government that protective measures had needed to be introduced and an acceptance by tour operators of the necessity of doing so.

The embarkation and commencement of the outward cruise differed little on this occasion. From what I had observed when travelling with my older son on my earlier visit, the only observable change was the forest of cranes above the skyline of Ha Long City, reflecting the number of completed and under construction 10 storey or so buildings (also reflective of accommodation demand from the booming tourism industry).

There are two operational aspects of the vessels that stay out overnight that have changed for the better.

First, each vessel has now been assigned a designated night-time mooring location. In the past, the vessels were free to choose a location anywhere amongst the islands (limited only by the sailing time back to port). Although each operator had its own favourite overnight mooring place, these could vary unpredictably. The fact that these are now organised with appropriate privacy separations between the various vessels (but nonetheless at identified locations) enables greater efficiency for the operation of the pump-out barge which collects the grey and black water from the holding tanks on each of the vessels. In the past, the activity of this barge (**picture above right**) was on a somewhat haphazard basis with the barge crew needing to hunt for the vessels to do the pump-out. Now, my guide told me, these arrangements are on a strict appointment basis so that there is a known roster of where and when pump-out will take place. This, I was told, significantly lessens the risk of accidental discharge because a vessel might be overlooked (as had been the case in the past haphazard overnight mooring regime).



The second change related to regulation of swimming by tourists. During my earlier visit, our vessel stopped to permit the guests to go swimming. The location for doing this was randomly selected with the vessel dropping anchor at a convenient time and location. The guests jumped from the embarkation door; swam around in the vicinity of the vessel; and climbed back on board using a stainless steel swimming pool style ladder. These activities are now regulated with a wharf having been constructed on one of the islands (named Ti Top Island, the Vietnamese pronunciation of the name of a Russian Air Force officer, General Titov (**picture below**), who had been lent by the Soviet Union to “Uncle Ho” in the late 1960s to assist train the Vietnamese Air Force in their “glorious struggle against the American imperialists”).



This island has a sandy beach and organised disembarkation/embarkation wharf facilities to be used by tenders from the larger vessels or directly by smaller ones. There are changing and ablution facilities and the beach is protected by a netted enclosure approximately 100 m long and extending some 30 or so metres into the Bay. When we were there, several hundred swimmers were visible at any one time - with a regular turnover as the tenders came and went.

My guide informed me that these arrangements had had a positive impact in two respects. First, the organising of human and litter waste collection had limited this aspect of tourism's impact. Second, the fact that there was now a more confined area where boats would moor for such activities meant (as was also the case with the designation of the overnight mooring locations) that there was confinement of the potential damage to the floor of the Bay itself.

Indeed, as a consequence of the increasing pressures of the tourism industry, this facility at Ti Top Island was, itself, becoming overcrowded and a new facility was under construction to utilise a beach on another island a kilometre or so away. We were able to observe, during our passage back to harbour, that construction of this new facility was well advanced (see photo below). When it is operational, however, it will lack the "attraction" of a statue of the General!



The visitation process has evolved by better sequencing management of groups from the various vessels. This has meant that, inside the cave, there is better and more efficient sequencing of "ripples going down the caterpillar" as the groups move through the two chambers (an interconnecting pathway having been cut to join them). This meant that the groups were better able to be confined to the organised concrete or earthen floored walkways and, my guide informed me, had resulted in reduction (but not elimination) of visitors seeking to climb on the formations.



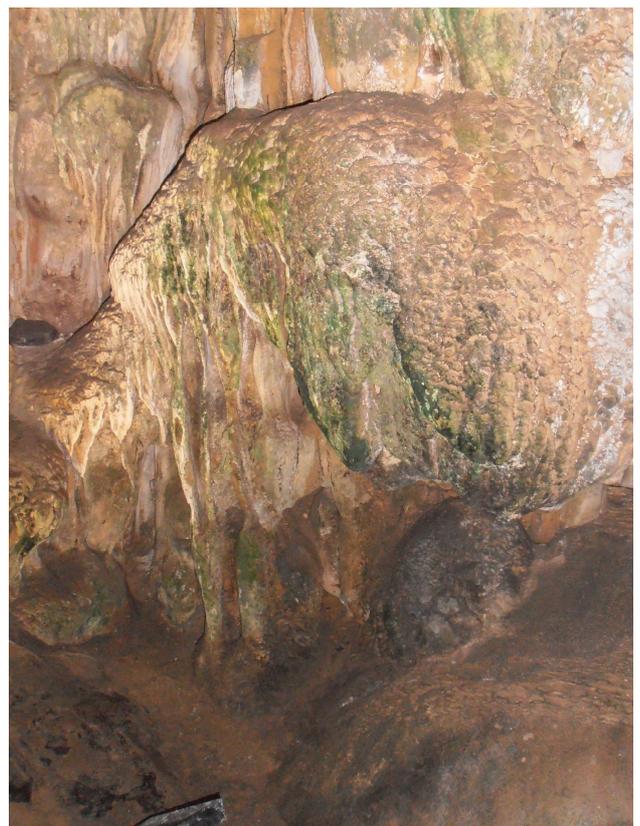
The high tourist throughput has meant that there has been significant lampenflora impact from the older style lighting system used and my guide was unaware of any contemplation of upgrading to an LED system at this cave or any of the other tourist caves. Indeed, although not at Sung Sot Cave, some other tourist caves are lit using rainbow lighting to "enhance" the cave's formations.

Enough digression, I now turn to the caves.

First, changes have been made to where tourists are permitted to disembark from their vessel to go kayaking. In the past, such activities took place at a wide range of locations. At one of these, depending on the tide (the tidal range being some 2 m), it was possible to kayak into Luon cave. My guide advised me that this was still permitted, but was now controlled so that entry did not happen at higher points of the tide cycle when there was a greater risk of damage to the formations from paddle strike.

However, the major change concerning cave impacts arose, I was told, from a better understanding of the impact that tourist groups had on the various show caves to which access steps and paths had been organised and through which tour groups could traverse.

For Sung Sot Cave, there are formalised and well organised facilities with separate arrival and departure wharves and a one-way circulation pattern up to the cave and then down to the embarkation wharf.



This year, our visit was at the commencement of the wet season. In 2011 and now, there was virtually no moisture evident in the cave with hydraulic activity confined to only one area. On each occasion, save with respect to this extremely limited area, each of the chambers of this cave looked dead.

I remarked upon this to our guide and he indicated that this was a position in common with some of the other caves (although he was not precise as to whether this applied to all the other tourist caves). He did, however, observe that there was a growing awareness amongst the tourist operator community about the negative impact that the very high levels of visitation had on the caves that had been adapted for tourism purposes.

He said that, unlike what was happening with the development of a second designated swimming beach location, he did not anticipate that any more caves would be opened up. What he thought would happen was that the time period across which visits were scheduled would be extended from the presently, broadly speaking, mid-morning to mid to late afternoon. In the longer term, he expected that there might well be lighting to the pathways and in the wharf areas to permit cave visits to extend into the evening. This, he thought, would lead to potential significant expansion of utilisation of the caves without the necessity to adapt and impact new caves for tourism purposes.

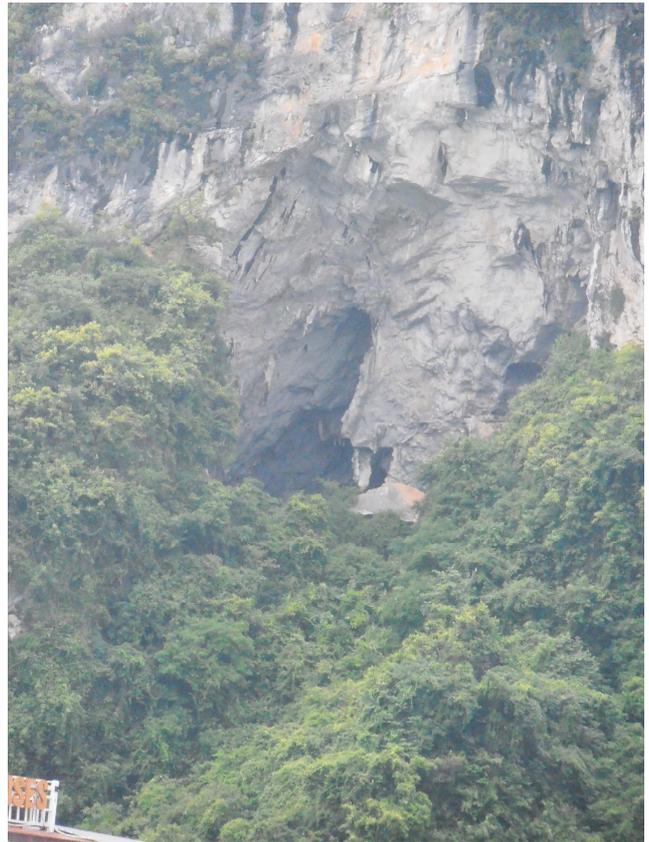
It is fair to observe that, as we threaded our way through the channels between the myriad islands passed during our cruise, there were a number of obvious significant openings in a number of islands – with sufficient darkness behind to at least hint at the potential existence of a cave system beyond.

In this context, two matters warrant observation. The first explains the caves' relevance (at least for us). It comes from the official description on the UNESCO website of the reasons for the (now expanded) World Heritage inscription. A small, but relevant, part reads:

Possessing a tremendous diversity of caves and other landforms derived from the unusual geomorphological process of marine invaded tower karst the caves are of three main types: remnants of phreatic caves; old karstic foot caves and marine notch caves. The property also displays the full range of karst formation processes on a very large scale and over a very long period of geological time, possessing the most complete and extensive example of its type in the world and providing a unique and extensive reservoir of data for the future understanding of geoclimatic history and the nature of karst processes in a complex environment.

Second, although anecdotal, our guide's confirmation that there were many hundred known caves, many of significant size, makes it clear that managing the present tourist visitation caves in a fashion which will increase their utilisation (and, also, it is reasonable to assume, increase the extent of the human impact on them) is an environmentally responsible alternative that will meet the

demands of the tourism industry and avoid further environmental sacrifices on its altar.



Neil Kell's comments

In October 2015, I visited three caves at Ha Long Bay following a one week consultancy at Trang An Landscape Complex south of Hanoi - it is in simple terms a inland version of Ha Long Bay. At Ha Long Bay my 'announced arrival' as a touristic visitor turned into a management accompanied tour of review and assessment of Thien Cung Grotto, Dau Go Cave, and Sung Sot Cave over three days travelling out by both the management launch, and the staff ferry. Management asked if I could provide a report - it ran to 15 pages about show cave lighting, management, and operations as I experienced it.



In brief, I was shocked by the extent of lampenflora (and the lack of understanding of it) and the seeming disregard for in-cave conservation management. Adding to the lampenflora impacts is littering by both visitors and staff and includes rusting light fittings, spent lamps, decayed walkway materials cunningly hidden out of view and under walkways. And in Thien Cung Cave, there was the stench of a site for urination adjacent to where an in-cave attendant was positioned.

Then I reflected back some 20 years previous to a conversation I had had with the late Elery Hamilton-Smith who had just completed the second stage World Heritage Area assessment process. Elery expressed his admiration of the caves and the management's regard for the resource conservation. He was confident that new developments of the show caves were well executed and that management had a good focus on their stewardship of the resource and the visitor experience. In Elery's words - "I feel confident those caves are in good hands".

So in 2015 - just two decades later, I am being accompanied through these caves by the same management person who accompanied Elery during his assessment work. In Thien Cung Cave, this person

commented to me that when the cave was discovered and then opened for showing that much of the cave surfaces were white, and now those once white surfaces are variously mid brown-grey tones. I was asked why this was so - my reply was that it is air-borne visitor detritus settled onto every surface.

Lampenflora was similarly ubiquitous and seemingly equally not identified as an unacceptable show cave impact requiring active cave management. I bought locally in Ha Long City some sodium hypochlorite and a pump sprayer, and made up the approved solution to spray on a test site to demonstrate one possible method of control.

From this experience I returned to Australia quite stunned in my thinking that such wondrous karst resources - in less than 3 decades - could be so degraded, and possibly irretrievably so. I was about to turn 65 in a few months and thought that maybe retirement from being involved in show cave development is possibly the next best thing for me. Experiencing show caves so degraded and mis-managed in such a short time scale under World Heritage Area oversight was disturbing.

Further adventures in Seongryugul, Ulsan, South Korea

Andy Spate

Neil Kell and I have been working in Seongryu Cave for many years - mainly in 2006. I visited the cave during the Samcheok City World Cave Expo in 2002 - on a very, very wet day in Samcheok - but dryish in Ulsan. That day elements of the Expo were washed away. A few days later Lana Little visited Seongryugul (gul = cave) and had to swim through parts of the show cave!



Seongryugul Ticket Office. Somewhat classier than ours!

The cave, designated Korean Natural Monument No. 155, was the first show cave to open in Korea - in 1963.

But, it has a much longer history as the use of Korean caves as refuges during times of invasion stretches back a millennium or more. Seongryugul, near the east coast city of Ulsan, is mentioned in a book written by a Gok Lee in 1349. There are two examples of Chinese script engraved in the rock at the cave entrance which are said to date from this time.

The cave was initially called Seonyugul because it was a beautiful site for mountain gods to stay and rest. Its current name originated during the Japanese Invasions of Korea (1592-1598). During the wars, Buddhist statues housed in the nearby temple were relocated to the cave; hence the name, Seongryugul (Cave Where Buddha Stays).

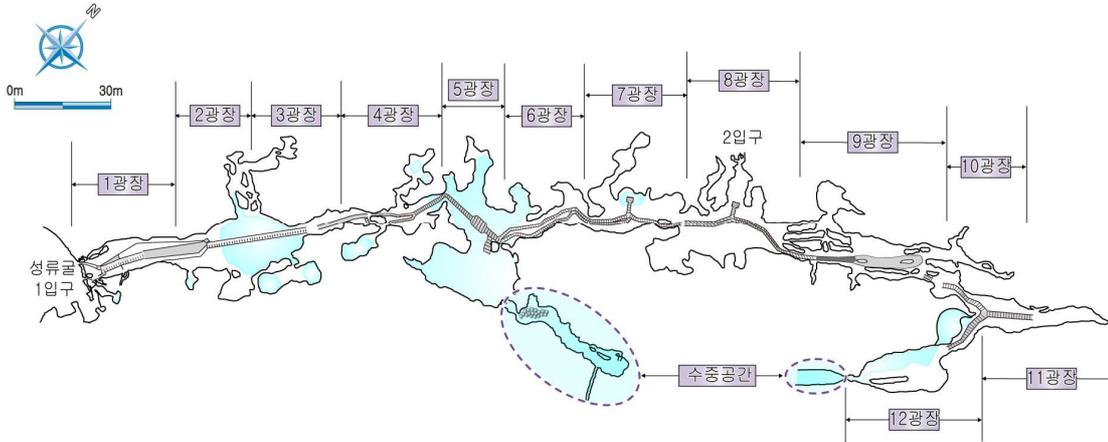
Ancient Chinese characters are engraved in the limestone just at the entrance to the cave and a short distance inside. I am unable to find what they spell out. They are said to be recording a public officer's visiting the cave on March 8 in 544 CE (Silla Dynasty, 57 BCE- 935 CE). There are 38 characters carved on the limestone near the exit of the cave each are approximately three centimetres wide and four centimetres in height. Only 30 of them are recognizable.

Seongryu cave has long been an inspiration for many artists during history including a travel journal during the Goryeo Dynasty (918-1392) and in poems and paintings during the Joseon Dynasty (1392-1897).

Tragically, as happened in other Korean show caves that Neil and I have worked in, during either (or both?) of the Japanese occupations, Koreans took refuge in Seongryugul which was then blocked by the Japanese - scores of men, women and children starved to death.

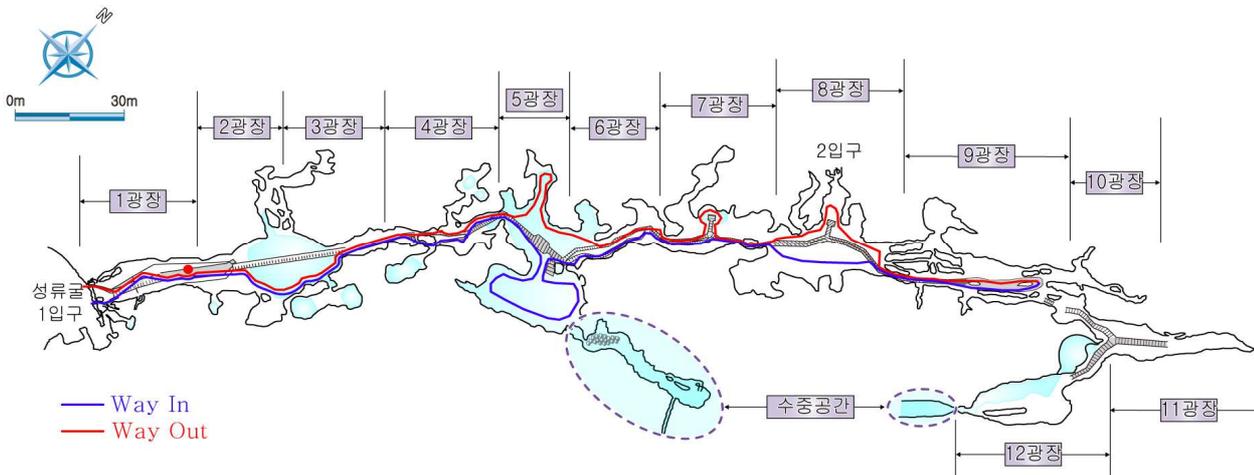
Anyway, Neil and I were retained in 2006 by the Korean Cave Research Institute (KCRI) to provide advice on relighting and infrastructure refurbishment. Some of our recommendations were accepted, some weren't, as one would expect. A number of lessons arose – for example; don't drill through waterproof housings to mount your new lights ... Don't buy cheap LEDs.

We have been provided with figures that suggest the maximum daily visitation is about 8,000; the daily minimum 50 with about 300,000 annually. The maximum figure may be a considerable under estimate. And this in a show cave only about 540 m in path length (in and out). There is one section where one has to get down on (low) hands and knees!



Existing route. Number 1 on the left hand side is the entrance. The long rectangles with the cross-hatching are stainless steel pathways or stairs. The grey is concrete – with the paving stones in Section 9. Blue is lakes – oval dashed circles are dived connections. Point 2 in Section 8 is the proposed second entrance site (already somewhat open to the outside.) Only Sections 1 to 10 are currently used by visitors. The high levels of carbon dioxide occur in Section 9 and 10.

So Neil and I were invited back by Dr Kim Lyoun of KCRI to provide further advice on recent redevelopment projects. The projects involve removal of much of the existing infrastructure and re-routing the elevated pathways over the lakes to provide a better two-way cave experience. There is a possibility of a second entrance for use in busy times allowing for one-way access to the cave. My memory told me, vividly, I had been through the cave and down the exit pathway to the village. Alas, it was a dream.



Proposed route. Note how the new route hugs the walls rather than dividing the chambers. In Section 5 in particular the in and out routes are well separated. And again, to a lesser extent, in Section 8.

Whenever I am in Korea I tell any Western companions that 'each day in Korea you will see something different!' I have been to Korea 25 times with an aggregate of over two years' time there. One day, I saw a shop that sold only eggs – that is specialization! Another difference this time was that I had a twelve-year old young man – Dr Kim Lyoun's son - as our interpreter. Master Kim Jihun was fabulous – great English, helpful, etc. Just great. He may come to Australia in the near future and I hope all Australian cave sites will make him welcome and support his visit if it happens.



Captain Lee Jong Hee and Master Translator Kim Jihun go recreational boating on the first lake.

KCRI had a number of concerns – chief of which is elevated levels of CO₂ in the back sections of the cave – 8,000+ ppm (0.8%) which occur in the summer months. The accepted work safety level is 5,000 ppm (0.5%) for a working day exposure so this should not be a problem for the self-guided visitors - except possibly for the elderly or respirational impaired people. Ventilation has been suggested ... there may be pluses and probably minuses from such an approach. There has been research into the ventilation of this cave using radon-222. More on that later.

Seongryugul is infested with stainless steel which dominates much of the within-cave viewscape.



A stainless steel highway. Note that the effect is augmented by the flash but I am sure you get the picture



Note the variation in handrail height and the horizontal bars

**Have you noted the dates
on Page 3 yet?**

It is very difficult to overcome the Koreans' wish to have ornate designs in their infrastructure. Neil and I have been recommending, for years, horizontal wires beneath hand rails. We have worked on a number of show caves in Korea and had no success. The response is that kids will stand and climb on them – but many of the caves we have worked on have horizontal bars (figure 2). Even easier to climb! Reduction of stainless steel is a must. Another issue is the variation in handrail height and diameter in many Korean show caves. And abrupt handrail transitions at steps.



Handrail transition at a step. Neil and I each witnessed several stumbles as a result of the 'vanishing' handrail (above)

Great idea for concrete pathways – lots of work but very effective in breaking up the bleakness of plain concrete (below)



From the editor

Why doesn't Australia or New Zealand have a National Cave and Karst Day?

The National Caves Association of the United States has more than 80 show cave members spread across the entirety of the continental United States, Bermuda and Barbados. For the past two years, on June 6, they have promoted National Cave and Karst Day. The July edition of *Cave Talk*, the Association's newsletter to its members, sets out a variety of ways by which member show caves have promoted participation in National Cave and Karst Day, in their local communities, seeking to attract additional visitors on this day.

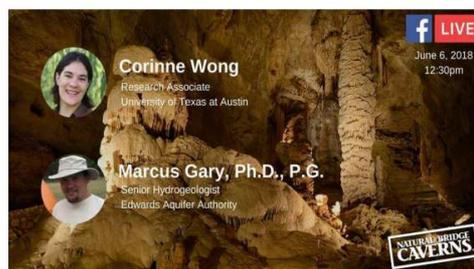


Some of the endeavours are ones which simply promote visitation to the relevant show cave on the nominated date. Others venture a little further into more traditional types of marketing. For example, the Natural Bridge Cavern site ran a promotion that gave away a free map of that cave site's underground system (subject, as always, to the qualifier "while stocks last"!) in order to stimulate visitation. Several other sites, including Diamond Caverns and The Lost Sea, offered discounted entry charges.

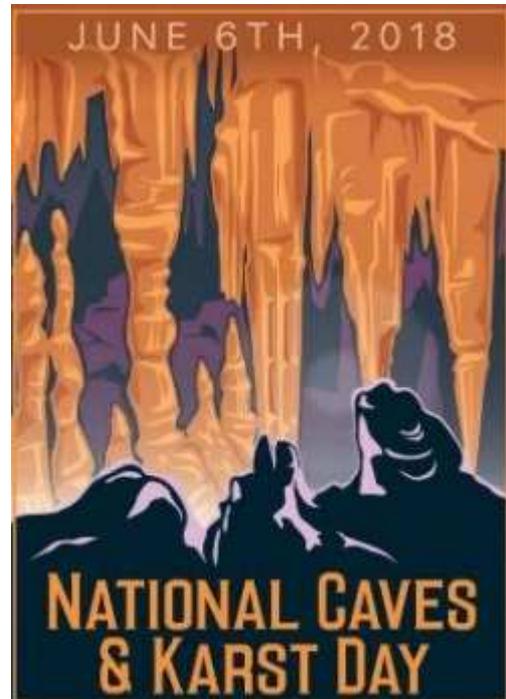
On a more serious note, the Natural Bridge Cavern site also promoted a more academically oriented approach as can be seen from the promotional material below.



We're celebrating National Caves and Karst Day by giving YOU a gift. Visit **Natural Bridge Caverns** and say "karst" at the ticket counter and receive a FREE cave map - while supplies last! (left)



This involved providing talks by Brian Vauter, Natural Bridge staff geologist, Marcus Gary, Ph.D., P.G. Senior Hydrogeologist at the Edwards Aquifer Authority (EAA) and Corinne Wong, Research Associate at the the University of Texas at Austin. These were also streamed on social media.



The US National Park Service caves celebrated "Cave Week." Its Facebook post stated: *Join us over the next seven days in our appreciation of caves across the country. We will be posting about other cave sites within the National Park Service, sharing their unique differences, and how you can visit them during your travels.*

In both Australia and New Zealand, a single National Cave and Karst Day might not be the appropriate promotional path to follow. Given that, for locational reasons, we might wish to promote longer customer experiences in conjunction with either accommodation provision at the show cave site itself or in conjunction with accommodation providers in nearby communities, perhaps it is time for this Association to contemplate whether we might seek to promote, in either Australia or New Zealand or as an Australasian concept, a National Cave and Karst Weekend or Week?

*A “mystery shopper”
makes a visit to Wellington Caves*

The last weekend in June 2018 found me in Dubbo NSW with a group of relatives gathered together from Adelaide, Darwin, NSW and Qld to celebrate the 70th birthdays of the families' twins. It seemed everyone wanted to visit the Wellington Caves. As the supposed Cave Expert, they wanted my opinion. This was because the male twin is somewhat disabled and uses a walker. I seemed to remember that the Phosphate Mine Cave was wheelchair friendly. One of the party phoned the Caves and was very pleased with the courtesy of the person and the assurances that they would certainly look after our man.

I intended to visit the Cathedral Cave at noon while others would accompany our birthday boy on the 11 am Phosphate Mine Tour. Two of the ladies accompanied me on party shopping duties before we travelled to the Caves. I was surprised at the number of tourists wandering around on a sporting Saturday, especially as most would have decided against stopping as they passed the massive Saturday Markets at Geurie. I was in trouble for not stopping to allow my passengers to browse. We enjoyed the Interpretative Centre before lining up at the gate with a number of other people for our tour.

As expected, the Phosphate Mine guide would take us on the Cathedral Tour once all the visitors on that tour had passed us waiting patiently at the gate. Naturally our man was last, sitting on his walker being pushed by a relative. The look on his face brought happiness to our hearts.

At the entrance to the Cathedral Cave, the Guide introduced us to a volunteer casual guide about 16 years of age who was learning the ropes and would conduct the tour. My heart sank, but I maintained the smile on my ugly face for the benefit of the relative, who was a bit reluctantly accompanying me. We descended into the cave and the young guide asked if anyone had been through caves before. I was surprised that only a couple of hands were raised. I never admit that I am a member of ACKMA because it tends to affect the way the tour is conducted.

The young man who shall remain nameless, was excellent as was the Senior Guide who only reminded

him of a couple of things he had forgotten. As the visitors were mostly first timers and just general tourists, he kept the information simple but covered it and the questions adequately. He left such things as CaCO_3 and chemical reactions well alone, while concisely explaining the process. He did include a few dragons etc which I thought appropriate considering the nature of the visitors.

All the visitors made a point of thanking the young guide and had obviously enjoyed the tour. Wellington Caves are what they are and to me the tour was designed to show off the best features and give the visitors good information without overloading them. I was impressed. A few days later on our round trip we called into Borenore Caves but that is another story that has been covered by Kent Henderson in Journal #110.



Above and left from our “mystery shopper”.

Right from Ian Eddison (sent for “Around the show caves” - see later article)



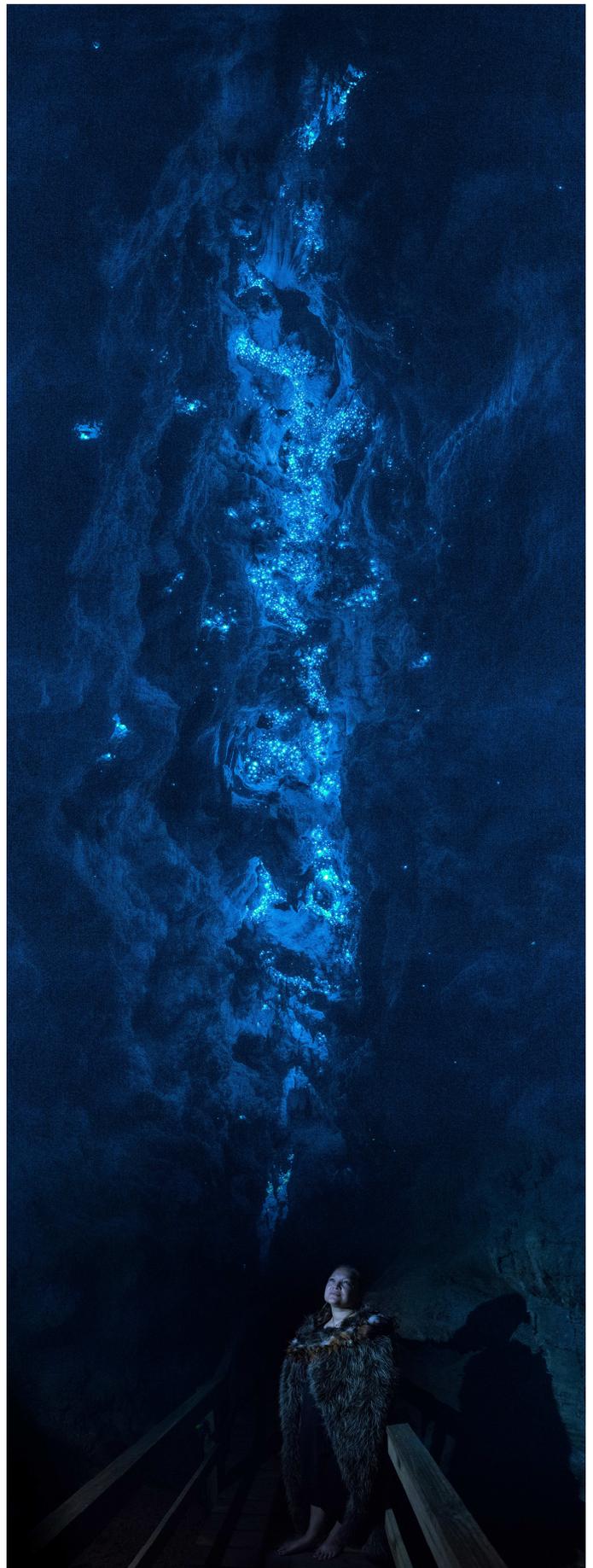
“Around the show caves”

Changes at the Kawiti Caves, New Zealand

The Kawiti Family Glow Worm Caves are located in beautiful Northland, between Whangarei and the Bay of Islands. This family operated business has been showcasing its cherished limestone caves for over 50 years. Unlike other limestone caves around New Zealand, the Kawiti Caves are pristine and untouched; leaving the attraction to Mother Nature, a couple of lanterns, and of course the glow worms. There are absolutely no frills here. Visitors leave astonished and always comment on the natural uniqueness of the Kawiti Caves and the history behind this family treasure. These limestone caves were discovered by Hineamaru who is the tupuna or ancestor to the local hapu, Ngati Hine.



Today, Ngati Hine’s direct descendants are still responsible for preserving this family attraction. The Kawiti Family strives to protect and preserve this taonga. There has been a transition in management in the last two years and General Manager, Shelly Kawiti-Jessop is happy to announce upcoming developments. Along with a very informative and unique guided tour, you will soon be able to grab a coffee and a bite to eat before or after your tour. That’s right, there are plans for brand new facilities including a new office, a café, as well as toilet facilities. All upcoming developments will be project managed by the family architect, Derek Kawiti. The Kawiti Family welcomes you to enjoy more than just a tour, but an experience.



Glossary from the Maori Dictionary

hapu - clan or descent group

taonga - treasure or prized site

Beth Russell, *Hastings Caves, Tasmania reports:*

Vale Alfred Roger Griffiths

30/10/49 – 5/12/17



It is with sadness that we reflect on the passing of long-time Hastings Caves guide Roger Griffiths but also celebrate his significant contribution to Hastings over a long period.

Roger commenced work at Hastings Caves in 1994 and during the 1990s was part of the team working on a major refurbishment of Newdegate Cave. Phillip Bradley (former ranger-in-charge) recalls working with Roger to remove the timber from the cave that had been 'dumped' when the old timber stairway had been replaced by the current concrete steps and old cable that had also been left abandoned in the cave during a lighting upgrade in the early 1970s. As Phil recalls, it was 'gut-busting work'.

In the next phase of the upgrade, Roger supervised a job skills team, mainly young people from the Huon Valley, who installed paving in the cave. Roger and colleague Peter Price then carried out extensive cleaning of the formations.

Following this refurbishment of the cave, Roger set up a cave housekeeping program where cave guides undertook regular maintenance and cleaning. He was always looking at what was going on in other show caves and ensuring Newdegate Cave was up measuring up to those standards.

On my first cave tour with Roger, I remember shrinking

in my shoes and thinking, I should remove my manager's badge! His initial address to visitors at the cave entrance included a few swear words and I saw a few horrified looks amongst the crowd. We made our way down the steps to the first platform, by this stage Roger had well and truly engaged with his audience, science was explained simply and demonstrated on the way through the cave. By the end of the tour, Roger's group were complimenting him on a fantastic cave tour; it was certainly the best cave tour I have been on, and I was breathing a sigh of relief...

Roger's passion for Newdegate Cave was always evident; his uniform presentation was commendable, and he liked to ensure other guides presented well, boots were clean and polished!

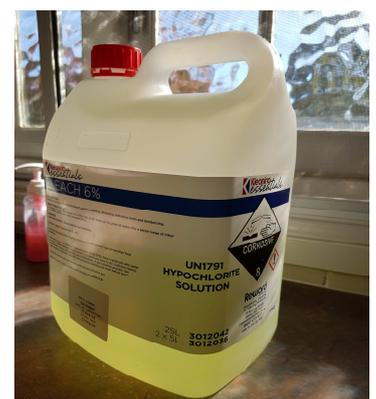
Roger was instrumental in training new guides and was a strong mentor to them. He encouraged guides to be engaging and to demonstrate passion for their work. He was an avid researcher, always looking online for interesting articles relating to caves and interpretation. He organised DVDs and video clips for guides to watch and encouraged other guides to do their own online research and read cave books.

Roger assisted fellow cave guide Alice Liddell in collating a Hastings Caves educational package and Junior Caver Booklet. He produced a document for new guides, entitled Mud to Majestic which is still in use. He also did a televised guided tour of King George V Cave for the travel program Getaway with popular presenter Sorrel Wilby.

Roger retired from Hastings in 2012 but his passion for Hastings didn't. He would phone up regularly to remind me of important cave duties, documents or resources that were available to pass onto guides (in my ROGER file!). He attended Hastings staff meetings a few times after he left to pass on his knowledge to new guides who were always keen to hear more from this enthusiastic ambassador for our wonderful cave.

We are sad that Roger has died, and extend our condolences to his wife Colleen, but are happy to have had the benefit of Roger's input into Hastings Caves over so many years. The caves are better for his dedicated service.

Wellington Caves wields the hypochlorite - see next page



News from Wellington Caves

The Wellington Caves team has been coming to grips with the old lampenflora issue that persists in most show caves. There were some immediate results, some requiring follow up and some we just could not get to without planning and extra equipment but persistence has paid off. The difficulty of reaching some locations has probably been why the issue hadn't been dealt with sooner. We considered a number of treatments suggested in papers previously published however, in our kitchen was hypochlorite 6%. We diluted it by half and had a go. We also have scheduled to reassess the results every three months.



Before treatment (Ian Eddison)



After treatment (Ian Eddison)

The architect's plans are now finalised and site preparation of the new Visitor Experience Centre will begin in October. Demolition of existing buildings and an aviary will happen soon, then preparation of services and the foundations will begin.



Photo courtesy of Jenolan Caves' *Client Newsletter*

Jenolan tells us of Google Streetview's visit

Google has been getting photos of all our caves to create 360 degree imagery throughout our cave system. Two of our Guides, Scott & Tania have been meticulously going through the caves with Google Streetview's cameras. The project will help provide people with an immersive street view experience of our caves before they visit, including the Jubilee Cave, which hasn't been seen by the public for 4 years, and the Plughole which is not able to be seen by people under age 10. Tania has also gone with Andrew from NSW Parks and Wildlife, to capture our amazing walking trails. Imagine being able to show people the cave tour you did, or bush walk you went on! We don't know when these will be available on Google, but keep your eyes peeled over the coming months.

News from Margaret River

Mark Delane advises from Margaret River:

The new Mammoth Cave Ticket Office is nearing completion. For those at the ACKMA conference in May, the site was just a clearing. We are looking forward having the building open for the September school holidays with increase in the experience on offer to all customers.



The new Mammoth Cave booking office takes shape (Mark Delane)



New lighting in Lake Cave (Peter Bell)

At Lake Cave, we have started replacing the entire lighting system within the cave. The old fixtures and fittings which are around 20 years old are being removed and replaced with nice new Weidmuller lights and equipment.

This project has been in the pipeline for the past 2 years, with lots of research, planning R&D etc. The project is being undertaken in-house and the project is expected to be completed in late September. The New Lighting system will be rolled out to reflect the current lighting with some small changes to suit the new lights.

Cave Guide Training Survey Results

Scott Melton – Jenolan Caves

Following on from the very successful “Guides’ Schools” run in conjunction with the last two ACKMA AGM meetings, ACKMA was very interested in ascertaining the scope and depth of the differing methods of training provided to cave guides around Australia and New Zealand. Following the establishment of a sub-committee to investigate this subject, an online survey was designed and distributed to seek the thoughts of cave managers, cave guides as well as others who have a general interest in cave guides’ training. One of the main reasons for this project is that, over the longer term, ACKMA could be looking at developing a nationally accredited Certificate in Cave Guiding, possibly in conjunction with a Registered Training Organisation, which would be broadly tourism based but with a specific focus on cave and karst fundamentals.

Preliminary survey results were presented to the ACKMA Conference held at Margaret River in May 2018 by Scott Melton and Jodie Anderson. The survey closed on the 30th June 2018 and a total of 71 responses were received. Following is a summary of the results of the survey: -

- 33% of respondents were in a management/supervisory capacity;
- 66% of respondents were guides; and
- 1% of respondents were other interested individuals.
- 77% of respondents were 35 years or older.
- Over 75% of respondents have post-high school qualifications (TAFE/University).
- Nearly 52% of respondents have worked in the tourism industry for 10 or more years.
- ~ 60% of respondents are employed on a part-time or casual basis; and
- ~ 38% of respondents are employed on a full-time basis.
- The majority of respondents were from NSW, QLD and VIC, followed closely by TAS, WA and New Zealand.
- Most of initial guide training is by observation of experienced guides followed by the provision of a training manual. Unsupervised inspection of a cave ranked as the third main method of guide training.
- A variety of methods is used for the delivery of risk management training including SOPs, one-on-one discussion with experienced guides, scenario training and workshops.
- The focus of cave guide training manuals is closely split between cave geology and the social/cultural history of a cave site.
- Videos & DVDs, reference books and documentaries also provide information.

Nearly 50% of respondents advised that no formal checklist or sign-off process was implemented for initial guide assessment.

- 78% of respondents advised that professional development/training opportunities are provided at their site (such as TAFE, Savannah Guides & In-House Training); and
- 63% of respondents advise that they have been offered the opportunity for external accreditation; and
- Other training opportunities are also provided such as external courses and opportunities to attend conferences;
- 60% of respondents advised that they are afforded the opportunity to attend such events;
- Nearly 77% of respondents advised that they are either funded or partly funded to attend such events; and
- Benefits of such training include: -
 1. Increased level of knowledge & skills;
 2. A more professional standard of guiding;
 3. A formal recognition of skills; and
 4. Networking opportunities
- Nearly 69% of respondents are interested in the development of a National Certificate Level III in Cave Guiding;
- 25% of respondents may be interested;
- Just over 73% of respondents would participate in the accreditation if it was online;
- Just under 21% may participate if accreditation was online; and
- Just over 79% would either self- fund or employer fund such accreditation.
- Topics that respondents would like to see included in such accreditation include: -
 1. Risk Management / Group Management/Interpretation/Delivery Principles/Engagement;
 2. Flora & Fauna;
 3. Geology/Cave Creation/Cave Decoration;
 4. Social/Human Impacts on and interaction with caves; and
 5. Cave Staff
- Interpretation – Guiding, Delivery & Engagement is of prime importance to cave managers such as presentation techniques/Communication, Customer Service and Risk Management; and
- Funding & time issues were also identified by management as well as factually correct training manuals/reference materials as requirements to enable the delivery of high quality guided tours.

Cave Guide Training Survey Results continued

- Conversely, issues identified by guides as being barriers to the delivery of high quality guided tours include: -
 1. Availability of appropriate training;
 2. Access to appropriate training;
 3. Funding for training; and
 4. Burn-out of staff.
- Guides see content and interpretation as the two main types of training they would like to receive - with this including: -
 1. Presentation/Interpretation Skills;
 2. Group Management Skills/Group Engagement Skills; and
 3. Guide Exchanges.
- 88% of respondents had heard of ACKMA;
- 80% of respondents had heard of ACKMA through the workplace; and
- Regrettably, under 50% of respondents were aware that ACKMA facilitates a Guides' Training school every two years.

As can be seen, the results of the survey are encouraging and show that there is indeed an underlying body of support for the development of either a Certificate III or IV in Tourism/Cave Guiding with a focus on cave and karst processes as well as customer service and delivery skills. However, funding for guide training appears to be a major impediment to the delivery of such training.

While ACKMA is not able to fund training for guides, it is felt that ACKMA has the skill base within its membership to assist with the development and delivery of a cave guides' training programme.

Bonus *"Around the show caves"* from the Naracoorte Caves' Spring newsletter

Science Week at Naracoorte

Naracoorte Caves also ran its own special science week 'in cave event' with adults receiving entry at children's prices to encourage a joint family interactive learning experience. Cave guides took participants on a journey back in time to learn about the mega fauna that once roamed the area 45,000 years ago. Local palaeontologist Dr Liz Reed intrigued participants during a special presentation in a cave and in the site laboratory. In the afternoon guests were treated to a performance by the world's favourite singing palaeontologist, Professor Flint, in Blanche Cave.



Finding your Voice—and keeping it!

A voice training manual for cave guides

Cathie Plowman

The above is the title of a voice training kit that I prepared with Alan Andrews in 2007. Alan is an actor and drama coach, who worked as a tour guide at the Port Arthur Historic Site in Tasmania, where his work included voice coaching work for the tour guides

Why voice training for cave guides?

Show cave experiences in Australia are largely focussed on the guide to show and interpret the cave. If you're a cave guide, how often have you raised your voice to reach the 'back of the group'? This is neither good for your voice, nor does it contribute to an engaging and effective presentation.

Good use of the voice requires learning and on-going practice. Voice work is an established and integral part of the theatre and performing world where voice warm-ups, relaxation, posture, breathing exercises and facial exercises are as much a part of performing as learning a script and being on stage.

Singers, actors and news readers all work with their voices to communicate well and reduce the risk of strain and laryngitis. Why not cave guides?

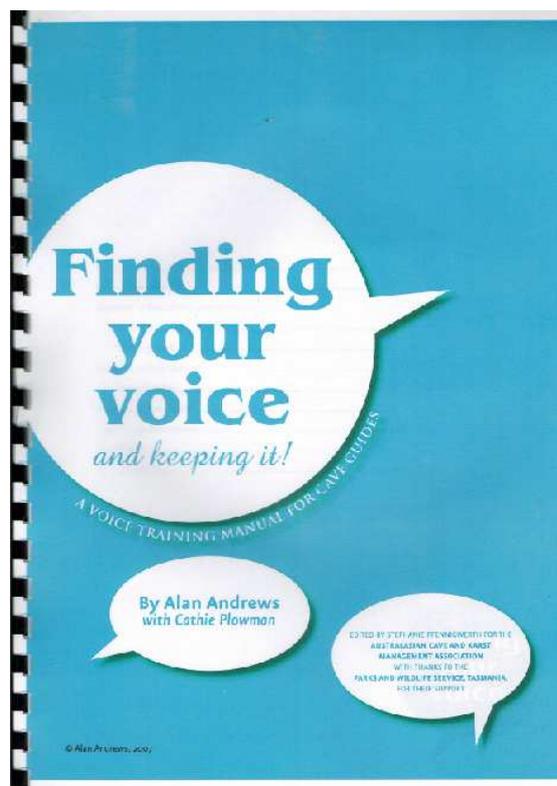
Cave guides who use their voice for work every day without being taught how to use it are like ballet dancers going onto the stage without first warming up: their performance will suffer, and the audience will leave feeling unsatisfied.

'Words carry approximately 7 per cent of the message, while the voice carries 38 per cent,' voice coach Lorraine Merritt quotes in her book, *Talking the Talk*. If guide health and effective visitor interpretation are important, then cave guides, and their managers, need to ensure that guides are equipped with good voice skills.

Finding your Voice contains four groups of exercises to help get started on voice health and enhanced communication. These are breathing awareness, articulation, projection and resonators. The manual can readily be accessed at the ACKMA website. Print off a copy and give it a go. Voice work is easy, fun, will enhance your tours and reduce your risk of voice strain and laryngitis.

Voice work is not just for cave guides. It's a useful skill for anyone who does public speaking.

In my presentation at the ACKMA conference in May 2018, I discussed some options for taking voice work further, but using the *Finding your Voice* manual is an easy place to start. I would love to receive feedback from cave guides who are using the manual.



Recovery of fossil bones from Elephant Hole Cave, Mount Etna

Dianne Vavryn

After reading Scott Hocknull's excellent paper in the September 2017 Journal - "The Ghosts of Mount Etna" - I thought I would write a bit more about the fossil bones from Elephant Hole Cave that Kerry Williamson and I recovered in 1986 and finally, after many years, led to the studies of fossil bones in the area - studies which continue today.

Elephant Hole Cave was situated on the west flank of Mount Etna in Central Queensland. It had three middle level entrances, all with vertical pitches. It was well known to me, my husband Josef and other cavers to contain large quantities of fossil bones.

Some of these bones were cemented in calcified mud and large quantities of the calcified mud had weathered into a powdery soil freeing its bone contents.

In 1970, Central Queensland Cement, who were mining the eastern end of the southern flank of Mount Etna, began preparing a haul road around the base of the mountain and began mining a small limestone hill adjoined to the main cavernous face approximately a third of the height of the main mountain. It contained many huge fig trees with massive roots disappearing down solution holes. We felt confident that there must be caves in this hill but there were no holes large enough to enter.

Josef and I, along with our caving companions, checked the mining operations regularly to see if any caves had been opened by the mining operations.

Along with other members of Central Queensland Speleological Society, in 1982 we had the great privilege of seeing one such cave which was named Crystal Palace before its total destruction. Our belief that this hill contained caves was vindicated.

It was quite a dangerous exercise climbing down through the blasted rock to access the cave below. The beauty of this cave for its speleothems was outstanding and was equal to some of the best I have seen elsewhere. We later found another deep hole in the quarry that was too dangerous to contemplate entering. It was later found to reach the very lower level of Elephant Hole cave - not all that far from the fossil deposits.

On one of these trips, we came across some very large blocks of calcified mud, with huge bones cemented in them, on the steep road leading out of the quarry. It appeared they may have fallen off a truck. The colour of this material was not like any other I had seen in any cave in this area. It was very dark maroon - almost bordering on dark purple. I wanted to shift these blocks off the road so they would not get destroyed, but sadly they were just far too heavy to shift. It weighed heavily on my heart and I still feel a sadness that these bones are gone and we will never know what they were and how old.

At that period the mine operators were not in the least bit interested in the preservation of any part of Mount Etna - that came much later when Chris White took over the management. I had long thought the bone deposits in the caves were important to science but could not get anyone I approached at conferences interested in having a look - as Riversleigh had everyone's attention.

As mining operations continued, the road into what now was becoming an open cut was lowered on many occasions and, from 1984 onwards, Jeff Simmons, Josef and I had to re-route the Bat Cleft track numerous times to be able to continue doing the tours. All the environmental values of the mountain were presented on these tours and we were gaining public support for the saving of the mountain.

In 1986, the mining company started building a road leading from the existing haul road up to the main cavernous face of the mountain in the vicinity of many important caves. It was clear that their intentions were to mine this area. These caves included Illium Cave, with its huge guano deposits usually with Horseshoe bats (*Rhinolophus megaphyllus*) present. It had once been used by Little bentwing and Eastern bentwing bats (*Mineopterus australis* and *Mineopterus orianae oceanensis*) as an acclimatising cave prior to moving into Bat Cleft.

Helms Deep was used by Ghost bats (*Macroderma gigas*) and both *Mineopterus* species.

Speaking Tube Cave contained the warmest known wintering roost of any cave in this area - it was used by the pregnant female Ghost bats and was considered to be essential to their survival.

"E7 Speaking Tube is the principal overwintering site for pregnant females in The Caves area. The Ghost bat colony is extremely persistent in its use of the site, despite the fact heavy mortality has been recorded after blasting in the western quarry." (John Toop).

John was the foremost authority on Ghost bats in this area and this would have been written prior to the caves destruction. Eastern horseshoe bats also roosted in this cave.

Last, but not least, Elephant Hole Cave, with large deposits of bone fossils, was also used by Ghost bats, Eastern horseshoe bats and Common sheath-tail bats (*Taphozous georgianus*).

I felt it was imperative that as much of the fossil material as possible should be rescued before the cave was destroyed and the bones gone forever. Josef was in hospital at the time and I could not reach other local cavers. I contacted Kerry Williamson from the University of Queensland Speleological Society about the bones and what I thought was the imminent destruction of the cave. Kerry was based in Brisbane. Kerry came up from Brisbane and stayed with me, my daughter Tania (then aged 17) and son David (then aged 16) at The Caves.

I first showed Kerry the bone deposits which involved abseiling a number of vertical drops; some climbing; and making our way through narrow (and in places very low) passages. The following day we returned to the cave. Kerry had a number of bags with him. I thought he would sift through the material the bones were in and just take the bones. However this was not the case and we also filled the bags with the material they were in. We had wonderful company at the site as we filled the bags with a number of Horseshoe bats checking us out as they fluttered around us numerous times and followed us part of the way as we made our way back through the narrow passageways to the first pitch. These very special little bats are very inquisitive and often flutter around cave visitors inspecting them.

One by one, we each lugged the full bags to the first pitch - which was a feat in itself. Kerry prussiked up to the first ledge and I tied one bag on at a time onto the rope, then Kerry hauled each one up to his ledge. I then prussiked up past Kerry to the next ledge and Kerry repositioned the bags on the rope and I hauled them up to my ledge. We did this up two more drops until we reached the entrance. One ledge was particularly difficult to haul the bags over as the bags kept getting caught under the overhang and it was also difficult to prussik over. There were many more bone deposits than we could save - a whole shaft of calcified mud full of fossilised bones.

Page 3 dates noted yet?

The following day, I took Kerry and the bags to the railway station where they were emptied into a very large bag, weighed and sent to Brisbane. Kerry said it would be some time before he could work on the bones as he also had other material (from Chillagoe). He thought the many small curved teeth in the deposit were possibly from a rodent - possibly an extinct one but could not say for sure until he could examine them properly. He said the deposits may be from owls or from animals that had fallen down the now sealed shaft. He didn't know how old the bones would be but maybe around 20,000 years.

He said he would know more when he had studied them.

Ten or more years after we had collected that material, after years of waiting and wondering just what that material contained and how old, it was music to my ears to hear from Scott Hocknull that he was working on those bones.

I am so pleased that there has been further study of the bone deposits in the caves area. I am highly delighted about other important discoveries made up to date. It is such exciting work Scott Hocknull is doing and the discoveries he is making.

Some of the fossil bones are 500,000 years old and the only Quarternary-aged rainforest fauna in Australia.

If Kerry and I had not rescued that material, and Scott Hocknull as a very keen young volunteer at the museum had not asked and been given permission to sort through the material, I wonder very much if any of these very important discoveries would have been made and whether that large bag of fossils bones would still be sitting on a dusty shelf at the Queensland Museum. Simply because no one was interested in fossil bones from Mount Etna, they weren't thought to be of much importance when compared with research and findings in fossil bones going on elsewhere in Australia. I don't think palaeontologists at the time had any inkling just how old and how important to science these fossil bones would turn out to be.

It is great that some of the remaining material was found and has been stockpiled for future generations to study. The resultant findings will add to our understanding of the past climates and the life forms that prevailed at those periods.

Karst and pseudo-karst features along the Tour du Mont Blanc - the rambles of a frustrated speleo in the European Alps

John Brush

Canberra Speleological Society Inc

The Tour du Mont Blanc (TMB) is a long-distance walking route around the Mont Blanc Massif, passing through France, Italy and Switzerland. The full circuit is 170-190 km long (there are several route variations), involves a total ascent (and descent) of 10,000 to 11,000 metres, and takes most people 12 or 13 days, including one or two rest days. It can be walked in either direction and commenced at any point, but is traditionally walked in an counter-clockwise direction starting at Les Houches, a small ski village on the outskirts of Chamonix in France.

Each day, the scenery along the walk is stunning with views to Mont Blanc and other snow-covered peaks and glaciers. The route traverses tricky scree slopes, precipitous rock faces equipped with steel ladders, alpine meadows full of wildflowers, shady larch and fir forests and, in early summer, remnant snow drifts. The route also goes right past isolated mountain chalets and village cafes that sell freshly brewed coffee, tempting patisseries, cake and more substantial fare. And cold beer. It is possible to camp along the route, but accommodation for us was in rustic mountain refuges and comfortable hotels in villages. As delightful as all this was, from a speleological perspective the walk was a little disappointing. There was barely a hint of the spectacular karst scenery that is so typical of many parts of the European Alps. Perhaps in frustration, my eye was

drawn instead to a range of pseudo-karst features. The following notes document some of the features that grabbed our attention along the way.

Stage 0. A training/ loosening-up day that commenced with a cog railway trip from Chamonix up to Montanvers, an old hotel overlooking the Mer de Glace (Sea of Ice). This one of the longest glaciers in Europe and near the lower end of the glacier there is an ice cave. However, it is not a natural meltwater outflow cave but a man-made tunnel freshly dug into the glacier for the summer tourist trade. Apparently, a fresh tunnel is dug into the ice each year. Visiting an ice cave can be very spectacular, as everything is bathed in soft blue light transmitted through the ice. However at Montanvers, we became aware that green, red and purple LED lights had been installed to 'enhance' the ice cave experience. Perhaps the LEDs are now required because the surface of the glacier above the cave is covered with opaque tarpaulins in an attempt to reduce the rate of melting over the summer. Needless to say, we skipped the cave visit and walked 17 km back to Chamonix.

Stage 1 (Les Houches to Les Contamines). Nice scenery and spectacular views but disappointingly devoid of karst, pseudo or otherwise.

Stage 2 (Les Contamines to Col de la Croix du Bonhomme). We spent the morning ascending beside the Torrent Bon Nant. A section of the track was along a cobbled road and across a stone bridge that were both built by The Romans. Nearby, the full force of the Bon Nant stream passes through a natural bridge. It is possible to descend a steep track towards the base of the arch, but with all the water, it was not possible to get very close. **(See photo at top of next page)**



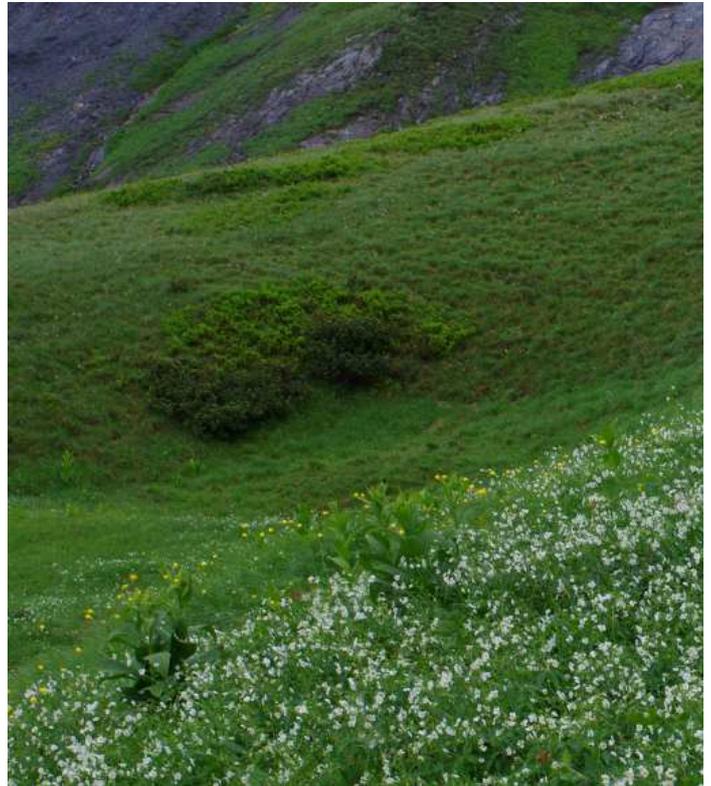
Natural bridge over the Torrent Bon Nant

Later in the day, beyond Col du Bonhomme, the track passes over thinly bedded limestone that had minor surface solution features, but there was no sign of any cave development.



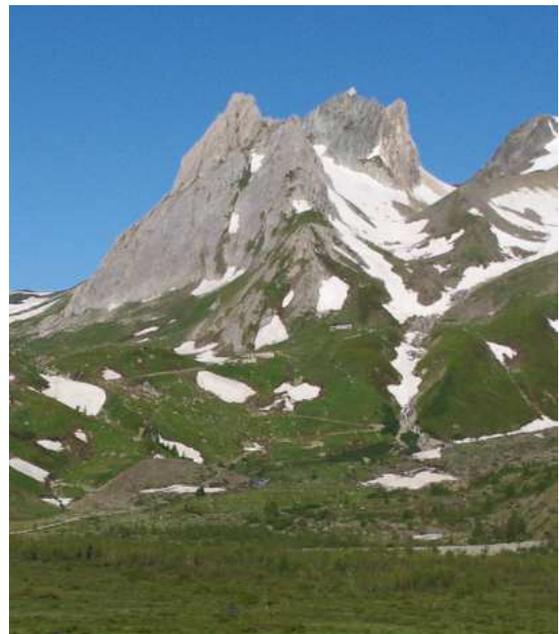
Thinly bedded limestone with minor solution features; above Col du Bonhomme

Stage 3 (Col de la Croix du Bonhomme to Cabane du Combal). On the slopes below the Refuge at the Col, the track passes through a band of limestone and further on, there were some closed depressions in an area with no obvious outcrop. The depressions gave the impression of being solution dolines, but are more likely to have resulted from mass slope movements, or have formed from glacial moraines.



Closed depression below Col de la Croix du Bonhomme

A further 10 km on, we passed over the Col de la Seigne (2516m) and entered Italy. Some distance below the Col there were outcrops of slabby limestone and through gaps in the clouds, there were glimpses of Les Pyramides Calcaires, a group of limestone peaks rising above the valley.



View to Les Pyramides Calcaires

No karst features could be distinguished on the pyramids, but lower down the valley, near the Rifugio Elisabetta, a stream appeared to emerge from the hillside. Large snow banks made it difficult to see exactly what was going on, but the topo map marked two springs in the area, thus confirming our first sighting of a real karst feature along the TMB.

In this general area there were also several small tunnel entrances and mullock heaps on the slopes above the track. We did not give them a closer look and I have not been able to find out anything more about them. However, there was a reference on the Web to some of the old buildings near Rifugio Elisabetta being miners' huts, suggesting the tunnels may have been old mine workings.

Stage 4 (Cabane du Combal to Cormayeur). A crystal-clear sunny day and there were superb views to the near-vertical southern face of Mont Blanc and its flanking glaciers. However, from a speleo perspective, there was nothing of interest.



Karst spring near Rifugio Elisabetta

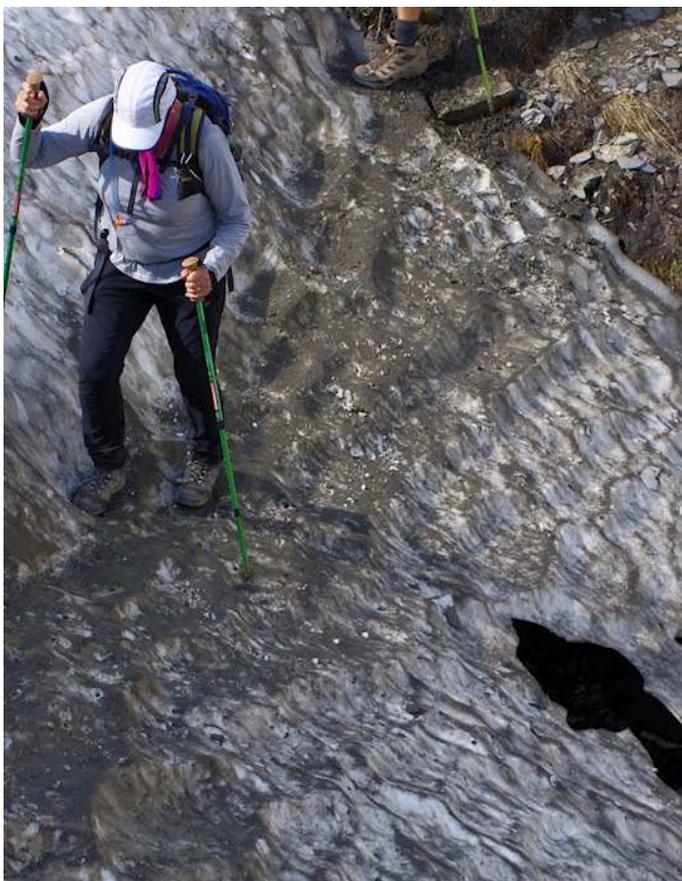


Mont Blanc, at 4409 metres, is the highest point in Western Europe

Stage 5 (Courmayeur to Rifugio Bonatti). Another clear sunny day and once again, there were views to Mont Blanc as well as to the Grandes Jorasses, a range of unbelievably steep and rugged rock towers. Once again, we saw no karst or pseudo karst features.

Stage 6 (Rifugio Bonatti to La Fouly). This stage winds up to the Grand Col Ferret and passes from Italy into Switzerland.

From a distance, the route appeared to be completely snow free. However, along the way we encountered snow banks hidden away in several very steep, north-facing gullies. While the snow banks were of interest because of tunnels that streams had carved into them, they also presented risks to walkers who had to traverse across them. There was a danger of breaking through into a hidden tunnel, or of slipping on the steep slope and sliding into one of the holes that were beginning to open up.



Crossing a tricky snow-filled gully, where there was a risk of breaking through, or slipping into a hole in the snow

In fact, just shortly after we passed this area, a woman did lose her footing, slid into a hole and broke her arm when she hit the rocky creek bed below. Fortunately, her injuries were not more serious and she was promptly evacuated by a mountain rescue helicopter.

Near Rifugio Elena a short time later, we came across a black hole in the ground. It was next to a collapsed cottage and had a well-constructed dome-shaped stone roof partly covered with a layer of turf. It may once have been an underground cellar or perhaps a storage building or animal shelter. Today, its main use seems to be as a toilet and, for that reason, it did not warrant a close inspection.



Perhaps the remains of a cellar but now used as a makeshift toilet!

Stage 7 (La Fouly to Champex). This stage was the highlight of the trip from a speleo perspective, as we saw several entrances and were able to venture into two of them.

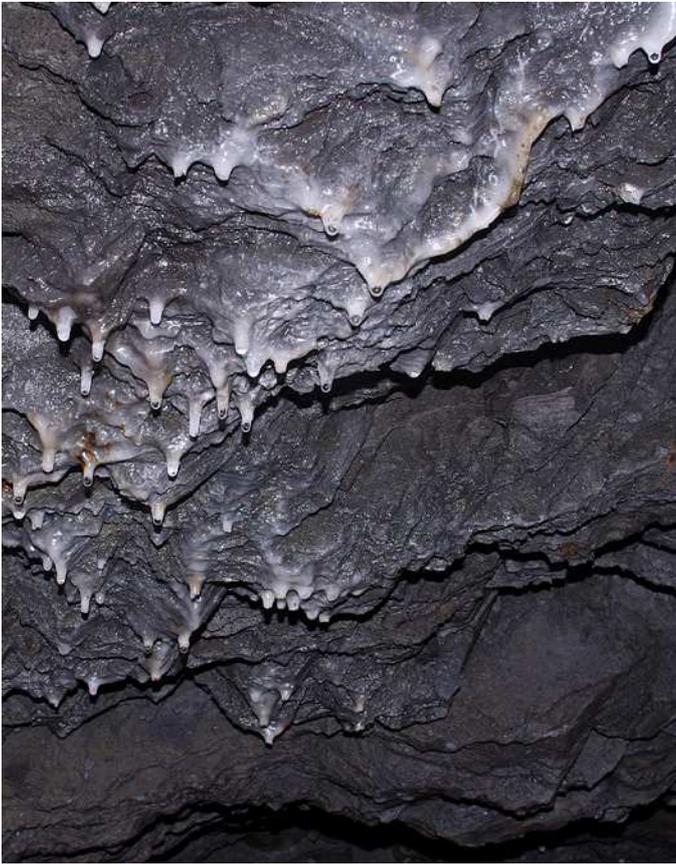
As we were about to cross a footbridge over the Torrent du Darbellay, we saw an entrance partly obscured by vegetation.



The partly-obscured entrance to the Darbellay slate mine

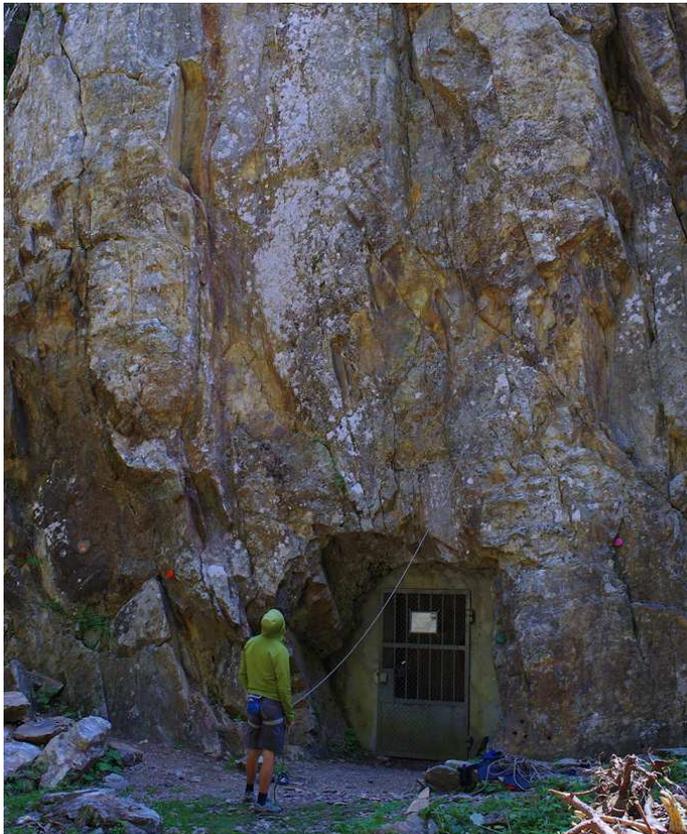
Using a digital camera and a feeble torch as lights, we ventured in. The small entrance opened into a room about 10 to 15 metres long and several metres high and wide. There was some toilet paper just inside the entrance but further in, everything looked good. At the inner end of the room, we explored two small tunnels each of which was about 10 m long and about 1.5 m high and 1 m wide. All the walls and roof were a dark grey colour, relieved only by thin patches of white and orange flowstone and clusters of short, white calcite straws. **(See picture next page)** At least it looked and felt like a cave!

The workings appeared to be an old slate mine, later confirmed by an interpretive sign a couple of hundred metres further on where there were the remains of stone walls and rusty pieces of metal, including rail tracks. Judging by the size of a huge scree slope of slate fragments in that area, it must have once been a big operation. According to the sign, the mine(s) operated between 1903 and 1955.



Calcite straws and flowstone almost made the Darbellay slate mine feel like a cave

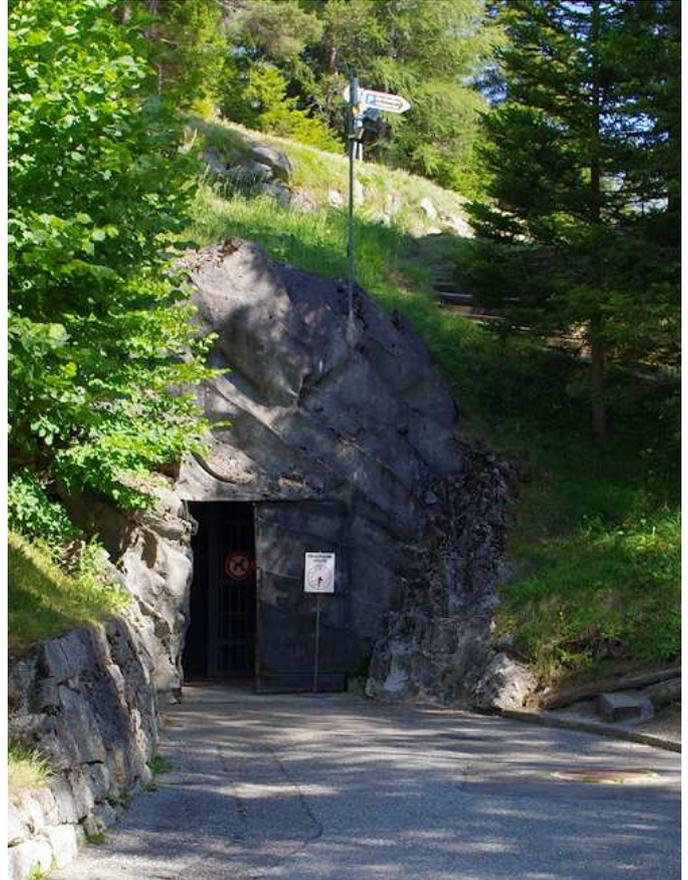
Near Champex, we stopped to watch a pair of climbers on a cliff and noticed a tunnel entrance with a locked iron door close to where one of the climbers was belaying.



A cliff with a door; an entrance to one of the WW II military installations near Champex

A short distance away, a vertical ladder led to another iron door about 15 metres above ground level. As we were to find out later in the day, these were part of a network of more than 50 fortifications in the area that were constructed during World War II as defences against a possible invasion from Italy.

In the picturesque village of Champex there were more fortifications and, as an underground artillery fortress was open for inspection later that afternoon, we decided to return for the two-hour tour.



The entrance to the underground artillery fortress at Champex, Switzerland

The fortress (designated Artillery Fortress A46) was completed in 1942 but was upgraded over the years, including to withstand nuclear attack. It was last manned in 1998 but remained classified as a defence secret until it was officially decommissioned in 1999. At that time it was bought by the Pro-Fort Association and opened to the public. As many of its internal features remain intact, it gives some fascinating insights. Unfortunately, photographs were not permitted.

The fort has more than 600 metres of tunnels, initially leading deep into the mountain, but then branching and running parallel to an east-facing cliff face, with eight side branches leading out to the cliff. One of the side passages was an emergency exit, two more were observation posts and the other five were gun emplacements. The huge guns (firing 75mm or 100mm shells) were installed in underground rooms with just the barrel poking out through the cliff face.

Camouflage netting remains in place over the gun barrels and cliff openings. The guns point towards two strategic passes to Italy; the Saint Bernard Pass and the Grand Col Ferret that we had walked over the previous day. Luckily, we were not aware at that time that a huge gun was pointing at us. We were told the guns were last fired in 1986, but at whom was not revealed.

The underground fort had its own power supply (the original diesel engines and generators are still in place), hospital, staff accommodation, workshops, an air filtration system and large artillery, food, water and diesel storage areas. In fact it was fully self-contained and set up to operate with its full complement of 150 soldiers without outside inputs for at least 40 days.

Stages 8 (Champex to Trient) and **Stage 10** (Argentière to La Flégère). No features of interest for a weary speleo.

Stage 9 (Trient to Argentière). On a crisp and sunny morning, we climbed 900m up to the Col de Balme and passed from Swiss mountain scenery, complete with cows, to French mountain scenery, complete with a multitude of ski lifts.



From the Col, we could see a band of limestone near the Col Des Posettes a couple of hundred metres below and walked down to check it out. From a distance the limestone terrain looked promising with closed depressions, small blind valleys and so on. Up close, the rock turned out to be thinly bedded and highly fractured and the few pits we looked at were small and rubble-filled.

At left - View to the limestone band near Col des Posettes

Of more interest in this area were the spectacular views to the Mont Blanc area. Later on, I noticed the topo map marked a feature with a cave symbol and labelled it the Fenêtre de Belle Place. It was about 1.5 km along strike to the northeast of where we had been

At right - There were some small pits in the limestone near Col des Posettes. The main attraction was the spectacular views to Aiguille Verte (left) and Mont Blanc



Stage 11 (La Flégère to Les Houches). The final stage of the walk and for those of us who walked the whole way, it was a long, hot 1500m descent from the day's high point. I was looking forward to a celebratory drink and also checking out a feature I heard about called "Les Caves du Pèle". I immediately thought of Pele, the Hawaiian Goddess of fire and Vulcanism and had visions of exploring a lava cave in the Chamonix area. Alas, Les Caves du Pèle turned out to be a basement wine bar. Now, I have nothing much against such places and it would have been an appropriate place to finish our walk. However, to add to my disappointment, Pèle's underground bar no longer existed, but it still seemed to be a fitting end to this story about the karst and pseudo karst features along the TMB.

ACKMA Submission on Snowy 2.0



P O Box 5099
UTAS Sandy Bay
Tasmania 7005

Re: Snowy 2.0 – Environmental Impact Statement for “Exploratory Works”

ACKMA is an association bringing together karst and cave managers, cave guides, scientists, tour operators and cavers to better manage and interpret our karst resources in Australia and New Zealand in a professional manner. The Association has broad environmental and social interests in our natural environment – especially in relation to karst. ACKMA members have provided professional expertise across the two countries and elsewhere across the Southern Hemisphere from South Africa to Tonga in the Pacific and in a number of many Asian countries.

Firstly, we are concerned about the short time available for comment on a project of this enormous magnitude. Some six volumes with >3800 pages. Exhibited on 23 July for 28 days only. And a video clip that states that approval could be given so that “exploratory” works could start by the end of a year. The document reads as a *fait accompli*.

This remarkably short exhibition period and the rush to get approval are clearly politically motivated and is unwarranted and unacceptable for a project of this magnitude in such an important national park.

The project has already heavily impacted on Kosciuszko National Park with little in the way of environmental impact assessment.

Since the proposed project was announced several academic institutions have suggested very many pumped hydro projects across Australia. **Surely these should be examined before proceeding with this proposal in this sensitive environment.**

To turn to the specifics:

The document states that only three of Kosciuszko National Park’s eight karst areas might be involved. You have omitted Cooinbil on The Long Plain. The proposed project is unlikely to impact on either Coleman Plain or Cooinbil. However, we have concerns for the potential of issues with groundwater at Yarrangobilly. How will drainage of the machinery hall and access tunnels affect regional groundwaters?

Caves and tufa

Ravine and Wallaces Creek have the most extensive tufa deposits in south-eastern Australia – possibly in Australia as a whole. Water carrying dissolved limestone from the thinly bedded Devonian limestone of the Lick Hole Formation (part of the Boraig Group) has tumbled over the near-vertical walls of the conglomerate Milk Shanty Formation producing tufa ‘cascades’, ‘caves

of construction' (sometimes referred to as 'accretion' or 'carapace' caves) and low-angle tufa deposits including terraces (unfortunately much obscured by blackberries). Some of these latter may well be impacted by roadworks and other operations associated with the proposed project. The caves of construction are quite small in the proposed work area but are larger further up Wallace's Creek. The small caves in the tufa deposits support bats and have important sub-fossil materials.

Blockstreams

The periglacial blockstreams which cross the Lobs Hole access road will need special care to ensure that they do not collapse when the road is upgraded. They can be important reservoirs of small mammal habitat (e.g. Mountain Pigmy Possum and the Broad Tooth Rat) as well as other environmental information¹.

Biodiversity

ACKMA cannot comment in detail on biodiversity issues except in the case of bats. We know of six to eight species of forest bats at Yarrangobilly. There is no reason why at least some of these species would not exist and forage in the Ravine area. Was a bat survey actually carried out in the Ravine area?

The Eastern Bent-wing bat (*Miniopterus schreibersii oceanensis*) is certainly known from the site as the undersigned has worked for decades in the Ravine/Yarrangobilly/Coolman Plain area. I have observed this bat on several occasions in adits and elsewhere at Ravine.

This is in direct contradiction to the statements in Table 6.3 of the Biodiversity Development Assessment Report (Volume 6, Appendix F, page 105) and to the statement in Table 6.3 "The Exploratory Works survey area contains no suitable roosting structure for this species. This species is unlikely to roost within the project area."

This statement is simply wrong. I, and others, have seen them in the adits. I have also seen them in the small caves in the tufa cliffs. It appears one of the adits will be covered by tunnel spoil thus losing a roosting site.

Weeds

Weeds are already a considerable problem at Ravine with blackberries and St John's Wort are the chief offenders. However, there are a number of other non-native species there including poplars and briar present.

The vastly increased vehicle movements associated with the proposed project will promote the introduction of more weed species to the area and efforts must be made to reduce those

¹ Jennings JN and Caine N, 1968, Some blockstreams of the Toolong Range, Kosciusko State Park, New South Wales, *Journal and Proceedings of the Royal Society of New South Wales*, 101:93-103.

Jennings, JN, 1969, Australian Landform Example No. 13, Periglacial Rockstreams, *Australian Geographer*, 11:85-86.

introductions. Perhaps part of the remediation of the site could address the whole issue of non-native species at Ravine.

Disposal of tunnel spoil

We note that there are huge volumes of rock to be removed from the tunnel and the machinery hall. It seems that some of this will be simply stockpiled at Ravine and some will be disposed of by “sub-aqueous” disposal. (What is wrong with “underwater”?)

We are concerned that the spoil will potentially contain pyrites and other oxidisable minerals that may well have adverse aspects on the water quality of the Yarrangobilly River and Talbingo Reservoir – and potentially downstream in the Tumut and Murrumbidgee Rivers.

We note a comment about pyrites being layered with limestone (with a “purity of 99%” - there is little limestone in NSW of this purity – and much is a very long way from Ravine²).

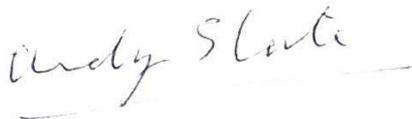
Elsewhere in the document (Appendix K, Section 5.1.2.1) a figure of >95% is used. The above quoted Appendix K states that the limestone will be coming from Moss Vale. As there are no extensive limestone deposits at Moss Vale, we assume the source is from the South Marulan quarry operated by the Boral Group? Section 5.1 says 58,000 cubic metres will be required. How many trucks per day will be required? The trucking and Lobs Hole Road maintenance costs will be huge.

Lobs Hole Road upgrade

This road crosses the important fossiliferous Lick Hole Limestone and lies within the catchments which supply the dissolved limestone that produces much of the tufa deposits characteristic of the Ravine area. Thus the interests of the fossils will need attention and the issue of excess sediment supply must be considered. As mentioned above road upgrade across the blockstreams will require careful planning and execution.

Recreational and other access to Ravine

We are concerned that Ravine may be off-limits for many years - no research, no recreation, no historical visits. This site has important historical and recreational links to many local people in the Tumut region and further afield in southern NSW and the ACT – perhaps the proposed project, if it goes ahead could have occasional open days?



Andy Spate

ACKMA President

20 August 2018

² See Carne JE and Jones LJ, 1919, *Limestone Deposits of New South Wales*, Geological Survey, Department of Mines, Sydney. This is the definitive work on limestone purity in NSW. I am unable to locate again in the document the “99%” figure.

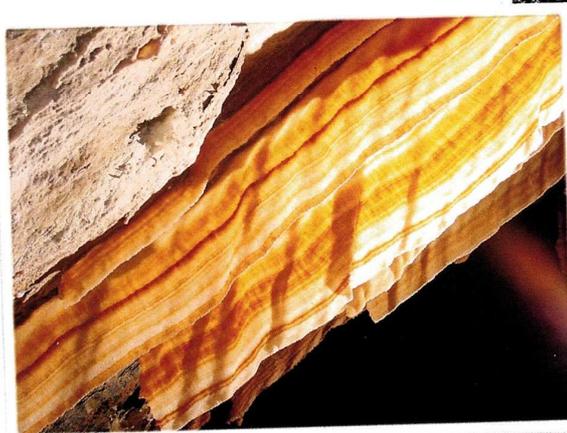
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