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FRONT COVER: Waterfall flowing down a normally dry karst drainage neat Tunc Minimus Cave, Paparoa National Park, New Zealand

Photo: Mary Traves

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IN THIS ISSUE

Editorial - Steve Bourne	Page 3
Paparoa National Park update - Mary Traves	Page 5
Graham Parkes award - Dale Calnin	Page 8
Once more unto the deep: Cathedral Cave, Naracoorte - Liz Reed	Page 9
Philippine adventures part 3 - Kent Henderson	Page 15
ANDYSEZ 57 Karren - Andy Spate	Page 20
White-nose Syndrome - ASF guidelines	Page 30
Savannah Guides workshop - Ann Augusteyn	Page 32
Crowd Funding - Cathie Plowman	Page 34

EDITORIAL

Steve Bourne

The ACKMA AGM at Te Anau is almost upon us as I write this, with Neil informing me that 60 members have registered. This is about the same number as attended the Naracoorte Conference in 2016 and once again shows value in holding ACKMA AGMs in locations where fewer members have been before. I am sure many members are extending their visit to Te Anau and enjoying South Island, New Zealand scenery. I unfortunately won't be one of them due to work commitments. I say work commitments, but have a busy schedule of other cave commitments; UIS post congress excursion, and trips to Nullarbor and Tasmania planned for later in the year. There is an expectation that one spends some time at the work site.

I hosted ACKMA member Greg Middleton and Julian Hume, palaeontologist with the Natural History Museum of London, in February. Together we have shared a few adventures; Mauritius, Rodrigues, Madagascar, South Africa and a few Australian locations. Julian's speciality is extinct island birds and his interest on this trip was island emus. He and Greg visited King and Flinders Islands before I joined them and we visited Kangaroo Island. ACKMA members Nick Heath and Matt Cooper led a trip into the back sections of Kelly Hill Cave, to chambers called Woop Woop and Back of Woop Woop. There were a few emu bones to get Julian excited by an excavation undertaken by Matt McDowell of Flinders University. The real surprise was finding a bird skeleton in the ceiling of the cave. Kelly Hill is aeolian limestone and presumably this bird died in a sand dune, and as this consolidated into a limestone (I use this term loosely as parts of this cave still feel like you are caving in a sand dune) and as the cave formed, the skeleton was exposed.

This cave is well track-marked, has good cleaning stations and has a very low number of visits allowed under permit. It is an extraordinarily well decorated cave.



*Bird skeleton in the ceiling of Kelly Hill Cave, Kangaroo Island
Photo: Steve Bourne*



*Close up of bird beak and limb bones of a bird skeleton in the ceiling of Kelly Hill Cave
Photo: Steve Bourne*

On the topic of finds in caves, cave divers recently found an articulated snake skeleton in Tank Cave, near Mount Gambier in South Australia. The skeleton was located in an undisturbed section 650m from the current closest entry point. Part of the skeleton is encased by the clay and sediment. Cave diver Toby Passeur provided images to palaeontologist Liz Reed with the hope of an identification, which is extremely difficult with snakes unless cranial elements are available. It seems likely that it is an Eastern Brown Snake given it is about 1.6m long. It is great to see finds like these. The fact that the cave has undisturbed sections preserving such interesting material.



*Snake skeleton in Tank Cave, Mount Gambier
Photo: Toby Passeur*

Some good news for Wellington Caves with the newly amalgamated Council, Dubbo Regional Council, endorsing the allocation of \$9 million provided to the new Council from the NSW Stronger Communities Fund to 10 major projects to kick start new developments in Dubbo, Wellington and surrounding villages. Of interest for ACKMA members is the \$2,500,000 allocated for the "Wellington Caves Visitor Experience Centre". Wellington Caves was also in the news after upgrading its megafauna models last year as well. Manager Jodie Anderson now has the enviable task of implementing this project. The media release included some figures on the value of Wellington Caves to the local economy, and I quote;

“Projects such as the Wellington Caves Visitor Experience Centre have great potential to add to the visitor economy,” Mr Kneipp said.

“A 15% increase in annual visitor numbers at the Wellington Caves has the potential to generate 5 additional jobs and contribute some \$855,000 to the local economy through salaries and visitor expenditure.”

A Flinders University team led by Gavin Prideaux, has been excavating in Cathedral Cave at Wellington. Their excavation and the interpretation of their finds will no doubt form an important part of the new visitor centre.



Manager of the Wellington Caves complex Jodie Anderson and Australian Museum preparator Tina Manssson with the partially refurbished Wonambi - a model of a giant python, part of the trio of megafauna models on show at the central west NSW attraction.

ABC: Sally Bryant

ACKMA Life Member Kent Henderson recently advised me that he met up with ACKMA Fellow Neil Kell during a brief visit Neil made to Melbourne early in February. They enjoyed an expansive lunch at The Australian Club and reminisced over their nearly 30 year association in caves. Neil finally retired from Yarrangobilly about a year ago.



Kent Henderson (left) and Neil Kell in front of the National Gallery of Victoria.

Photo: Kent Henderson

Andy Spate prepared a submission regarding the nomination of to the Cliefden Caves to the New South Wales State Heritage Register, submitted under Dale Calnin's signature as president of ACKMA. Advocacy is a critical role of ACKMA and I can recall submissions to the British Columbian and Tasmanian Governments as well as the two mentioned in this edition.

White-nose Syndrome, *Pseudogymnoascus destructans* is a serious concern for the Australasian caving community, with a sharp focus as the International Speleological Congress approaches in July. The Australian Speleological Federation is taking the risk very seriously and has produced a protocol and guidelines (published in this journal). This gained some serious media attention, when I did an interview on the topic with the local ABC radio, and suggested that they also speak to Nicholas White, ACKMA and ASF member, who is taking a lead role in biosecurity for the congress. The story was quickly picked up on Facebook, Twitter and email lists and has (hopefully) ensured everyone in caves is thinking about this risk and on alert to the threat of white-nose syndrome poses risk to Australian bat populations.

A report was prepared for Wildlife Health Australia titled *“Qualitative risk assessment: White-nose syndrome in bats in Australia”* by Holz et al. It has been distributed via the ACKMA email list and it is certainly worth reading. The authors conclude that the likelihood of White-nose syndrome entering Australia as almost certain to occur at least once in the next 10 years and the likelihood of the entry leading to exposure as being likely, leading to an overall likely assessment of entry and exposure of **likely**. This all sounds quite disastrous, but in my work role I have been participating in workshops regarding Foot and Mouth Disease in livestock. Those monitoring this suggest this disease reaches Australia every week through international airports, but through strict quarantine measures and perhaps a good dose of luck, has yet to take hold. The distribution range of the critically endangered Southern Bent-winged Bat falls entirely within the latitude and cave conditions that this fungus prefers, so would potentially have a devastating effect on a species already under severe pressure. Liz Reed and I are hosting an excursion to Naracoorte Caves post International Speleological Congress and are taking every step to ensure no contaminated equipment or clothing comes near the caves.

This journal once again has a diversity of articles from our mostly regular contributors. There is so much happening at Australasian caves at present it would be good to have more members hit the keyboards. Ann Augusteyn provides a summary of the Savannah Guides workshop held recently. The Capricorn Caves' commitment to self development with organisational support is outstanding and its a safe bet that they will be once again well represented at Te Anau. Kent Henderson has provided a very interesting third part to his Philippine adventures with the promise of more to come.

ACKMA provided a submission to the Papparoo National Park Management Plan, largely due to the efforts of ACKMA member Mary Trayes. Mary summarises this input in her update on the plan. Cathie Plowman instigated crowd-funding to support two international students to the ISC and reveals the lucky participants. Liz Reed continues her historical investigations on Naracoorte Caves with an article on Cathedral Cave. *Trove* is a resource that holds so much information on Australian cave history and I hope others might investigate and publish on other cave sites. Graham Parkes, well known in Buchan Caves' circles, was awarded the Australia Day Public Service Medal, and Dale Calnin summarises his award. Andy Spate has provided a huge *Andysez*, dedicated to Ken Grimes. This *Andysez* is about karren, something Ken was passionate about and taught so many people (including me) during the Karst Management Course that Charles Sturt University ran. This journal is a good read, I hope you enjoy, and look forward to more contributions from new authors.

PAPAROA NATIONAL PARK, NEW ZEALAND, UPDATE

Mary Trayes

On Friday 10 March 2017, the new Paparoa National Park (PNP) Management Plan was launched by the Department of Conservation (DOC) at Barrytown Settlers Hall, just south of Punakaiki. Changes to the previous plan were needed for the Government to push forward a new Great Walk (and ride...) over the Paparoas to commemorate the twenty nine men who lost their lives in the 2010 Pike River Mine explosion.

In the scramble to meet the time frame set by the Minister, DOC planners had to work hard to have a new plan in place by early 2017. Their first move was to do a round of community consultations. To do this they had a caravan at set points with advertised timetable through February – March 2016 so people could go and chat with them about any aspects of park management important to them personally. I went along on my own behalf when they were at Runanga and then Geoff Schurr, Phil Wood and I met them on behalf of ACKMA in Westport the following week.

After this, the planners spent April and May drawing up a draft plan which incorporated key aspects of the old plan (1990), various things people had asked for during the community consultation round, and statements regarding the dual role which local Maori (Poutinin Ngai Tahu) would have along with DOC in the future management of the park.

From the cave and karst management perspective, it was obvious that the draft plan needed much work, there being both factual errors and a number of oversights in the draft. To that end, the whole caving fraternity got busy writing submissions in July and there was much email networking behind the scenes between members of ACKMA, the New Zealand Speleological Society (NZSS), Nelson Speleological Group (NSG), Canterbury Caving Group (CCG) and the West Coast Alpine Club (WCAC), to which many cavers in the Greymouth area belong. I wrote a personal submission, including points about non cave and karst issues, and asked ACKMA if they would endorse the sections I had written pertaining to karst and caves, as the basis of an ACKMA submission.



*Loggers Road polje
Photo: Mary Trayes*

Dale Calnin, ACKMA President endorsed the idea and my initial draft was circulated to the ACKMA committee and some NZ members. Overall the feedback was positive, i.e. yes, that ACKMA should make a submission and this was duly accomplished with the help of John Brush (who edited my draft), some useful comments by Pete Chandler and Neil Collinson, and positive encouragement from Grant Gartrell and Steve Bourne. In late July I got my own submission away to DOC, asking for an oral hearing, and then worked at getting the ACKMA one completed on time – it needed Dale's signature and his OK for me to speak on ACKMA's behalf. In the end, when he wasn't answering emails because he was out of town, DOC gave me an extension over a weekend in mid-August, and I rang Dale him and luckily caught him in the office on a Saturday - sorted.

The hearings sessions were held in Greymouth over two days in August and went off fairly well, although like everyone else, I seemed to be pressed for time to make my points. I stayed around to support other submitters like Ian Millar, who was speaking for NZSS and Alice Shanks for CCG. The atmosphere was quite collegial. On the first day Ian Millar, Ian McGregor (NSG) and I had lunch together after making our presentations and on the second day a bigger group including Alice Shanks (now an ACKMA member) and a few other cavers and submitters wound down after the two days with coffees at Greymouth's DP1 Café.

In early October, all those who submitted were sent an online link by DOC which they could open and see whether or not what they had asked for had been 'allowed' or 'disallowed'. From the cave and karst perspective many points we had all wanted were 'allowed', e.g. the poorly worded phrases about public use of the Metro Cave had been rectified and all mention of Xanadu Cave (for safety reasons) had been removed, being replaced by the more general term 'Bullock Creek Caves.' I was annoyed, however to still find that the original boundary between 'Nikau Place' and 'Manuka Place' (DOC have the park divided up into various blocks for biodiversity management) still cut across underground drainages in the Fox River area, i.e. the cave entrances/resurgences are in 'Nikau' and the submergence in Armageddon and Cave Creek North are in 'Manuka.' I had asked for this to be changed in both my own and ACKMA's submissions, specifically referring to it with a map and photographs in the ACKMA hearing.

By late October the next step was for DOC to get sign-off (approval) for their plan from the West Coast Tai Poutini Conservation Board (a regional body which advises the West Coast Conservator) followed by the NZ Conservation Authority (a body which advises the Minister). This is about the time when things started going pear-shaped about one aspect of the whole plan leading to some strong letters to the newspapers, boycotting of the plan launch on 10 March by some groups and a small protest organised by yours truly outside the hall on the day. No, and ACKMA didn't get an invite.....when all the other caving groups did.

In short, the background to this is that DOC did not allow for public consultation during the planning process about where mountain bikers might enter or exit the proposed new Paparoa Great Walk (and ride...). Locals had made it clear back at the outset back in March that they didn't want bikers on the very popular Pororari River Track which meant DOC needed to come up with an alternative. However in the draft plan no alternatives were mooted, nothing in the text or on the various

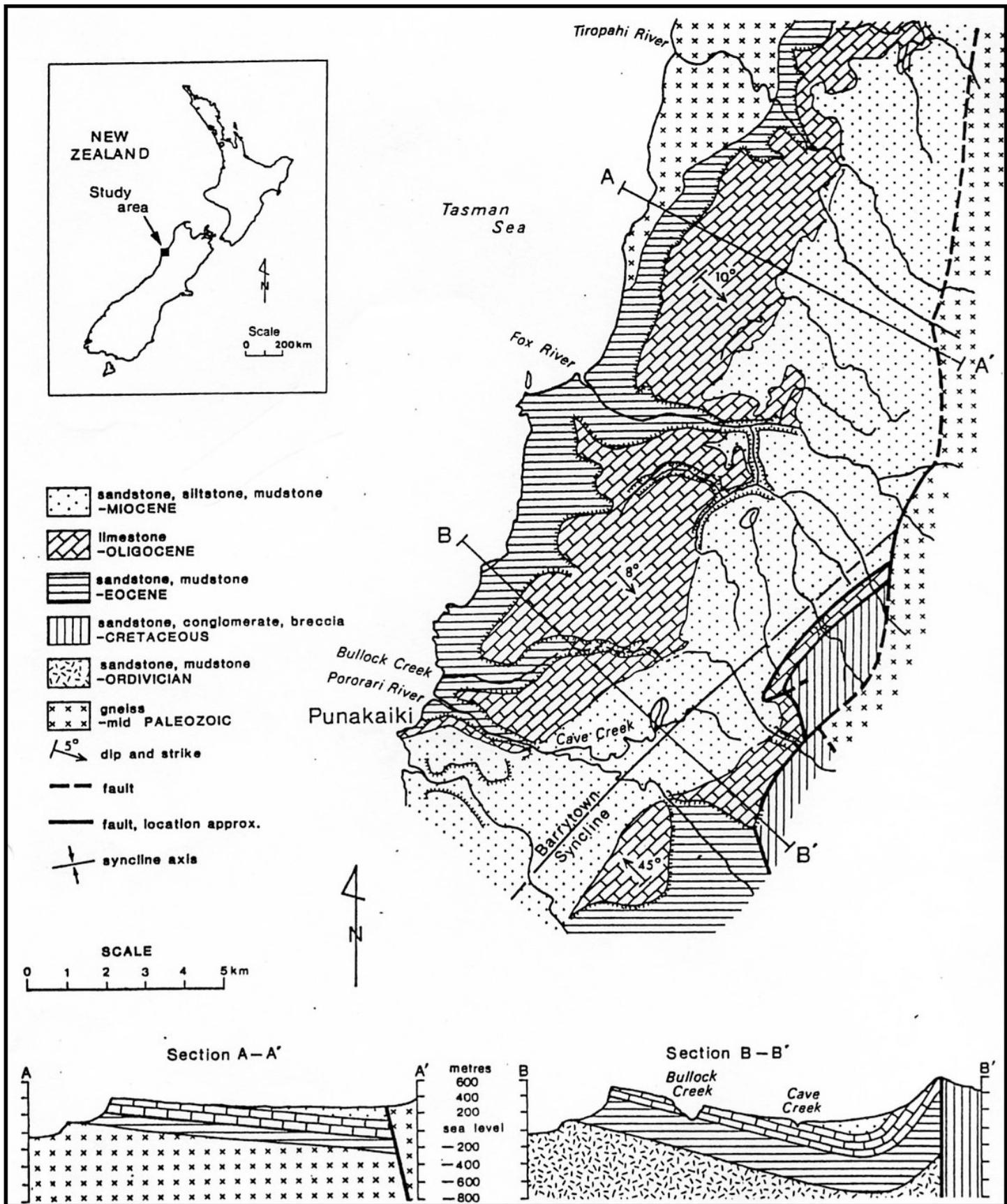
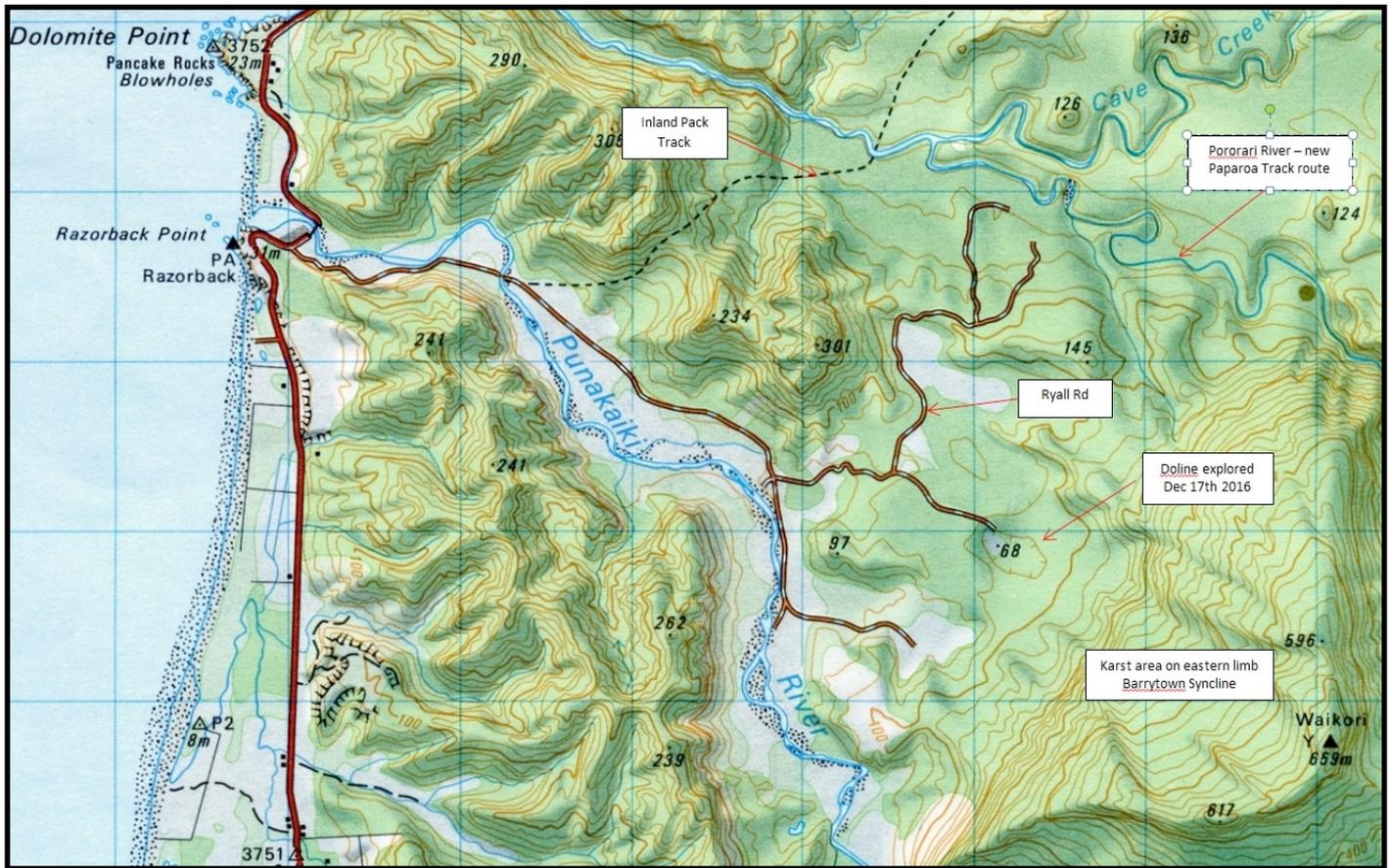


Fig. 1. Geology of the Paparoa Karst (after Laird 1998) from *The Hydrological Behaviour of a High Flooding Frequency Karst System in New Zealand*, S. Crawford, 1989.



K30 1:50,000 topo map showing key features around the southern end of the Barrytown Syncline

maps. One of the few groups to comment about this was the West Coast Alpine Club, which asked DOC in its submission to consider use of the old logging roads in the Punakaiki River area.

While everyone was waiting for the plan to go before the Conservation Board in October two different groups of WCAC members found blue survey tape by the Inland Pack Track (IPT) between the Pororari and Punakaiki Rivers and after consulting one another, correctly surmised it was to do with changes (to the grade) for biker egress from the Paparoa Track coming down the Pororari River valley. As this section of the IPT connects with the lower Pororari River Valley Track to form a great half day walk there was immediate consternation which rapidly hit the air waves. Opposition to DOC's plan, which had basically gone under the radar, has been escalating ever since with much letter writing and a couple of meetings with the Greymouth Area DOC manager. DOC management at a higher level have countered this saying they have consulted (yes, but only with the Conservation Board), that it's an 'operational' decision (so they don't need public approval anyway) and whatever we do they have the final say. So far these 'fighting words' have managed to unite a good array of tramping and outdoor clubs, a couple of environmental groups and a good assortment of non-affiliated residents living in the Punakaiki area.

You may be asking what's all this got to do with cave and karst management, but I have included this here because;

- a) there is a need to document the fact that there are real misgivings about the way the back country is being managed in New Zealand (see the great article in this month's NZ Wilderness Magazine about this), and
- b) because some members of the 'Save the Inland Pack Track' movement are the very same people who put the caves of Paparoa National Park on the map in the late 1960's and early 1970s, i.e. Paul Caffyn, Jean Rodgers, Bruce Annabell, Kerry-Jayne Wilson and Carolyn Hewlett.

There is a feasible, if maybe more expensive, route using one of the old logging roads (Ryall Road) which DOC could use for their mountain bike egress, our movement will keep working on ways to achieve that. The Government gave DOC \$10M to set up the Paparoa Great Walk, so there is money there if some re-prioritisation is done.

The big spin-off for caving from all of this that Ryall Road, (which many people have been exploring) and the new Paparoa Track up the Pororari, both give access to the steeply dipping Potikohua Limestone on the eastern limb of the Barrytown Syncline around Mt Waikori (see the topographical map). To date most karst exploration in Paparoa National Park has taken place in the limestone of the western limb of the Barrytown Syncline, where there are significant karst features (Bullock Creek - Cave Creek South stream capture and cave systems, the Abyssinia Cave system, which needs further exploration, and further north the Fox River - Cave Creek North cave systems). I have not been able to find any record of systematic prospecting in the Waikori area.

On 17 December 2016 Bruce Annabell and I (both pushing 70 years) made a start on this exploration when we decided to visit a large doline - or small polje - marked on the K30 1:50,000 topo map. A branch road off Ryall Road seemed to head right towards it so we set off along this in an easterly direction armed with loppers (for the bush lawyer and scrub), bits of tape to mark key points and my very basic GPS. Our first problem was crossing a small but deep creek on what was left of a couple of old bridge bearers but after that following the old road formation was fairly easy, although it meant pushing through bits of scrub in places and climbing over a few large logs. The road was both fairly straight and fairly level, dropping away in places on both sides.

After half an hour's travelling, and a bit of lopping through some windthrow, the just road fizzled out, and the ground just dropped away steeply both straight ahead (east) and on our

right (south). We put up a marker or two, noted a couple of limestone boulders and headed in a south-easterly direction down the hill into the doline. After clambering down and under a huge old log, and putting up a couple more tapes so we could find our way back, we suddenly stepped over a tiny stream – barely any water – and out onto a flattish area covered in grass dotted with some species of divaricating *coprosma* up to about 2- 2.5m tall. We estimated the drop down to be about 30m.

From here we continued on in our south easterly direction toward the other side of the doline where there was a gap on the skyline. Stopping for munchies and a drink, we noticed how everything looked the same so took care to mark our way across so we could find our way back up to the old logging road. After about 15 minutes we reached the far side and lo and behold we found some more large limestone boulders and a couple of very muddy sinks. They were all of 2m deep and sumped with mud. Aha.

Backtracking all around we found that streams which fed these sinks came from both the north and south after wending their way in circuitous fashion across the bottom of the doline. Most interesting from a drainage point of view, but not so good for those hoping to find a nice cave entrance. Before we headed I took some GPS readings and Bruce made a sketch map of the area including taking bearings on some clearly visible high points like Mt Waikori.

Back up on the road, having collected our bits of tape, we made our way back to Ryall Road, checking out some dolines on the right/north side of the road as we went. After a while they appeared on the left/south side so we surmised the road had crossed some sort of underground waterway. Eating lunch back in a patch of sun at the intersection with Ryall Road we suddenly both realised that we could hear running water and went to investigate. A full sized creek was cruising along parallel with Ryall Road - a lovely bush stream – but where had it come from? We hadn't crossed it going out to the doline or seen it coming back.

We headed on out and later asked Neil Mouat about this, whose family used to own the land before it became National Park. He told us that that stream, which is not marked on maps, goes underground further north, resurges near where we had lunch, then goes underground again before finally resurging near the Punakaiki River. Amazing that of all the maps we had recourse to, including the Punakaiki Geological map, not one showed any parts of this drainage, although some had the doline clearly marked on them. We also learned that Paul Caffyn and Leon Dalziel visited the second last submergence of this stream on one of their forays up Ryall Road and say it's worth taking a torch. A trip back to this area is now overdue.

PUBLIC SERVICE MEDAL AWARDED to GRAHAM PARKES

Dale Calnin



Graham's time at Buchan was marked by many achievements with significant progress in the management of Cave and Karst resources. He became a member of ACKMA and fostered partnerships with local caving clubs and organisations.

He introduced sensitive and controlled management principles, improved cave guiding standards, initiated the Friends of Buchan Caves group and accepted the other eight reserves with cave and karst values as part of his management responsibilities.

Many people who know Graham would agree that over his 43 year career, he built many strong friendships within Parks Victoria and enduring relationships with our partners and stakeholders.

Graham led the emergency response to some of the most severe fire and flood events in living memory. He drove recovery programs which protected sensitive environments and rebuilt essential park infrastructure, as well as supported the local tourism industry to recover and continue to contribute to regional and State economies.

Graham is well known for his capacity to build strong partnerships with people and organisations, including Traditional Owners, community groups, volunteers, all levels of government and the tourism industry. These partnerships have delivered innovative conservation, cultural and recreation works across many parks.

Those who had the pleasure in working with Graham cannot speak highly enough of this genuinely kind, hardworking and committed person. He embodies all that is good in land conservation and protection.

Congratulations to Graham on receiving this prestigious award.

ACKMA recognises and congratulates former Ranger in Charge of Buchan Caves Graham Parkes for his Public Service Medal awarded in the 2017 Australia Day Honours, for his outstanding contribution to the Victorian community.

Graham, a renowned Parks Victoria leader, received the medal for his significant and dedicated contribution to fire and emergency management, tourism and regional development, natural environment conservation and visionary park planning.

Graham began working for the Victorian National Parks Service as a park assistant in 1973, became the Ranger in Charge of Buchan Caves Reserve in the mid-eighties, later went on to become the Ranger in Charge of the Grampians National Park in 1994 and was District Manager for South Western Victoria prior to his retirement in 2016.

ONCE MORE UNTO THE DEEP: EARLY HISTORY OF CATHEDRAL CAVE, NARACOORTE

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A cave possessing little of interest

Cathedral Cave, also known as Deep Cave and 60 foot Cave, was discovered around 1845, along with other large caves in the Naracoorte complex. The name Cathedral Cave likely references the imposing form of the chambers, and the shape of the rocky entrance cone which resembles an altar.

The Reverend Julian Tenison-Woods, famous for penning the first detailed descriptions of Naracoorte's caves and fossils, never visited Cathedral Cave. He was certainly aware of it, but cited difficulty of access and paucity of interesting features as the reasons for his lack of attention. The prospect of descending its depths, dangling from a rope, apparently challenged even his adventurous and curious spirit:

"At the side of this cave there is another cave, probably also communicating; the passage has been discovered at the same time. This is exceedingly deep, probably over sixty feet, and only a wide spacious chamber. As there is no possibility of descent except by a rope, and as I was informed that the cave possesses little that is interesting, I preferred to wait for its exploration until a more practicable passage should be found between it and its neighbours." Woods (1862, p. 332).

Whether it was due to the depth of its entrance, or the presence of other caves deemed far more spectacular, Cathedral Cave never became a celebrated tourist attraction like Blanche, Victoria or Alexandra Caves. Palaeontological and

ecological research in recent decades has shown that it is every bit as significant scientifically as those other caves; nevertheless, information on the early history of the cave is scant in comparison with Naracoorte's more famous caves. In this paper I aim to highlight various aspects of Cathedral Cave's history, and present photographic images that have not (as far as I am aware) been published previously.

Photographic records

Few photographs of Cathedral Cave exist in Australian public collections. Two images are held in the State Library of South Australia (PRG 280/1/43/401 and B26141). Photographs and stereoviews also exist in private collections, including that of the author (Plates 1, 2 and 3). The best known of the Naracoorte Cave photographers, William Augustus Francis, captured two images of the cave in approximately 1900. Plate 1 shows a stereoview by Francis depicting the rubble cone beneath one of the entrances. Two gentlemen are evident sitting on the wall, and there is a stacked rock wall and staircase visible (Plate 1). Another stereoview by Francis shows the 'Water Grotto', which is an area with a small pool at the far end of a passage adjacent the main entrance chamber (Plate 2). Graffiti is clearly visible on the cave wall above the decorations. The same image is held in the State Library of South Australia (B26141).

A particularly interesting image is attributable to Thomas G. Campbell of 'Naracoorte' (common spelling of Naracoorte prior to 1924). This stereoview image (Plate 3) again shows the



Plate 1. Stereoview W.A. Francis, approximately 1900 – 60ft Cave, Cathedral Chamber.

Note the seated gentlemen at the base of the pitch.
Photographed from the original, collection of the author.

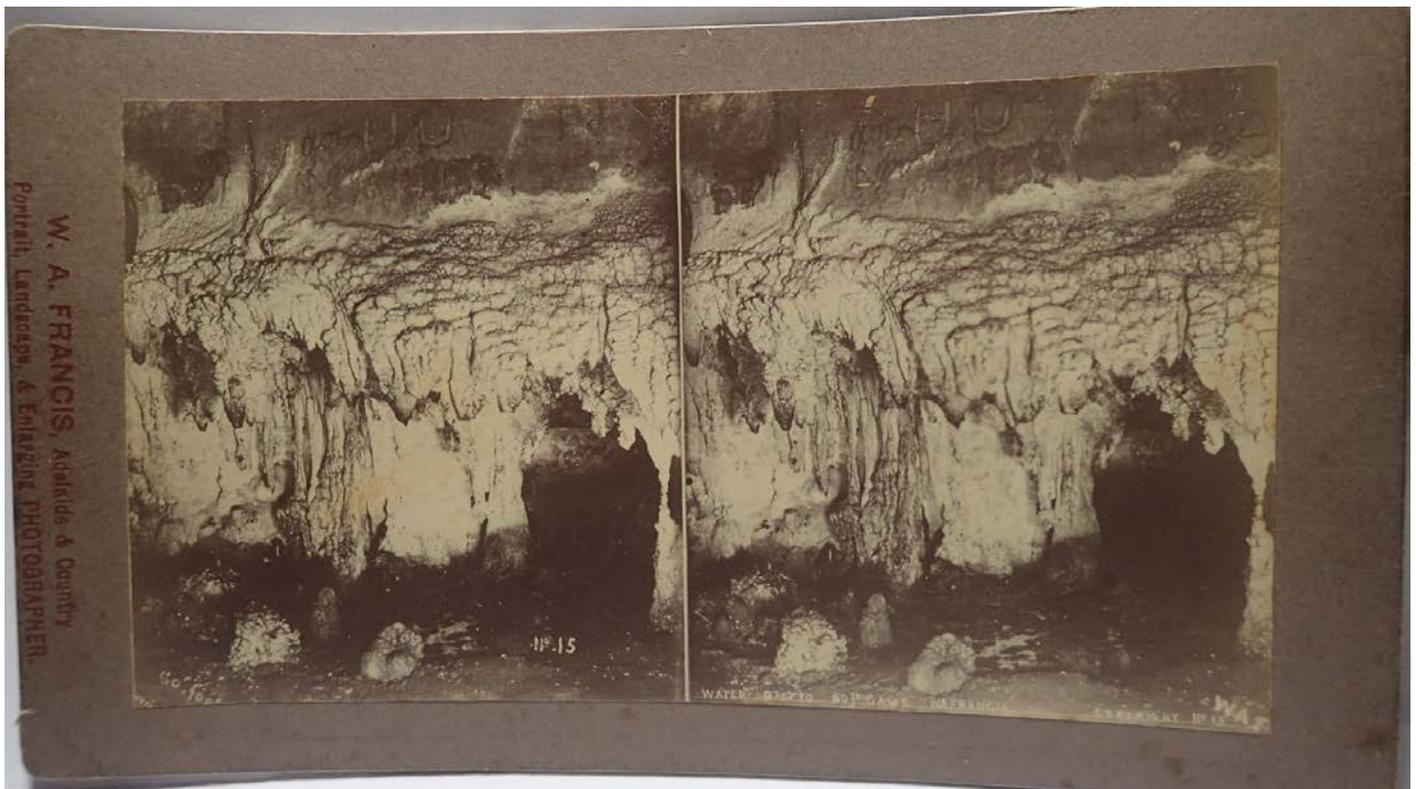


Plate 2. Stereoview W.A. Francis, approximately 1900 - "Water Grotto, 60 ft Cave, No. 15."
 Note graffiti on the wall above the scene.
 Photographed from the original, collection of the author.



Plate 3. Stereoview T.G. Campbell, photo. No. 8 "The Cathedral, 60 foot Cave."
 Photographed from the original, collection of the author.



Plate 4. Cathedral Cave, Naracoorte. Unusual double exposure.

State library of South Australia, accession number PRG 290/1/43/401. Part of the Searcy collection, approximately 1910.

entrance pitch and cone, but also clearly shows that a fence had been constructed in the cave, presumably to protect areas of the floor and decoration from visitors. Rocks and pieces of wood that can be seen scattered on the floor in the photo by Francis (Plate 1) appear to have been stacked up, and the area tidied. This was likely the work of William Reddan who was caretaker of the caves at the time this photograph was taken, which is probably between 1900 and 1910.

Another photograph from around 1910 (Plate 4), is part of the Searcy Collection in the State Library of SA (280/1/43/401). It shows the same view of the Cathedral Cave entrance, but is unusual for its double exposure; clearly showing elements of another cave scene blended with the image (Plate 4). This photograph also shows the fence within the cave and the 'tidy' nature of the scene, perhaps placing it at a similar time to the Campbell photograph.

Esteemed visitors

During the 1860s, at least two Governors of South Australia visited Cathedral Cave, namely Sir Dominick Daly and Sir James Fergusson. Daly was appointed Governor in October 1861, but did not take up residence in South Australia until the 4th of March 1862 (Manhood, 1974). His predecessor, Sir Richard Graves MacDonnell (1814 - 1881), visited Naracoorte Caves in 1856 and famously named 'Blanche Cave' after his wife the Lady Blanche Anne MacDonnell. Sir Dominick Daly served as Governor until his death on 19th February 1868 (Findlay, 1972). He visited the Naracoorte caves in 1863, including Cathedral Cave:

"After lunch the party proceeded to the deep Cave (60 feet) under the surface, where a chair was provided, with ropes and other appliances for lowering down the visitors. His Excellency at once descended, and was speedily followed by several gentlemen, who declined to avail themselves of the chair, but went down in the most plucky manner, "hand-over-hand", among the foremost of whom were the Chief Secretary and Major Brinkley."

Border Watch, Friday 20th of February 1863, p. 3.

An additional account of Governor Daly's visit:

"His Excellency was let down what is commonly known as the Deep Cave by means of a triangle and blocks erected over the opening, having a chair securely fastened at the end of the rope. Many others followed His Excellency, and some went down another cave by means of a ladder."

South Australian Register, Friday 20th of February 1863, p. 3.

According to another writer (likely the Reverend W.R. Fletcher), the descent into the cave for one Governor (possibly Daly) was less than perfectly executed:

"We heard a curious story of a narrow escape on the part of one of our recent Governors. His friends had done him the honour of providing an armchair, seated on which and dangling in state in

mid-air, His Excellency was to be content with touching the floor of the cavern. The idea was good; but, in utter ignorance of the capacity of glue to sustain such a weight, the ropes had been tied to the top rail of the circular back of the chair. Innocent and trusting, the Governor was just about to be swung off, in which case he would have found the bottom somewhat too speedily, when a loyal onlooker called out to him to stop. The chair was then properly attached and the viceregal party were saved from being actors in a most tragic comedy."

The Argus, 5th of May, 1879, p. 7.

Sir James Fergusson succeeded Daly as Governor in 1869 and served until 1872. Fergusson commenced as Governor during a difficult time for South Australia, when the state was in a depression. He controversially supported two separate dissolutions of parliament in 1870 and 1871, and this combined with his perceived aloof nature, meant he was at times criticised (Findlay, 1972). However, he put much effort into improving South Australia's economy, notably securing the overland telegraph line from the Northern Territory to Port Augusta (Findlay, 1972). He also strongly supported the establishment of a university in South Australia, notably The University of Adelaide which was founded in 1874.

In 1869, an impending visit by His Excellency Sir James Fergusson prompted an innovative proposal:

"Another suggestion was that a pulley should be provided to enable the Governor to visit the Deep Cave. This idea met with approval, and one gentleman present (who I grieve to say is on the Committee) intimated that as soon as the Governor was in the 'Deep' the rope should be drawn up, and His Excellency kept down until he made us a promise to grant a District Council for Narracoorte. There was no seconder to this proposition."

The Mercury (Hobart, Tasmania), Wednesday 19th of May, 1869, p. 3.

Perilous adventures

Several early accounts of Cathedral Cave focus on 'near-miss' incidents, and if one is to believe these reports, such occurrences were relatively frequent. A report titled 'A Perilous adventure at Mosquito Plains', tells the harrowing story of a narrow escape for a young man who ran into trouble exiting Cathedral Cave via a rope:

"On Wednesday last a gentleman had a narrow escape from meeting with a horrible death. He and two friends paid a visit to the above caves, and after inspecting one of the large ones, let himself down what is commonly known as the Deep Cave, - about forty-five feet, - with a rope, hand over hand, leaving the other two on the surface. Having spent some time below, and having doubtless more or less exhausted his strength, he commenced the ascent, which he found more difficult than he had imagined, for the nearer he came to the top, the weaker he became. He tried at one time to rest upon the rope, but failed, and of course fatigued himself the more with his efforts, but bravely pushed on again and again had to give in. One of those on the top called out, "Hold on then," and pulled up the rope; but from the position in which he stood at the side of the mouth of the cave he pulled the man under a projecting rock, and could not get him from under it. It was at this stage a case of life or death. The sight of the man hanging on a rope close to the top with no apparent means at hand to raise him, he exhausted, and a hard rock to fall upon, was one to be remembered. However, he threw out his foot and the one who had up to that time been a mere spectator of the scene, leaning as far down the cave as possible, caught his heel, drew him from under the rock, and the one who had hold of the rope pulled him up. From the number of hairbreadth escapes that have taken place here,

it ought to either be filled up or something done to enable visitors to see it without risk. The cave is attractive enough, and people will go down. The Government have been requested to vest the caves in trustees, who would make them safe if permitted. Had the adventurer above referred to broken his neck something would have been done, but as it is he had a narrow escape."

The Mercury (Hobart, Tasmania), Monday 10th of August, 1868, p. 3.

Another report from 1868, mentions an incident two weeks prior to the one described above. This time the 'near-miss' occurred in Bat Cave, where a man lost his balance on the rope and fell for a short distance before a knot caught in the block he had rigged. After safely reaching the bottom, he reports that his party of four proceeded through the cave:

"...we explored the cave, which we found had no very great attractions beyond the thousands of bats congregated there, who when disturbed usually fly round about one and extinguish the candles. But on this occasion they seemed to be in a state of torpor, clinging to the roof in clusters; and knocking them down, they remained on the ground, being apparently unable to rise."
The Argus, Saturday 8th of August, 1868, p. 6.

Thomas Hinckley, one of the first licensed bat guano miners at Naracoorte, cited the lack of visitation to Bat Cave to justify his mining application (Hamilton-Smith, 1998). After guano mining commenced in 1871, it is unlikely the cave received many visitors beyond those employed in mining activities. Undoubtedly, access had been made more secure for this activity. As the previous quote vividly illustrates, the welfare of the resident bats was not an important consideration at the time.

Prior to their mishap in Bat Cave, the same party had visited Cathedral Cave. They provide an interesting description of the cave:

"After visiting the caves of easy access, we started to have a look at what is usually called the 60 feet, or Deep Cave. On finding it, we discovered the entrance to be just large enough to allow one person to pass through. The thickness of the crust of this opening being only two or three feet, it affords no assistance in going up or down, as immediately under the crust is an immense cavern or chamber. Having fixed our tackling to a tree thrown across the mouth, we descended by placing one foot in a noose at one end of the rope and lowering away the other end. Having reached the bottom quite safe, we noticed that, although the cave was magnificently large, yet it did not bear comparison with the others for beauty of form, or fantastical, comical-shaped stalactites; still, by going to the end, and crawling along a narrow passage or drive, there are found some very pretty smaller caves, evidently not much disturbed, for their original beauty remained untouched. After a little "spell oh!" we made tracks for the summit again, and by really laborious pulling and tugging we all reached the top, and thought ourselves well out of our first adventure."

The Argus, Saturday 8th of August, 1868, p. 6.

This series of mishaps was used to argue for either the closure or modification of the deeper caves to protect visitors:

"To show the necessity of something being done, either by public subscription or the Government, towards providing a safe and easy mode of viewing the deep caves on the Mosquito Plains, a gentleman who recently visited the locality has sent us the following account of another very narrow escape, which

occurred a fortnight previous to the one referred to in our issue of the 31st ultimo.“

The Argus, Saturday 8th of August, 1868, p. 6.

Tourism

It is unclear how visitation to Cathedral Cave proceeded after these various mishaps, and if steps were taken to make the deeper caves more accessible. It is striking that at the time, priority was placed on providing safe entry for ‘visitors’ rather than protection of the caves from vandalism and misuse caused by these visitors. Many reports describe souveniring of cave decorations, not to mention the damage done by graffiti, candle-smoke, magnesium lights, picnics and parties (Reed and Bourne, 2013). By the late 1860s the degraded state of the caves was noted by several key visitors, including journalist Ebenezer Ward who wrote rather a scathing report in 1868 (Ward, 1868; Reed and Bourne, 2013).

The situation changed after 1876, when the caves came under the control of the Forest Board and the area became the Caves Range Forest Reserve. Even up until the late 1870s considerable damage was being done to the caves (Reed and Bourne, 2013). In 1879, the consequences of guano mining and inappropriate visitation caught the ire of the Reverend W.R. Fletcher:

“As I wandered among these caves and saw everywhere the marks of this insensate spirit of mischief and snobbishness, I wondered why either the Government or the Tourist Board had not appointed a guardian over the place. Surely these caverns are worth preserving. A small salary joined to his perquisites as showman would afford a good living to a suitable man, and his appointment would be a public boon. I learn, however, since my return that this is to be done. The Forest Board have taken the matter up, and though the misdeeds of the past can never be undone what remains may be preserved and left to the tender care of nature to heal the scars.”

The Argus, 5th of May, 1879, p. 7.

During the visit of Governor Jervois in 1880, local people expressed concern about this, and with increasing pressure to protect the caves, the Woods and Forests Department (formerly the Forest Board) set aside 50 acres around the caves as a reserve for their preservation. A caretaker was then appointed and work commenced to restore and ‘beautify’ the caves (Reed and Bourne, 2013).

While Blanche, Alexandra and Victoria Caves, were popular tourist attractions, there is little evidence available that Cathedral Cave was used for this purpose. Local guides may have offered tours into the cave, lowering guests down using a rope (Bourne, 2001). A tourist booklet, probably dating to the 1920s, provides a description of Cathedral Cave, yet does not mention it as a formal, guided option for visitors:

“The Deep Cave sometimes called the Cathedral Cave, might next attract the visitor’s attention. The latter name is appropriate, because the principal chamber (150ft. long and 50ft. wide, with an arched and fretted roof) has the appearance of an ancient cathedral. The resemblance is further intensified by the dim religious light which filters through an opening in the roof and concentrates its clearest rays on the dais below. Looking back from the dais a beautiful curtain may be seen dividing the anteroom from the main hall.”

The Naracoorte Caves. Issued by the Government Tourism Bureau, King William Street, Adelaide. Pp. 10. Probably dated to after 1924.

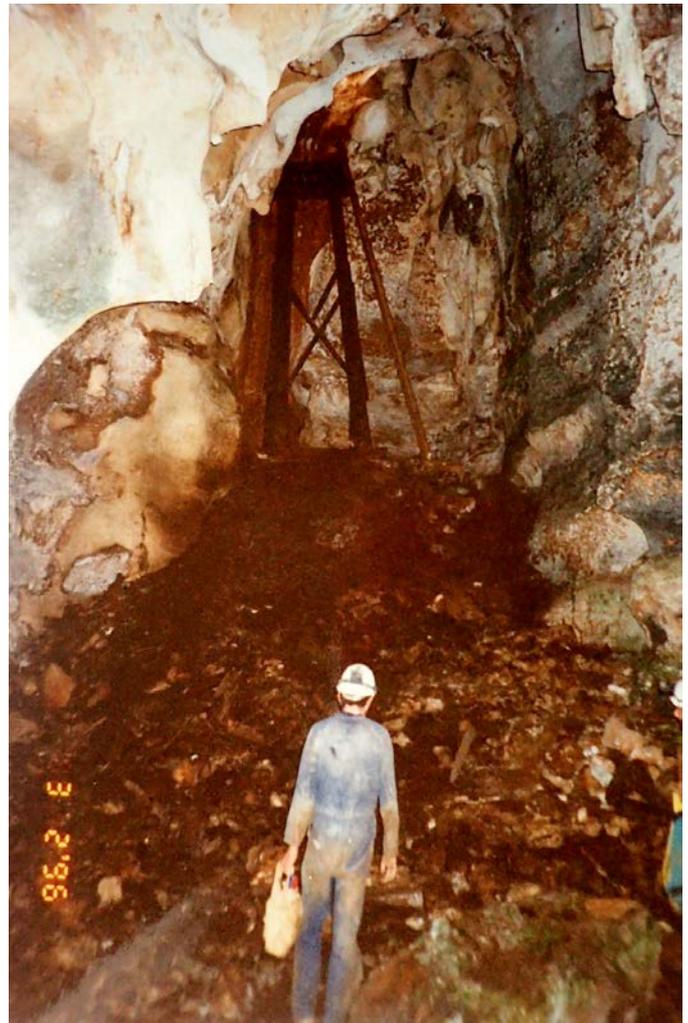


Plate 5. The wooden tower in Cathedral Cave in 1996 prior to removal.
Photo Steve Bourne.

To facilitate access into the cave, a wooden tower (Plate 5), was erected beneath one of the entrances (Bourne, 2001). This was likely in the early part of the twentieth century, and may have been around the same time the fences were installed (Plates 1 and 4). It is very likely this was the work of William Reddan. The installation of the tower undoubtedly increased the accessibility of the cave, and led to a rise in damage, particularly via graffiti (Bourne, 2001). This was only alleviated when the upper section of the tower collapsed around 1980 (Bourne, 2001). Prior to this, the cave had been used for very occasionally for tours, but most access was unsupervised (Bourne, 2001).

Scientific research

Given the World Heritage status of the Naracoorte Caves National Park, it is not surprising that Cathedral Cave has considerable palaeontological value (Reed and Bourne, 2000, 2009). Megafauna fossils were first reported from the cave in March 1959, following the discovery by cavers of cranial and postcranial specimens from the ‘marsupial lion’ *Thylacoleo carnifex* (Daily, 1960). In the late 1977/78 additional material was found further in the cave within a large sediment-floored chamber. Fossils collected by R.T. Wells in 1977 and 1978 were registered with the South Australian Museum, and included cranial elements from the extinct kangaroo *Procoptodon goliah*, giant devil *Sarcophilus laniarius* and Eastern Quoll *Dasyurus viverrinus*.

In the late 1990s, speleothems samples from the cave were used to reconstruct palaeoclimate at Naracoorte over the past 500,000 years, and provide dates for the fossil deposits (Ayliffe et al., 1998; Moriarty et al. 2000). Flinders University student Steven Brown conducted an excavation in 1998, which was the first systematic study of fossils from the cave (Brown and Wells, 2000). This excavation was later expanded by Gavin Prideaux, whose careful study showed that mammalian species diversity during the Pleistocene was broadly stable until megafauna extinction, which he concluded was unlikely to be driven by climate change (Prideaux et al., 2007).

Other scientific research in Cathedral Cave has focussed on the invertebrate faunas within the cave. A total of 34 species were recorded from the entrance zone and adjacent dark zone by Bellati et al. (2003), revealing a rich fauna (see also Moulds, 2004; Moulds et al., 2007). The cave is also important for the resident Southern Bent-wing Bats (Bourne, 2001).

Restoration

Cathedral Cave contains plentiful evidence of past damage, hence while its depth may have protected it from receiving the high levels of visitation that Blanche Cave endured, those who did brave the descent certainly left their mark. Following this long history of visitation, the cave floor was strewn with countless rocks, broken glass and other debris that had been thrown into the cave (Bourne, 2001). Graffiti covered most of the cave's walls, much of it modern. Recreational caving had impacted several areas of flowstone floors and rim pools, which were buried beneath a thick layer of clay (Bourne, 2001).

In 2000, a project was undertaken by park management to restore Cathedral Cave to a more natural state (Bourne, 2001). The pine forests above the cave had been removed in 1996,

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improving water flow into the cave and reactivating cave formations. The cave floor was cleaned of the debris and rubbish that people had thrown in from above. Track marking was installed, and graffiti removed in some places. Removal of a concrete border at the base of the fences surrounding the cave entrances restored natural water flow; and abseiling was no longer permitted in order to protect the areas under the entrance. The entrance was gated, and a new outside fence was installed which was designed to be discourage climbing and increase security for the cave. It also made it more difficult for things to be thrown into the entrance.

The restoration work coincided with the first serious scientific research in the cave. A major fossil excavation in the far reaches prompted construction of a safer access tower, which was engineered so that the cave was not permanently altered for its installation (Bourne, 2001). Following this, small group tours were offered with a focus on cave conservation and scientific values. These continued for several years, but were later discontinued.

Nature's wonders hidden in the deep

Cathedral Cave has had an interesting and varied history. Although it was not one of the popular and much publicised show caves, it certainly provided adventure and wonder for many visitors over the years. Like many of the caves at Naracoorte, the impact of visitation is still evident in its chambers today. Restoration projects were undertaken in the cave a century apart, first by Reddan and later by the National Parks Service. In recent years, a wealth of scientific study has revealed much about its natural values. If the Reverend Julian Tenison-Woods had some inkling of what lay beneath, he may well have braved the depths and discovered that the '60 foot Cave' possessed many things of interest.

PHILIPPINE KARST ADVENTURES: PART 3 - PALAWAN

Kent Henderson



In early January 2017, I found myself back in the Philippines yet again, this time destined for the wonderful karst world of Palawan (pronounced Pal-LAU-won). This long cigar-shaped island is located west of Manila, pointing towards Borneo,

being approximately 450 km long and 50 km wide. The northern half of the island is mostly tropical tower karst, featuring some very spectacular mountains.



Arriving by outrigger motor boat



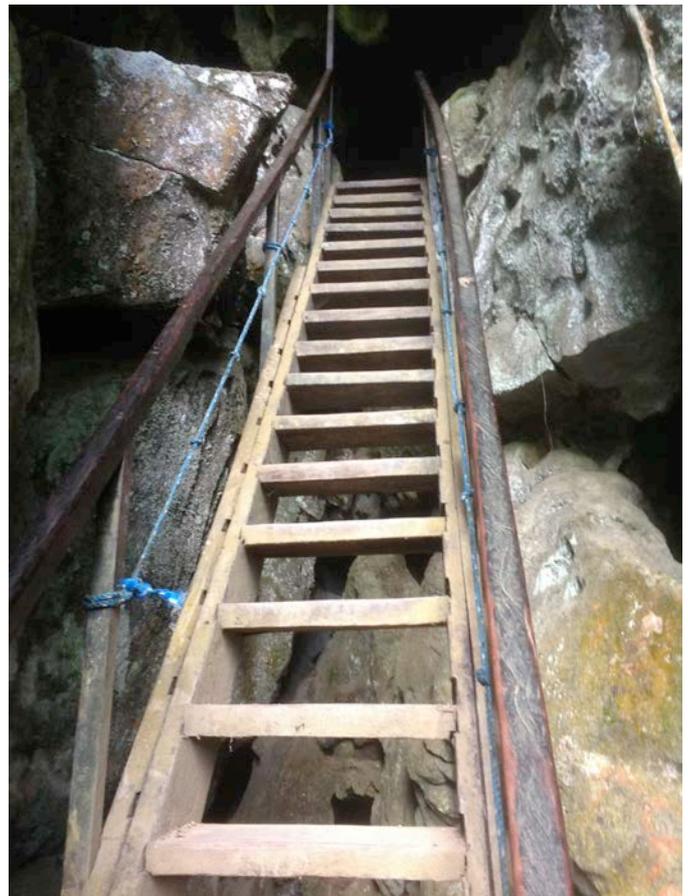
In the boat ready for the Underground River tour

The greatest attraction of Palawan is its world-famous Underground River Cave; which is a RAMSAR site and is concurrently World Heritage-listed. It has been on my karst bucket list for a very long time! It is located within the quite large Puerto Princesa Subterranean River National Park, some 50 km north of Puerto Princesa, the principal city on Palawan Island.

It is bordered by St. Paul Bay to the north and the Babuyan River to the east. The City Government of Puerto Princesa has managed the National Park since 1992. The entrance to the subterranean river is a hike or boat ride from the coastal town of Sabang.



A view out of the Underground River Cave

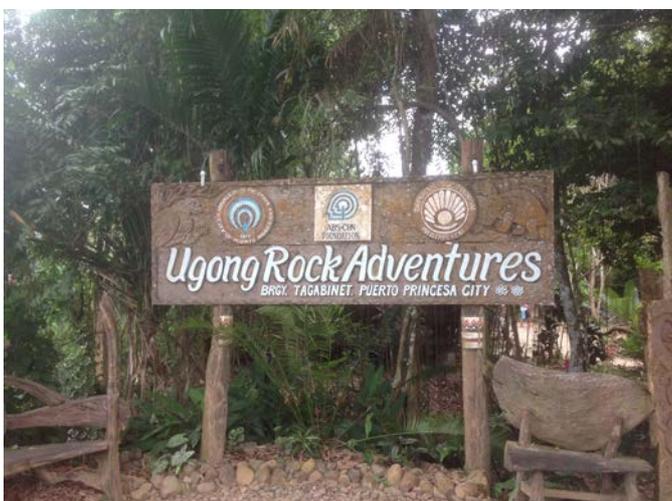


Infrastructure and rigging – Ugong Rock Adventures

St. Pauls Underground River Cave is more than 24 km long and contains an 8.2 km long underground section of the Cabayugan River. The river winds through the cave before flowing directly into the West Philippine Sea and is navigable by boat up to 4.3 km from the sea. The cave includes several large chambers, including the 360-meter-long Italian's Chamber of approx. 2.5 million m³ volume, making it one of the larger caverns in the world. Until the 2007 discovery of an underground river in Mexico's Yucatán Peninsula, the Puerto Princesa Subterranean River was reputed to be the world's longest underground river.

The area also represents a habitat for biodiversity conservation. The site contains a full mountain-to-the-sea ecosystem and has some of the most important forests in Asia. It was inscribed by UNESCO as a World Heritage Site on 4 December 1999.

In 2010, a group of cavers discovered that the underground river has a second floor, and small waterfalls inside the cave. They also found a cave dome measuring 300m above the underground river, rock formations, large bats, a deep water hole in the river, more river channels, and another deep cave.



Signage at Ugong Rock Adventures



The toilet - Ugong Rock Adventures. Not good...



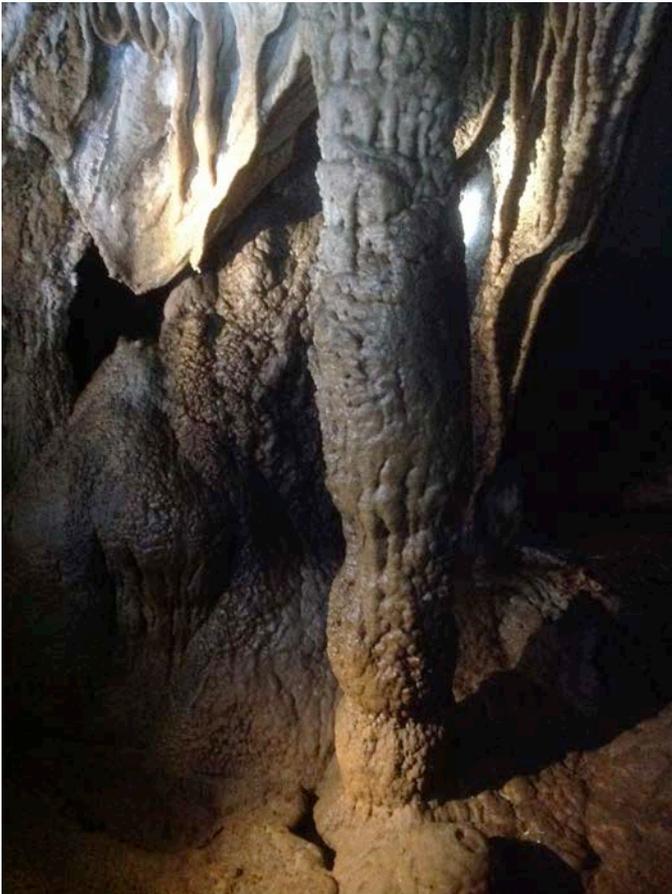
*At the top of the tower karst
– Ugong Rock Adventures*



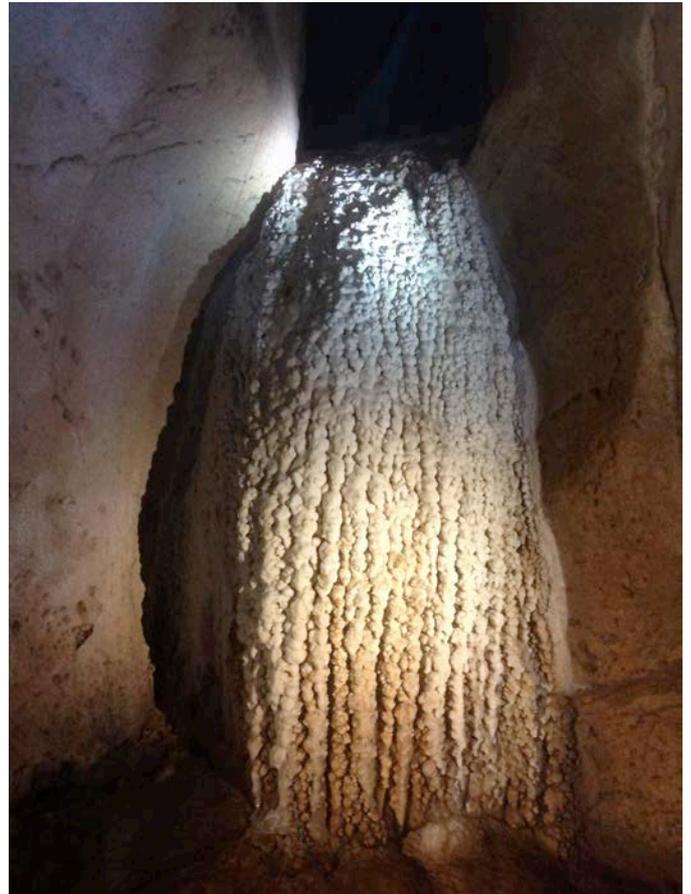
Impressive signage – One Hundred Caves

The Puerto Princesa Underground River was provisionally chosen as one of the New 7 Wonders of Nature; officially confirmed on 28 January 2012. It is in excellent company, the other six are: Table Mountain – South Africa; Iguazu Falls – Argentina/Brazil; The Amazon – South America; Halong Bay – Vietnam; Jeju Island – South Korea; and Komodo – Indonesia. As will be quickly noted, caves and karst are prominent! Controversially, the Great Barrier Reef missed a gong...

So...having flown into Puerto Princesa from Manila, I hot-footed it to Sabang. The next day it was off to the Underground River Cave. I went without expectations (past Asian karst experiences suggesting that is a good idea...), but I hoped that management would be at least as good as the Monfort Bat Cave (see Part 2). I was not to be disappointed. Indeed, I found that, by and large, the Palawan people were very environmentally conscious. For example, the Island's laws make littering a serious offence;



Decoration – One Hundred Caves



"Bob Marley's Hair"– One Hundred Caves

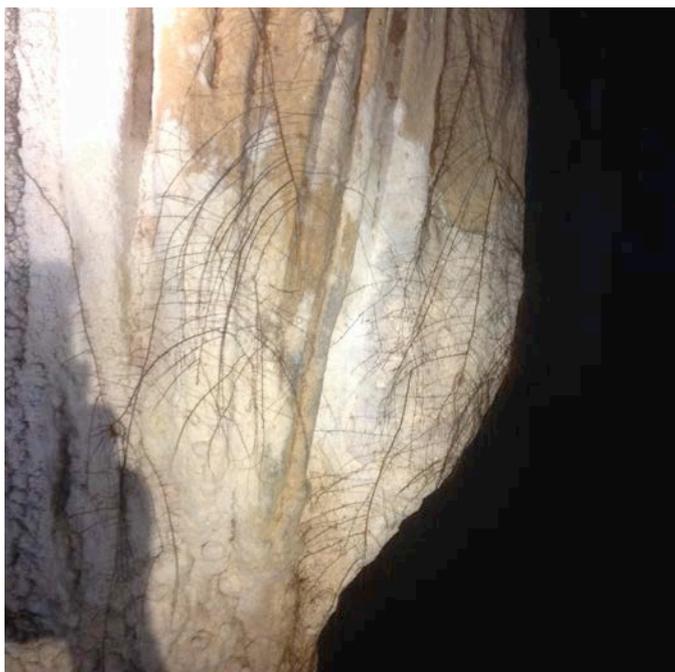
certainly Puerto Princesa was the cleanest place I have seen in the Philippines. The seaside hamlet of Sabang was the same. I boarded my small motorized outrigger boat at Sabang wharf.



Tree roots – One Hundred Caves

While one can take an hour's forest walk to the cave, most tourists take the boat option; both time-wise and probably because of the 'fun' of it. Each boat seats six people. There are about 100 boats that ply the 15 minute trip up the coast to the cave entrance area. Thus, they have the ability to move about 600 people per hour or so. I have not been able to ascertain visitation, but certainly the capacity of the tourist operation is several thousand per day. Given it is, arguably, the Philippines top tourist destination – that would suggest it receives a visitation well into six figures per annum.

Upon hopping onto one's motorized outrigger, one is given a life jacket with a number on the back, corresponding with the number of the boat emblazoned on its bow. Very organised; there is no way you can 'get lost', so to speak. Upon arrival at the beach near the cave, one alights through the waves, and walks a few short minutes to the side of river efflux, where (still



Tree roots on decoration – One Hundred Caves

wearing your life jacket...but now additionally supplied with a hard hat) one boards another small boat to do the cave tour. Each takes 6-8; and again there are a lot of them...

At the rear of each boat stands or sits your boatman, who guides the boat with a pole. He has a strong cap light, with which he highlights the cave's features during the tour. Every tourist is supplied with an audio set (hung around your neck), and ear plugs. It comes in many languages, and is set to yours and turned on by staff as your enter the boat. Thus it plays non-stop, in perfect harmony with the tour. When a feature is mentioned en route, your pole man immediately lights it up. It works very well indeed. You get to keep your ear plugs at the end, 'as a souvenir', perhaps more for OH&S reasons... I am sure there would be more than some who would not like recycled earplugs.

The tour audio was excellent. The intro on the geology and history of the cave was very good indeed. Not surprisingly, one was subjected to a modicum of 'fairy castle stuff'...more than a few Madonna and Child type formations, etc (this is a very Catholic country)...but mercifully not one Queen Victoria! That said, the tour was a wonderful experience. The quality of the cave; lots of seriously good – and large – decoration, was wondrous. The flow of the boats was clearly tightly managed; while you knew they were there it was not a diverting issue. The tour takes about 45 minutes of gliding through the cave in effective silence (other than the commentary in your ear); in and out along much the same route. Quite a peaceful experience actually.



Gearing up at One Hundred Caves

The management was excellent. No food or drink or smoking allowed; you were advised against talking too. Given the gentle, un-motorised boat journey, the cave impact of the tourism appears negligible. I asked one guide later about lighting the cave. You could do it...solar power, etc. He was dead against it...'it would destroy the experience'. I could not agree more. Aside from the fact that the cave, in terms of boatman, pole man guides, and support staff – plus ancillary businesses, probably employs over 1000 locals... So, all up, I would certainly rate the Underground River Cave, along with Ha Long Bay and the caves of Slovenia, as the greatest of my karst cum 'tourist cave' experiences.

Ahhh...but the joys of Palawan do not stop with the Underground River Cave! Sabang is bordered by karst aplenty... ranging from many very large mountains of limestone to karst towers big and small. The visual karst landscape alone is stunning, and mostly within the National Park. Very good! There



With my two young guides indulging in the Filipino national passion for 'selfies' – One Hundred Caves.

are many 'activities' one can do, including a 12 km karst forest walk (no time, sadly). But over consecutive days I did undertake two karst adventures.

The first was to Ugong Rock Adventures, about a 15 minute drive from Sabang. It uses a medium-sized karst tower. Your guide first takes you through a tunnel cutting under the base of the tower, then on a track/climb to the top of the tower. It was very carefully and thoroughly rigged. Once at the top you are helmeted and fully geared up. You have three choices. The first is a very significant abseil, while choice two and three are 'flying foxes' (called 'zip lines' in the Philippines) to the ground...the quick one or the slightly slower one. I chose the latter. It was fun!and very safely organised and run. The operation is a community-based enterprise, employing locals only from an adjacent village. I was most impressed with their care for the environment too, and their attitude to karst conservation. There was only one (fairly big) minus...behind the rigging area at the top of the tower was a toilet (with toilet bowl). Hmm... Nobody could tell me where the effluent went (as if I didn't know...); bit of an issue.



Glowworms in One Hundred Caves....they 'shouldn't exist' ...but they do!



Another local treasure – Elephant Cave...slated as a future (fully lit) show cave.

On the next day, I visited an operation in another adjacent tower; this time an adventure cave tour called One Hundred Caves. Given the large tower it was in, and my memories of Capricorn Caves at Rockhampton and the tower karst at Chillagoe, I have no doubt it was accurately named! Again, this is a community-based operation of local villagers. My tour consisted of me, a friend, and two lady guides. They were both excellent; especially, somewhat to my surprise, their grasp of karst geology and local ecology was first class! We were helmeted and the cave itself was rigged where necessary. The guides were extremely careful where we put our feet and hands, and adamant we did not touch anything (sensitive) we shouldn't. I actually tipped both guides at the end of the tour, so impressed I was! Never done that before!

The cave(s!!) itself was fascinating. I was expecting the 'dry decoration' one associates with caves in Australian tower karst (*a la* Capricorn or Chillagoe) and that is what we initially got. However, to my absolute surprise once we got well inside, so to speak, the decoration became wet and active...very much like you would see at the likes of Jenolan or Wombeyan. The speleothems were impressive, some quite large – with some of the best and most expansive flowstone I have seen! But there was more...helicitites!! Albeit they were small, but there they were there! And if that didn't stun me enough, then the glowworms did!!! There was a reasonable colony too, and while there were pools of water at the bottom/middle of the cave, the glowworms were not above it. What? No way!

So, I afterwards contacted my old (young!) friend Australian glowworm expert Dr Claire Baker, who was also a bit non plussed. She suggested the cave must have very high humidity for the glowies to exist but not be over water. Just so; the cave temperature was 25°C and the humidity was right up there! I did ask Claire if there was anything in the literature on Palawan glowworms, but not having heard back, I guess not...

Overall, a wonderful adventure cave experience! Indeed, my entire karst experience in Palawan was just that...very little to criticise. How wonderful! If you can get there – go! But there is more...! At the northern end of Palawan Island is the El Nido area...full of wonderful karst islands and islets and said to rival Vietnam's Ha Long Bay. So, hang onto your hats (!) before too long I may subject you to Philippine Karst Adventures, Part 4!

ANDEYSEZ 57 KARREN

Andy Spate

In memory of Ken Grimes

Strangely enough I haven't done an ANDYSEZ on karren – one of my favorite aspects of karst landscapes – the small features. Well in the tropics, as we saw recently at the wonderful Capricorn Caverns, they can be quite big features. And this is going to be a big ANDYSEZ. Thanks to those who contributed images.

Ken Grimes was an exceptional scientist, bushman, communicator, teacher and, above all, a thorough gentleman, well known across Australia and around the world for his understanding and documentation of karst.

In the four or more decades that I worked with Ken I only saw him out of sorts once – and I was fully in agreement with his crossness on that occasion. A few days before Ken's tragic death we communicated by email and we agreed that this would be a joint production. Unfortunately, that was not to be. It would have been far, far better production with his input.

This has been a very difficult ANDYSEZ to write for other, less important reasons. When I start to google 'karren' I get screens full of images of ladies. Whilst not altogether unpleasant it distracts from the task at hand! Particularly annoying is the fact that MSWord won't allow you to add 'karren' to the dictionary so this document is full of green underlinings!

Karren is a 'portmanteau' term (younger people may need to google that word as I assume dictionaries are passé – you might have to check that too) to describe small to medium scale landform features produced by solution of surface and subsurface bedrock – chiefly limestone but other rocks such as dolomite, gypsum and halite (salt). Karren features occur on other rock types but we will avoid them here. For now ... Maybe that will be a further ANDYSEZ.

Karren features are normally dismissed in a few paragraphs or short chapters in karst geomorphology texts. However, I am in possession on a text book titled *Karst Rock Features: Karst Sculpturing* edited by Ginés, Knez, Slabe and Dreybolt (2009, published by the Karst Research Institute, Postojna, Slovenia) It is a mere 561 pages long! And three (3) cm thick excluding the hard covers! The references alone run to about 26 pages! About 750 papers or books referenced! Clearly there is more to karren than we normally think about. There are probably only two copies of this book in Australia – it could be borrowed from me but only under the strictest conditions – it was a dying gift from Elery Hamilton-Smith and is thus is a very precious item. The other copy would be Ken's.

The book consists of two major parts – the first deals with the different types of karren in 20 chapters. The second part consists of 23 case studies including two from Ken. Then there are all the references – but no index. But help is at hand – there is a separate index – I think produced by Ken. But I don't know where it might be found. I had a suspicion that the book might be available online but I can't find a source at present.

Angel Ginés, in his Chapter 1 in the book cited above, has some nice things to say about karren so I will quote from his chapter (*Karrenfield Landscapes and Karren Landforms*). On page 19 he states:

*Karren is a complex group of small to medium-sized karstic landforms showing a great variety of characteristic shapes. Some of them can be considered as elementary karren features, since they seem associated to definite genetic factors and they frequently become integrated in wider-scale karren assemblages. **The bewildering diversity of karren is difficult to summarize.*** [Emphasis mine]

Karren features are small scale karst landscape features produced by solution on limestone and other rocks where rain water charged with atmospheric carbon dioxide is acidic and thus is able to corrode (dissolve) the bedrock. This is the same process that gives us our caves.

Most of the initial research and description of karren was by German researchers so we have terms like rillenkarrren, rundkarrren, kamanitzas and spitzkarrren to cope with. There are English equivalents for many and Angel Ginés and I will discuss and illustrate some of these below. Quotes from Ginés are in plain text – my comments in non-bold italics. We discuss many of the 25 types he identifies in his chapter. But it must be emphasised that many forms merge into one another so there can (will) be an almost chaotic assemblages – as we could see at Capricorn Caverns.

But first I must define epikarst for you. Michel Bakalowicz (2014) in a paper titled *The Epikarst, The Skin of Karst* (pp 16-22, Karst Waters Institute Special Publication 9, Leesburg, Virginia) states:

The epikarst is the shallow, superficial part of karst areas, in which climate, tree roots and karst processes fracture and enlarge rock joints and cracks, creating a more permeable zone overlaying the massive carbonate rock in which only few open vertical joints and fine cracks occur (page 17).

Paraphrasing Madeline Schreiber and others (2015), *Instrumenting Caves to Collect Hydrologic and Geochemical Data: Case Study from James Cave, Virginia*:

The epikarst is a critical zone that significantly influences karst hydrology, [cave formation], water quality, and ecosystems. The epikarst controls both the quantity and quality of internal recharge to karst aquifers and, as a result, is a particularly important component of the system (page 205).

From: https://www.researchgate.net/publication/291957042_Instrumenting_Caves_to_Collect_Hydrologic_and_Geochemical_Data_Case_Study_from_James_Cave_Virginia

Karren is the 'upper skin' of the epikarst and provides the collection surfaces and initial conduits that get the water into the epikarst and the karst proper.

Angel Ginés, in a 2005 personal communication to Ken, laid out some size criteria for thinking about karren as follows:

- Macrokarren: Large-sized karren – recognisable within a 10 m grid (pinnacles, giant grikes, etc.).
- Mesokarren: Normal-sized karren – recognisable within a 1m grid (rillenkarrren, kamenitza, etc.).
- Mikrokarren: Small-sized karren – recognisable within a 1cm grid. (rillensteine, etc.)
- Nanokarren: Minute features – recognisable under magnification within a 1mm grid.

The first three will be discussed here - we won't worry about nanokarren here – too small for your visitors to appreciate easily!

Ginés, in his Table 1, provides a classification of karren forms leading from elementary features to the more complex assemblages. The classification provides further subdivisions by size and a higher resolution than that shown above.

Table 1: Classification of karren forms. Yellow areas enclose elementary karren features. Green areas enclose complex large-scale landforms, namely karren assemblages and karrenfield types (after Ginés 2004, slightly modified).

SOLUTIONAL AGENT	KARREN FORMS								SYNONYMS
BIOKARSTIC	BORINGS								
WETTING		IRREGULAR ETCHING							
TINY WATER FILMS		MICRORILLS							RILLENSTEINE
STORM SHOWERS			RAINPITS						SOLUTION PITS
DIRECT RAINFALL			RILLENKARREN						SOLUTION FLUTES
CHANELLED WATER FLOW					SOLUTION RUNNELS				RINNENKARREN
						WALL KARREN			WANDKARREN
					DECANTATION RUNNELS				
					MEANDERING RUNNELS				MÄANDERKARREN
STANDING WATER				KAMENITZAS				SOLUTION PANS	
SHEET WASH WATER FLOW				SOLUTION BEVELS					AUSGLEICHSFÄCHEN
				TRITTKARREN					HEELSTEPS
		COCKLING PATTERNS							
			SOLUTION RIPPLES						
SNOW MELTING				TRICHTERKARREN					FUNNEL KARREN
				SHARPENED EDGES					LAME DENTATES
					DECANTATION RUNNELS				
					MEANDERING RUNNELS				
ICE MELTING					MEANDERING RUNNELS			MÄANDERKARREN	
INFILTRATION					GRIKES			KLUFTKARREN	
SOIL PERCOLATION WATER					RUNDKARREN				ROUNDED RUNNELS
				SMOOTH SURFACES					BODENKARREN, SUBCUTANEOUS KARREN
				SUBSOIL TUBES					
				SUBSOIL HOLLOWES					
				CUTTERS					
COMPLEX PROCESSES					UNDERCUT RUNNELS				HOHLKARREN
					CLINTS				FLACHKARREN
					PINNACLES				SPITZKARREN
							PINNACLE KARRENFIELD		KARRENFELD
							LIMESTONE PAVEMENT		
								STONE FOREST	
							ARÊTE KARST		
	0-1mm	1mm-1cm	1-10cm	10cm-1m	1m-10m	10-100m	100m-1km	1km-	LAPIÉS

Table 1. Classification of karren forms. From Ginés, page 16.

Pavements: These are not in Angel's list but are a very characteristic karst landform. However, they are not well-discussed in the literature. One can easily come across definitions such as 'horizontal surfaces of exposed limestone in which the joints have been enlarged, cutting the surface into roughly rectangular blocks'. Most texts point to their origin arising from glacial action – but this is impossible in the case of Chillagoe and Kongorong (see the accompanying images). Various chapters in Ginés et al (2009) touch on pavements without adding much to the discussion. One author states that there are five types – but all arise from glaciated surfaces

subsequently modified by solution! This is clearly not always the case as we can see in areas that have not been subjected to glaciation such as Chillagoe and the Nullarbor. OK, the Nullarbor and Kongorong might not be etched into 'roughly rectangular blocks' but ...

Whatever, pavements are often the palette on which much karren is initiated. Assuming the sculptor – solution – has a palette? Other karren is found on sloping and vertical surfaces.



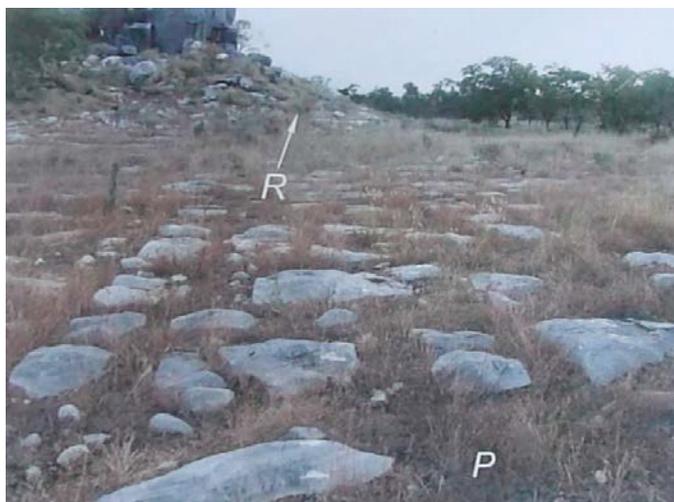
Pavement

Above. Yorkshire, UK. This is a typical karst pavement first shaved horizontally by glacial action and then modified by solution etching out the joints to produce grikes (the trenches, kluftkarren) and clints (the blocks). Note the sandstone blocks – glacial 'erratics' transported from elsewhere. http://www.limestone-pavements.org.uk/images/irrat_bolders.jpg

Top right. Chillagoe, Qld. Ignore the 'R' unless you are into Richer Slopes. The pavement, 'P', is most definitely not the result of glacial action but is simple solution of the limestone pediment. The clints and grikes are more mature than the Yorkshire example. Photo: Ken Grimes

Middle right. Pyrenees, France (near Gouffre de la Pierre Saint Martin). Alpine karrenfield (lapiés) with many features including dissected pavements, clint and grikes – and maybe a hint of a doline beyond the pavement. Photo: Kevin Kiernan

Bottom right. Mount Owen, South Island, NZ. High altitude, glaciated and perhaps smoothed by overlying snowpack. Note the incipient heelsteps (trittkarren) eroding up and back onto the smoothed surface of the clint. Photo: Kevin Kiernan





Pavement

Kongorong, Mount Gambier, SA. Again a pavement not produced by glacial action but by simple lowering of the bedrock surface. The soil-filled grikes can be metres deep. Photo: Steve Bourne

Kongorong, Mount Gambier, SA. This paddock was a karst pavement but has been “improved” for farming with the use of heavy rock-breaking machinery. Photo: Steve Bourne

Grikes (kluftkarren): Deep clefts, from 1 cm to 0.5 m across and up to several metres deep. They are one of the most typical mesokarren features, normally from 1 m to 10 m in length, formed through the simple solutional enlargement of joints or cracks. Their linear trends are determined by major structural

directions as joint sets or faulting. Owing to the fact that such slots cut in the bedrock are merely the visible surface expression of the fissures crisscrossing the karstifiable rocks, grikes constitute a significant component of the epikarst.



Giant grikes . Above Mimbi Cave, West Kimberly, WA. Giant grike network – up to five metres wide. Note the vertical wall karren (wandkarren) and the relatively undissected surface of the giant clints/pavement. Photo: Joe Jennings

Pinnacles (spitzkarren): Vertical solution along joints and fractures lowers the intervening rock flanks and produces isolated spires or pinnacles that can reach a few metres or tens of metres in height. Sometimes macrokarren as at Mulu's pinnacles! Usually the side walls are deep grikes with runnels

cutting across one another to form sharp ridges and peaks. They could be considered as particularly mature forms of karren. Ginés feels that often they may be sharpened from subcutaneous karren forms. This would appear unlikely for the pinnacles at Mulu, for example.



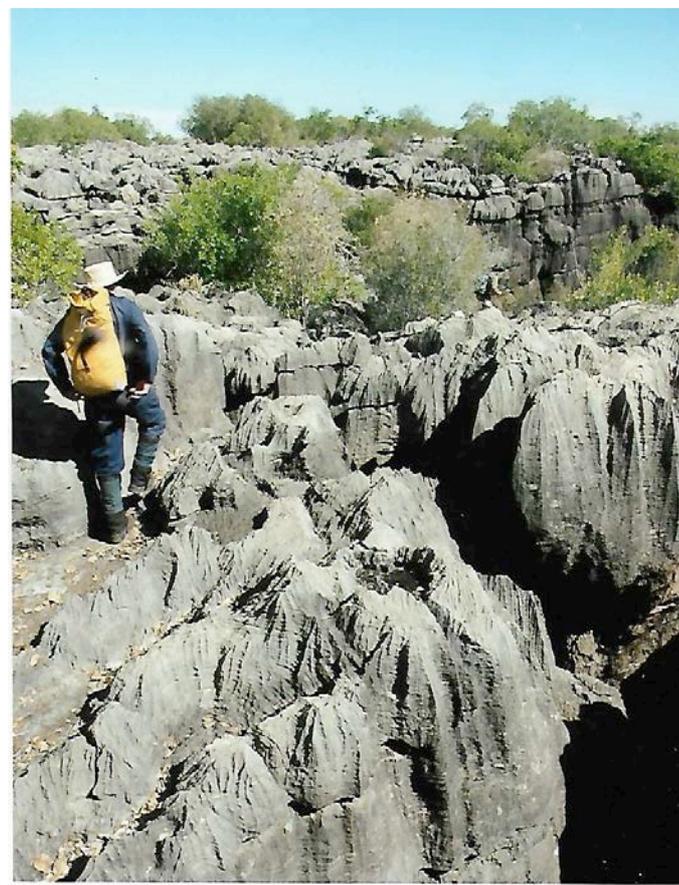
D030833: 4CH-5251 Haunted Bluff, Murgana, Chillagoe Spitzkarren & Wandkarren. K.G. Grimes 15-5-2003

Wall karren (wandkarren) and pinnacles (spitzkarren)
Above. Wall karren (wandkarren) and pinnacles (spitzkarren) Chillagoe, Qld.

Right. Small pinnacles (spitzkarren) and deep grikes – Gregory Karst, NT. Note the meticulous recording that Ken attached to his images!

Below. Mulu Pinnacles. These are pinnacles – spitzkarren at the top end of the range! Note the small scale solution flutes (rillenkarren) on the rock the lady is ornamenting. Also note the lack of solutionally enlarged horizontal features indicating the massive nature of the limestones at Mulu.

<http://1.bp.blogspot.com/-hJw02NyG-Uc/Tc-Tvz4chyI/AAAAAAAAAB9o/biU10ksou4o/s1600/P1020602.JPG>



BA-34 area karrenfield, Gregory Karst NT.au.
"K3" spitzkarren + deep grikes
D051209 K.G. Grimes, 6-7-2005





Broken River, Qld. Ken Grimes amongst a field of pinnacle karren (*spitzkarren*) standing in a **solution pan (*kamenitzas*)** modified by **meandering runnels (*mäanderkarren*)**. Turtle Tower is utterly amazing! Photo: Ian Household



Perue Peak, Prince of Wales Island, SE Alaska. **Grike** intersecting **solution tubes**; clint surface again glaciated. Photo: Kevin Kiernan



Meandering runnels (*mäanderkarren*) Broken River, Qld. Photo: Ken Grimes

Meandering runnels (*mäanderkarren*): Small winding channels that are cut directly into the rock surface or within a larger runnel. This special kind of karren channels exhibit meander forms with typical undercutting and slip-off slopes. There is frequent overlapping between meandering karren and some types of decantation runnels.

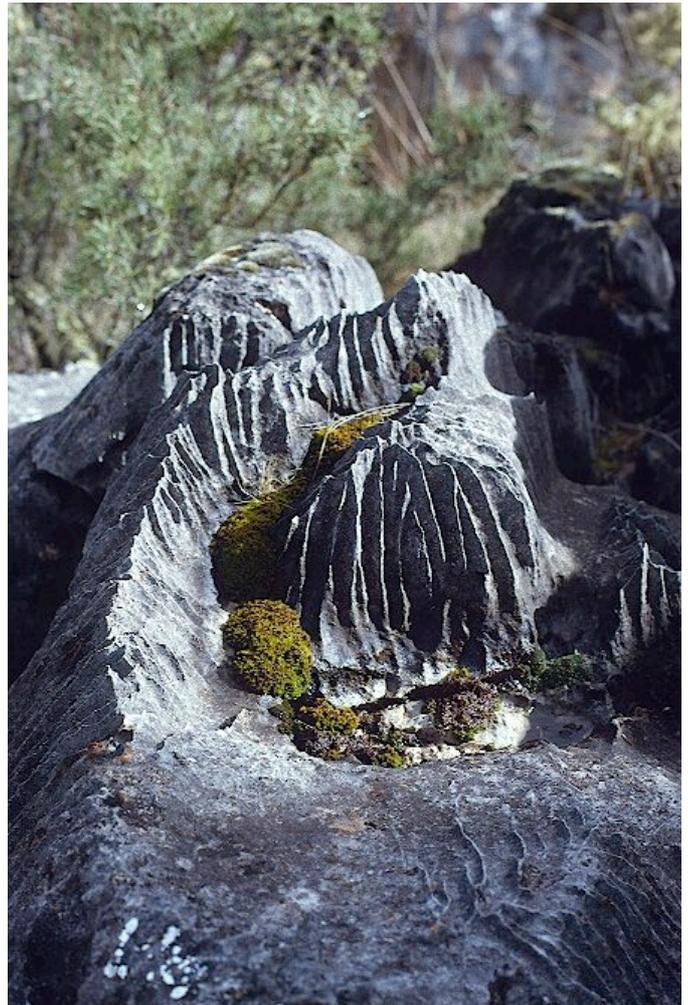
Solution runnels (rinnenkarren): Mesokarren features consisting of linear channels or furrows that generally show increased width and depth downslope. Threads of runoff water, pouring down the flanks of the rocks, are collected into channels to create solution runnels whose width and depth range from 5 to 50 cm, being very variable in length (commonly from 1 to 10 m, but in some cases exceeding 30 m long). Owing to the great diversity of topographic conditions and the kind of water supply feeding their channelized flow, they have a remarkable variety in cross section and plan pattern (including tributaries).



Above. Yarrangobilly, NSW. **Solution flutes (rillenkarren)** surrounding a small **solution bevel (ausgleichsflächen)**.

Photo: Andy Spate

Right. Yarrangobilly, NSW. **Solution flutes (rillenkarren on clints)**. Note the moss and other vegetation in the shallow grike around the core. The significance of this is discussed in the caption for solution pans (kamenitzas) below.



Solution flutes (rillenkarren): Small, straight, narrow, closely packed, parallel solutional furrows, that start at the crest of bare rock slopes and extinguish downslope. Their dimensions in limestone outcrops are typically 1.2-2.5 cm in width, 2-6 mm in depth and 10-30 cm in length or longer. (If longer they usually start to develop into wider karren forms). Individual flutes are parabolic in cross-section and are separated by sharply pronounced cusp lines. In plan view, they may form a simple suite of parallel flutes showing remarkable regularity of form and dimension. Their development to either side of a crest often produces a typical herringbone pattern – sometimes swirly.

Solution bevels (ausgleichsflächen): Lovely word! Allows you swear at the visitors – unless they speak German. Flat, smooth surfaces, 0.2 to 1 m long, usually found as plane sub-horizontal belts developed below the level of rillenkarren-flutes extinction.

Heelsteps (trittkarren): Conspicuous karren features that form arcuate headwalls, which flat floors are open in downslope direction. A single trittkarren consists of a flat tread-like surface, 10 to 40 cm in diameter, and a sharp back-slope or riser, 3 to 30 cm in height. Their typical appearance is as groups of heel prints excavated as steps on the rock outcrops. They seem to be the result of complex solutional processes involving both horizontal and headward corrosion generated by the thinning of water sheets flowing upon small slope falls.

Solution ripples: Wave-like forms, transverse to downward water movement under gravity. Their rhythmic forms suggest that periodic pulses of flow or chemical changes are important

in their development. Joe Jennings suggested many years ago that, as they seem to occur most frequently in windy areas that wind pulsating on the water film may play a role.



Heelsteps (trittkarren)

These are exceptionally developed – probably in an alpine environment. http://www.neko.ch/wp-content/uploads/2016/07/06_Tannenstockkarst_Trittkarren_20Juli16MTruessel.jpg

Solution pans (kamenitzas): Dish-shaped depressions, 1 cm to 50cm deep, 5 cm to 5 m wide and mostly elliptical or circular to highly irregular in plan. Usually they have flat and nearly horizontal bottoms that are floored by a thin layer of soil, vegetation or algal remains which decay enhances further dissolution. Their borders are frequently overhanging and may have small overflow outlets. At least one at Yarrangobilly does not have flat floor but has small spikes to ~3 mm height across the floor cracks. Their linear trends are determined by major structural directions as joint sets or faulting. Owing to the fact that such slots cut in the bedrock are merely the visible surface expression of the fissures crisscrossing the karstifiable rocks, grikes constitute a significant component of the epikarst.



Yarrangobilly, NSW. Joe Jennings measuring the acidity of water in a **solution pan**. The decaying vegetation will enhance solution.

Clints (flachkarren): Tabular intervening blocks or slabs isolated by grikes. They are flat or gently inclined outcropping rocks which become divided into straight-sided blocks by the solution widening of fissures. These bare flat surfaces of limestone, generally parallel to the bedding (no, no!), are the main constituent of limestone pavements.

Microrills (rillensteine): Microkarren features characterized by rock surfaces showing several different patterns formed by tiny channels and/or micro-spikes, rarely surpassing 1 mm in width. They have been typically described as about 1 mm wide rills, round bottomed and packed together with characteristic tightly sinuous to anastomosing plan view patterns on gentle slopes, becoming more parallel and straighter with increasing slope.

Rainpits (solution pits): Small, hollowed cuplike karren features, sub-circular in plan and nearly parabolic or tapering in cross section, whose diameter ranges from 1 cm to 5 cm, and exceptionally exceeding 2cm in depth. Frequently appear clustered in groups and can coalesce to give irregular and carious (having many cavities like your teeth before fluoridation of water appeared) appearance to the rock surfaces.

Decantation runnels: Channels generated by water released steadily, that start from an upslope point-located store (e.g. a patch of moss) or from a diffuse or linear source (e.g. a bedding plane) situated upwards. Generally their cross-sections are largest close to the input of water and diminish downslope.



Cooleman Plains, NSW. **Solution pans (kamenitzas)**, some over-deepened. Where soil, decaying vegetation and plants accumulate in the bottom of solution pans more carbon dioxide and organic acids accelerate deepening of the pans and grike floors. Note, the tear-drop shaped pan is aligned along and unseen joint that can be traced to the right. The development of the small solution flutes around the pans is inhibited by the short path length available. Photo: Andy Spate

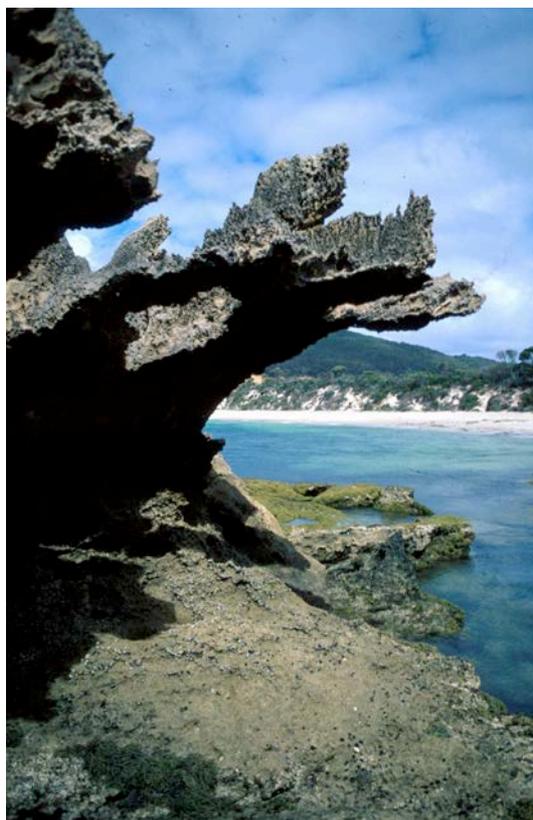


Cooleman Plains, NSW. **Subsoil karren**. Smoothly shaped features such as these are typical of karren formed within soils. Where these are seen at the surface they are indicative of recent soil erosion. The limestones of Central Western NSW (e.g. at Molong) show that sometimes as much as a metre of soil has been lost since Europeans arrived. Photo: Andy Spate



Above. Cooleman Plains, NSW. **Solution ripples.** These are found in sub-alpine to alpine areas. Jennings (per. comm.) attributed them to winds rippling a film of surface water as it flows down the rock surface. Photo: Andy Spate

Right. Flinders Island, Tasmania. Coastal Karren. The spiky karren is often referred to as phytokarst (first described from the Island of Hell in the Caribbean – the name arises from the difficulty of crossing such terrains). Seawater in spray mixed with rainwater, plus algae etc., enhances solution to rapidly produce such forms in ‘soft’ limestones. The term phytokarst is used incorrectly in other contexts.



Cooleman Plains, NSW. This “history block”, being studied by Joe Jennings and Bao Hao Sheng, shows a number of features of interest. The observers have their hands on typical above-ground weathering. Since European settlement, with intensive grazing and rabbits, a creek has removed the soil in front of the rock. Three stages of incision can be seen. The first is the smooth area below the top indicating that the stream removed soil quickly. The band of scalloping below, shows a long period of stream flow eroding the limestone. Renewed incision by the stream has quickly removed the soil revealing traces of shallow, rounded solution runnels.

Rounded runnels (rundkarren): Channels or furrows developed beneath a soil cover, whose troughs and ribs become smoothed by the more active corrosion associated with soil waters that produces their characteristic rounded cross-sections.

Subsoil smooth surfaces (subcutaneous karren forms): A whole array of characteristic rounded and smooth rock surfaces appear clearly related to subsoil corrosion. Smoothing and bleaching of subsoil karren-forms is evident when it is compared with the sharpening and grey appearance of exhumed karren forms. Subsoil smoothing can be considered a consequence of specific nanokarren features developed in contact with the action of acidic soil water.

Subsoil hollows (subcutaneous hollow-forms): Subsoil hollows showing different shapes and sizes are frequently exposed in road cuts and quarry walls. They are also common at the foot of karren pinnacles. In addition to pockets, niches and recesses, great subsoil wells and small subsoil pitting and scallop-like features are frequently found.

Undercut runnels (hohlkarren): Mesokarren furrows transformed by organic debris or partial soil filling because their side walls have been hollowed under by enhanced biogenic carbon dioxide concentration. Typical bag-like cross sections, wider at the bottom than at the top, are generated in this way. Undercutting is often also seen in solution pans as they accumulate organic material that provides acidity to dissolve away our limestone at the margins.

The images below are not karren but are small scale landform features found in limestone and other rocks.



Above left and right. Cooleman Plain, NSW. A-tent or pop-up. These fragile features are found on flat or gently sloping surfaces where overlying sediments which have compacted the rocks below, and have later been removed by solution. The compacted surface layer expands to relieve the tension induced by the formerly overlying materials. The process appears to be sudden. These at Cooleman Plain range in length from a few tens of centimetres to about two metres with the gap beneath in the largest of 10-15 centimetres. Photos: Andy Spate

Below. Wudinna Rock, Eyre Peninsula, SA. This A-tent, in granite, is a much larger feature – and not so fragile! The slab thickness approaches a metre. Interpretative material at this site suggests that the slabs have extended by 3-4% as they popped up. Well worth a visit on your way to the Nullarbor. Photo. Kirsty Dixon



17th INTERNATIONAL CONGRESS of SPELEOLOGY MANAGEMENT of WHITE NOSE SYNDROME



The Australian Speleological Federation has developed protocols and information for delegates attending the 17th International Congress of Speleology in Australia in July. The information is reproduced here for the benefit of all ACKMA members. This is a serious issue, not just for this event, but for managing the risk of White Nose Syndrome entering Australian and New Zealand cave systems.

Introduction

Australia and New Zealand are free of the white nose fungus. This fungus has devastated cave-dwelling bat populations in the eastern USA and Canada and has been spreading westwards for 10 years. These bats were susceptible to the fungus as they had never experienced it before.

Studies showed that the fungus originated in Europe, and that bats in Europe had developed resistance to the fungus by natural selection over generations, so little if any disease or morbidity is seen in European cave bat populations although the fungus is widespread in European and UK caves. The fungus has now been detected in China and, as with Europe, there are no known catastrophic disease episodes attributable to the fungus.

The disease is seen in hibernating cave bat populations, of a number of different genera, as the fungus grows and produces its disease effects at temperatures below about 15°C. The fungus spores are generated in large numbers in caves used by bats. The infection is spread by bats as they migrate to other roosting caves or mines. As fungus spores are very difficult to inactivate they can also be transported by cave visitors to other sites. This is the quarantine dilemma faced by Australia and New Zealand.

In Australia and New Zealand, there are a number of cave dwelling bat species, which hibernate during winter at temperatures below 15°C. Several of these species are considered vulnerable and one is classed as critically endangered.

The 17th International Congress of Speleology is working closely with the Federal Department of Agriculture and Water Resources to manage the risk of WNS associated with the congress.

Policy

The objective is to keep Australia and New Zealand free of the white nose fungus.

- All field excursion participants from Europe, Asia and North America are considered as coming from white nose fungus areas and thus may inadvertently bring the white nose fungus into Australia or New Zealand.
- By preference, bring cave clothing and caving equipment that has never been used in caves before.
- All field excursion participants should only bring personal cave clothing, including overalls, knee and elbow pads, footwear, caving bags, helmets, lights and vertical gear as specified by the excursion leader. If the excursion leader has arranged loan equipment then please use this and leave your own equipment at home.
- We realise that people prefer to use their own caving equipment. However, we also understand that participants will want to do everything that they can to ensure that WNS is not inadvertently introduced to Australia.

- All cave clothing and equipment that has been in a cave before must be decontaminated before being used in Australia or New Zealand.

What to bring to Australia and New Zealand

- As far as possible, please do not bring any clothing or equipment to Australia or New Zealand that has previously been in a cave.
- For Chillagoe excursions: The Chillagoe Caving Club has purchased new helmets for the ICS excursions. Chillagoe caves will be warm, dry and even dusty. You will not require caving suits. Old clothing will be sufficient. You could purchase this from a charity shop in Cairns on your arrival there, or bring suitable clothing from home. For those choosing vertical caving, SRT equipment can be hired from the club (\$15.00 per day).
- The Naracoorte excursion: overalls, helmets, lights and Pelican cases for cameras will be supplied.



Clean clothes and boots are critical when entering bat cave habitat. Bat winter census, Naracoorte 2009.

Photo: Steve Bourne

Cleaning clothing and equipment before coming to Australia and New Zealand

Any clothing or equipment that has been in a cave before will need to be cleaned to the standard below *before* bringing it to Australia and New Zealand. We are relying on the goodwill of participants re this.

- Clean any dirty personal cave clothing or equipment before disinfection.



*A healthy bat population. The ASF has put steps in place to ensure it remains that way. Naracoorte 2003.
Photo: Steve Bourne*

- Separate submersibles which should include cave packs, ropes and harnesses from delicate gear.
- Don't forget to wash knee and elbow pads.
- Use a washing machine set to 60°C (140°F) for 20 minutes.
- For boots that are not suitable for washing machine treatment they must be scrubbed to remove all mud and dirt.
- Excursion leaders will have 6% hydrogen peroxide spray and isopropanol disinfectant wipes and instructions on how to use these.
- All helmets, lights, cameras, cave packs, compasses and other such equipment that has been used in a cave outside Australia or New Zealand must be cleaned with the wipes.
- All boots and shoes must be sprayed, unless they have never been worn before.
- A wash at 60°C (140°F) for 20 minutes will not damage your clothing. Hydrogen peroxide is commonly used in cosmetic products, e.g hair colouring and teeth whitening.

At the commencement of your field excursion in Australia or New Zealand

Expect to be asked if your clothing has been used in a cave outside of Australia or New Zealand before and how you have treated it. Again, we will be relying on your goodwill.

Thank you for your efforts to keep Australia and New Zealand free of the white nose fungus. We appreciate your support.

References:

<http://www.agriculture.gov.au/pests-diseases-weeds/animal/white-nose-syndrome>
<https://www.whitenosesyndrome.org/resource/national-white-nose-syndrome-decontamination-protocol-april-2016>
 Australian white nose syndrome assessments and procedures:
<http://www.wildlifehealthaustralia.com.au/ProgramsProjects/BatHealthFocusGroup.aspx#WNS>
 Some recent Australian press coverage re the White Nose threat to Australian bats: <http://mobile.abc.net.au/news/2017-03-30/caving-community-on-alert-with-threat-of-white-nose-syndrome/8397970?pfmredir=sm>

Further information or questions please contact Nicholas White at: biosecurity@speleo2017.com

OUTBACK GUIDES SCHOOL LEADS the WAY

Ann Augusteyn

Seven guides from Capricorn Caves battled floods and road closures following Cyclone Debbie to attend the 35th Savannah Guide school in the drought stricken Queensland Outback. They were joined in Longreach by Neil Collinson and Laura Dawson from Te Anau who had also been diverted with airport closures. The 4 day school themed “*Pastoralism, Preservation and Prehistory*” showcased the amazing experiences in the Longreach/Winton area, field trips focussing on plant, fauna and fossil identification, a very competitive twitchathon challenge as well as an appreciation of the local indigenous culture and pastoral community. We were treated to the delivery of interpretation at its very best.



Examiner Vicki Jones and Capricorn Cave Guides Christian Bom, Jay Bond and Chennoa Wells after receiving their Savannah Guide accreditation.



Fossicking in an ancient creek bed



Examiner Vicki Jones, Neil Collinson, Laura Dawson, and Alan Smith (Smithy)

These schools are held biennially with the objective of “*maintaining high standards of interpretation and public education; training and guiding leadership and natural and cultural resource management*”. Established in 1988 in the Gulf Savannah, the network has expanded well beyond the tropical savannahs of Queensland, Northern Territory and Western Australia.

To gain accreditation as a Savannah Guide there is a rigorous process of on site peer assessment on site covering interpretative content, communication and presentation elements supported by post assessment interview and mentoring when required. To maintain accreditation the guide commits to attending a Savannah Guide school at least once every two years.

There were two outstanding highlights amongst many. First was the inspection of the dinosaur stampede tracks at Lark Quarry, Winton with presentations of Scott Hocknull’s interpretation of the stampede, supported by technology research. This was followed by a very special opportunity to fossick in an ancient creek bed for 95 million year old plant fossils. Second, at the Australian Age of Dinosaurs, we were



Dinosaur Canyon Winton



Dinosaur graveyard Australian Age of Dinosaurs Museum

privileged to view the Dinosaur Canyon prior to its official opening at Easter by Dame Quentin Bryce. The wheelchair accessible pathway meanders down the escarpment from the “jump up” providing a walk back in time when dinosaurs roamed the red dirt canyons. The authentic life size dinosaurs are further brought to life with audio and visual apps. Each themed gallery has been sponsored by a generous donor. The Australian Age of Dinosaurs is an amazing interactive

educational experience initiated by the passion of one man David Elliot, supported by enthusiastic and dedicated staff, research palaeontologists and the local community. It most deservedly won the top gong at the Queensland Tourism awards in 2016.

As ACKMA members we can relate to all these ecological sustainable tourism principles, guiding standards and protection of the natural resources.



Capricorn Caves team on top of the jump up at Winton. L to R Ann Augusteyn, Heidi Van Dermeer, Kathering Herring, Christian Bom, Chennoa Wells, Jay Bond, Jordan Wheeler.

CROWD FUNDING: A WAY to BRING an IDEA to LIFE

Cathie Plowman

Leading up to the 2013 bid for Australia to host the upcoming 17th International Congress of Speleology (ICS), one of the benefits raised was that we could obtain AusAID funding to support students from Australia's neighbouring countries to attend the event, and so increase speleological efforts in those countries.

The Australian bid was successful, Australia's overseas aid budget greatly diminished, the congress organising committee were all up to their eyeballs in their efforts, but I thought that this idea from 2013 warranted some action.

Crowd-fund I decided, and set out to raise \$6000 for two scholarships to the congress for people from Oceania and South-East Asia. Very busy, I kept putting the idea off, but by late September I realised that the Christmas season, and related charity events, would be ramping up in November. Act soon, or I would miss the opportunity.

There's a suite of online crowd-funding organisations and my first deliberation was selecting which one to use. I settled on **Chuffed**, which I had never heard of before I started on this venture. With Chuffed, an Australian-based site, you got to keep all donations whether you reach your target or not, transaction fees were not deducted from the donation and the site only accepts crowd-funding for social causes.

Getting started was easy. Chuffed has easy to follow templates to put your project in words, some simple needs, supplying evidence of who you are and banking details, and the 'Scholarships to International Congress' project was launched on 25 September. There was a Chuffed support person available by phone or email to assist me throughout the project and, once the project was approved, I was offered a Skype meeting with the Chuffed CEO to discuss my marketing and promotional strategies. I took up this opportunity, learnt a lot from it and it sparked me with confidence.

The money didn't flow in; it trickled in and very slowly. Many of the crowd-funding efforts that I've seen raise their funds readily. Prominent people like Bob Brown and campaigns for species on the brink of extinction draw in money quickly. Not so my efforts and I honestly didn't think we would get there. I spent part of each day, or at night after nursing work, beating out emails and Facebook messages asking everyone I could think of if they might make a donation. One friend, who I have not seen for 15 years or more, responded that he has tightened his donation giving to just a few select charities, but he admired my persistence so sent \$50. Most of the donations were between \$50 and \$100, averaging close to the \$80 that the CEO of Chuffed had advised me I would get. Generally, the donors were from cave-associated contacts or my 'personal networks' but there were about six donors who are totally unknown to me.

I had chosen a 40-day campaign (there's nothing to be gained by dragging things out, people will either donate now or not at all) and it was about day 26 when things started picking up and I started to think that we might get to \$4000 if we were lucky. Once there was a swing in the momentum from some large and very generous donations, the money literally started rolling in. I could hardly believe it when I realised that we were getting close to \$5000 and then, two nights before the campaign was to close, we were close to \$6000. We made it, with time to spare, the final tally being \$6205.

Having successfully raised the money, I now felt the weight of responsibility to all the generous people who had donated. I

had to get the word out regarding the scholarships to ensure that we had a good selection of applicants to choose from and there are not a lot of ready to access speleological networks in the target countries. I Googled and emailed any relevant contacts I could find in Oceania or South-East Asia: university websites, land management authorities, tourism agencies, conservation groups, newspaper email addresses. ACKMA and ASF colleagues sent me their contacts.

Wanting to ensure that the recipients spoke English, part of the application process was that applicants had to provide an outline of a 20-minute presentation that they would give, in English, at the ICS if selected.

The applications were slow to arrive, but by the closing date of 28 February, I had 10 applications, the number that I was hoping for. There was one from Thailand, five from Indonesia (thanks to the efforts of Steve Bourne in encouraging applications), four from the Philippines and one from Papua New Guinea. I stood aside while two senior ACKMA figures pondered the applications and contacted referees. Then I had the pain of telling eight applicants that their efforts were unsuccessful and the joy of writing to the two successful applicants. They continue to express their gratitude at the opportunity provided to them.

If you have an idea you want to implement, crowd-funding is an option; but you do need to work hard. You need to be able to ask people to donate their money. It won't arrive otherwise.

In recent weeks, it has been my privilege to communicate with the successful applicants re making their travel arrangements. From my limited knowledge of them, I am sure that they are very suitable scholarship recipients. Please read about their karst studies and conservation projects below.

Ms Roxanne Tsang is a post-graduate student in the Anthropology and Sociology Strand, School of Humanities and Social Sciences, University of Papua New Guinea, PNG.



Roxanne Tsang travelling to the field work site in New Britain .

Photo: Dr Susan McIntyre-Tamwoy.

Below is an excerpt from Ms Tsang's scholarship application:

I am currently engaged as a volunteer with the Nakanai Caves Cultural Heritage Project, an Australian Research Council (ARC) Linkage Project which is a collaboration between Extent Heritage Pty Ltd. (Sydney, Australia), James Cook University (Cairns, Australia), Australian National University (Canberra, Australia), University of Sydney (Sydney, Australia), University of Papua New Guinea (Port Moresby, Papua New Guinea (PNG)) and the PNG conservation NGO 'Partners with Melanesians'.

This project aims to document and integrate the natural and cultural values of the Nakanai Caves in East New Britain Province, PNG. The Nakanai Karst area is currently on the PNG World Heritage Tentative List as part of the Sublime Karsts nomination. This project will contribute to an understanding of the cultural values should the area proceed to a cultural landscape nomination to the World Heritage List. The methodology incorporates community knowledge with archaeological and anthropological evidence to link natural and cultural values and define the landscape from local perspectives. Local input into the research is prioritised. This involves interviewing the locals on their perspectives of these cave and karst areas. This is the component of the project in which I am directly involved.

The documentation of the cultural values of Nakanai area is the first of its kind. However, we are fortunate to have access to reports from the cave expeditions by various Australians, French, British and French-Swiss cavers since early 1970s – 2012 (e.g. French caver, Jean-Paul Sounier) who discovered some of these caves and karsts and was able to map them.

Mr Isma Dwi Kurniawan is a post-graduate student at the Faculty of Biology, Gadjah Mada University, Indonesia.

Below is an excerpt from Mr Kurniawan's scholarship application:

*My research focus is biospeleology. I have been involved in several cave and karst management and/or conservation activities in Indonesia. When I was an undergraduate student, I was a member of biospeleology student group in my university (Biospeleology Studien Gruppen, Yogyakarta State University (BSG UNY)) and participated in cave exploration with a research focus on cave biota in Menoreh and Gunungsewu karst area (Central Java). My first research on biospeleology is *The Diversity of Zooplankton in The Underground River of Jlamprong Cave, Gunungsewu Karst Area, Yogyakarta*. I have published this research in *The ASEAN Academic Society International Conference (AASIC), Hat Yai Thailand in 2012*. My undergraduate thesis was also on biospeleology with a cave conservation topic entitled *The Implementation of Edu-Ecotourism to conserve the ecosystem of Jlamprong Cave in Gunungsewu Karst Area, Yogyakarta*. I have presented this research in *The Society for Conservation Biology Conference (SCB) Asia Section 2014 in Melaka, Malaysia*. Several months ago, I joined a karst expedition sponsored by Tropical Forest Conservation Act (TFCA) in Sangkulirang-Mangkalihat karst area (East Borneo). I was a member of the biospeleology team in this program and we developed a cave biota inventory. I am currently studying the impacts of human activities on cave ecology for my master thesis, focusing on show caves in Gunungsewu karst area (Central Java).*

I am a member of the Indonesian Speleological Society (ISS), which in turn is a member of the Australasian Cave and Karst Management Association (ACKMA). I'm part of Cave Biology and Conservation Division in the ISS. The Indonesian Speleological Society is a nonprofit organization working in the field of speleology in Indonesia. This organization engages all Indonesian professional researcher, academist, practitioner, student, and also local society focusing on cave and karst issues to work together and actively implement their knowledge for karst and cave management and/or conservation. We (ISS) in collaboration with several institutions and organizations have had conducted workshops, seminars, and projects focusing on karst and cave management and/or conservation in Indonesia. I am currently participating in a project of cave conservation and restoration in Gunungsewu karst area together with my colleagues in the ISS.

In closing, my sincere thanks to everyone who supported this effort, either by their donation or personal encouragement and support. We look forward to welcoming Roxanne and Isma to Australia for the ICS in July.



Isma Dwi Kurniawan.
Photo: Andi Joko Purnomo (BSG UNY)

Speleo 2017

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Caves
in an
Ancient
Land



Image of Chillagoe by Alan Pryke



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