

Journal of the

Australasian Cave and Karst Management Association



The ACKMA Journal

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FRONT COVER: Dripping straw, Harry Wood Cave, Yarrangobilly Caves. Photo: Steve Bourne

BACK COVER: Delicate feature in Jillabeanan Cave, Yarrangobilly Caves. Photo: Steve Bourne

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FROM THE EDITOR

This journal contains reports from the Yarrangobilly Caves Guides Workshop and ACKMA AGM. I had been to Yarrangobilly several times previously, but never for more than two nights, so a week gave me a chance to explore much more of what Yarrangobilly has to offer than I have previously seen. I also took a few photographs – what a great place for the camera enthusiast! Sasa Kennedy writes on a caving trip she and others did with George Bradford, Manager of Yarrangobilly, while a report or images of Eagles Nest Cave will have to wait until I return for another visit as a new member of the Canberra Speleological Society.



View of Caves House from the bluff, Yarrangobilly Caves
Photo: Steve Bourne

John Brush and Cathie Plowman provide excellent reports from the Vulcanospeleology Conference held on the Galapagos Islands. Six Australians attended this event and these reports are sure to inspire others to visit the islands – I know I want to get there!

Katrina Wills and Matthew McDowell provide an update of research and interpretation at Kelly Hill Caves, Kangaroo Island, South Australia. Matthew completed his PhD investigating palaeontological sites in the cave, with research outcomes being integrated into interpretation on adventure cave tours.

Nick Powe, Kents Caverns, United Kingdom sent in an interview he provided to the media on his family operated cave. I am sure many cave managers will relate to the challenges Nick presents in his interview.

Nicholas White reports that the Australian Speleological Federation has made changes to its Code of Ethics. These changes involved bringing the Code into line with the International Union of Speleology (UIS) requirements which introduced clauses opposing the use of caves for competitive events. The new clauses are unambiguous in opposing the use of caves for competitive events.

Background to Caving Competitions

A few years ago in New Zealand, cave managers and the New Zealand Speleological Society had to respond to a request to conduct a competitive event that involved caving as one of the components. A compromise was reached and a very closely controlled and non-timed trip through the cave for the competition teams was conducted. See Deborah Carden's article *The Race Through Metro Cave* in ACKMA Journal No. 62 March 2006 for a discussion on this event.

In 2008, Parks Victoria had a request to have a cave at Buchan used for a competitive event. The advice of the Cave and Karst Advisory Committee to Parks Victoria was that it should proceed that it be an untimed event under very strict control. This occurred and it was held in Wilsons Cave at Buchan with entry from the upstream entrance which consists of climb downs over rocks for about 40 metres of cave length until the main streamway which continues for about 80 metres to a walk out entrance. The cave is robust and there is little to damage.

In 2013, the organisers of the Mark Webber Challenge inquired through several cavers and the Tasmanian Parks and Wildlife Service about having a cave component in the 2013 event. They had conducted a cave component in the Gunns Plains Show Cave in the 2012 event. Geoff Deer spoke about this at the recent AGM and advised that the event did not have a detrimental impact on the cave.

Actual Changes Adopted

Add the following new clauses 1.4 and 3.11

1.4 The newly adopted UIS Code of Ethics can be found at: UIS website: <http://test3.brlog.net/> as the document Revised Code of Ethics proposed to the 2013 General Assembly.

3.11 Competitive Events in Caves

Competitions should not be held in caves. Although caving is a sport and has elements of performance, and training is necessary for safety, competitions of any sort are inappropriate in caves, because heavy physical use damages their natural values. Damaging caves in the name of sport is totally unjustified.

See the Australian Speleological Federation website www.caves.org.au to download the revised guidelines.

After 38 years of distinguished service to the Western Australian Department of Parks and Wildlife and its predecessors (the National Parks Authority, Department of Conservation and Land Management, Department of Environment and Conservation), John Watson, former South Coast Regional Manager until 2007, retired at the end of March.

During his career, John has been closely involved in supporting and promoting many national and international conservation initiatives. These included development of the Fitzgerald River National Park Biosphere Reserve, participation in drafting the IUCN WCPA Guidelines for Mountain Protected Areas (1992 & 2004), lead editing the IUCN WCPA Guidelines for Cave and Karst Protection (1997), and contributions to the IUCN WCPA Ecological Restoration Taskforce on Best Practice Guidelines for Ecological Restoration



*John Watson receiving his Fellow award from the President Steve Bourne at Mulu, 2010
Photo: Kent Henderson*

in Protected Areas (2013). He also acted as local host for the IUCN WCPA “Protected Areas in the 21st Century: from Islands to Networks” mid-term meeting held in Albany in 1997.

John’s contribution to caves and karst was recognised by ACKMA when he was made a Fellow of our association at the 2010 ACKMA AGM at Mulu, Borneo.

Another retirement in Western Australia is Anne Wood. Jay Anderson reports on Anne’s career later in this journal.

Corrections

The image on the back cover of the last journal was incorrectly attributed to Rolan Eberhard. It should have credited to Geoffrey Lea.

A caption in Sasa Kennedy’s article referred to Fox Whistle Tour, instead of Foot Whistle Tour. I apologise for these errors.

Coming Events

Coming Events	
2014: 17-22 August	International Workshop on Ice Caves, Idaho, USA
2014: 2-8 November	International Show Caves Association, Jenolan Caves, Australia
2015: 10-15 May	ACKMA Conference, Naracoorte Caves, South Australia
2015: 21-26 June	30th Australian Speleological Conference, Exmouth, Western Australia
2016: May	ACKMA Annual General Meeting and Cave Guides Workshop, Rockhampton, Queensland
2017: July	International Union of Speleology Congress, Penrith, NSW, Australia
	Do you know of an event that may interest ACKMA members? Please send to publications@ackma.org

PRESIDENT'S REPORT

Dan Cove

As is usual, the ACKMA AGM weekend was a tremendous occasion. It was wonderful to meet with so many members and catch up on the latest happenings in the world of Australian and New Zealand caves. And the venue! A Yarrangobilly Caves completely transformed since my last visit circa 2007. The whole area, but in particular the magnificently renovated Caves House complex, is inspirational. What a testament to George and to his whole team to have achieved so much. At a time when maintenance, let alone enhancement, of heritage assets is often given low priority, it was simply glorious to relax in the 'Blue Room' of Yarrangobilly Caves House and to admire the care that had so obviously been taken with every detail of the restoration. All credit to the team – an amazing achievement and a sensational AGM venue.

As to the business of the weekend itself, both the Executive Meeting and the AGM were highly productive sessions. The Committee met on Saturday morning to consider several major issues and from this meeting took a series of recommendations to the AGM for discussion and resolution. Foremost amongst these was the question of membership levels and fees. Two issues had become very clear;

- That the current fee structure was inadequate to cover the production printing and distribution costs of the high quality Journal.
- That a viable option was now available in the form of an online downloadable version of the full Journal accessible via the secure, members' area of the ACKMA website.

With these issues came the recommendation to instigate a dual fee based approach. Annual membership of ACKMA was recommended to be lowered to \$40AU, providing full rights of membership and full access to the online electronic Journal. For those wishing to receive a hard copy of the Journal, there would be an additional annual fee of \$35AU resulting in a total annual cost of \$75AU. This recommendation was thoroughly discussed by the membership, and the amendment was proposed that the \$40/\$75 options were in fact too low. However, the motion was ultimately voted upon and passed by the AGM to be reviewed carefully over the next 12 months, given that there is no way to be certain what percentage of the membership will elect for hard copy journals in addition to the standard membership renewal fee.

I commend the Committee in particular for its work in analysing this issue and the future financial impact upon ACKMA. There is no doubt that there are compelling reasons for the review and the revised pricing structure. As one who considers that ACKMA has genuine importance as an ongoing organisation, I am hopeful that this change will attract new members, as well as ensure that the organisation has the resources to continue and to evolve further into the future.

In addition to the question of membership, the Committee also recommended the creation of a pilot ACKMA fellowship program, to be initially trialled over 12 months, whereby \$1,500 would be provided for the awarding of fellowships allocated based upon merit following a panel selection process to further understanding and contributions to cave and karst management consistent with the values of the organisation. For the initial period it was proposed that the framework be established for facilitation of an exchange style program for cave guides who could submit proposals to travel to other cave sites for learning and development based work or research. The full details of this program are to be written up later in the Journal, but in brief I consider this both an exciting opportunity for cave guides as well as an excellent starting point for what I hope may evolve into a broader program of fellowships available to anyone concerned with cave and karst management from guides to landowners, students or other professionals. The membership voted in favour of the establishment of this program also.



The Committee has also undertaken to complete a review of the rules of the association this year. It is proposed that the revised rules will be completed and distributed to the full membership a minimum of three months before the next Conference and AGM at Naracoorte Caves to provide a period for membership comments and submissions. The amended rules can then be endorsed and come into effect as of the next AGM. This is a time consuming and arduous process, and I again thank those members of the Committee who have undertaken to give their time over the coming months.

And so 2014 seems set to continue in the busy way it has begun, as we reset the ACKMA clock and begin the countdown to Naracoorte in May 2015!

ANNOUNCING THE ACKMA GUIDE FELLOWSHIP

Sasa Kennedy

As part of ACKMA's role in encouraging ongoing development in cave and karst interpretation, the ACKMA Committee has decided to instigate and fund a pilot Guide Fellowship Programme. The Fellowship is to assist a guide's professional development by allowing them to spend time at a different cave system, exchanging ideas and experiencing different ways of working and interpreting caves. Up to three fellowships will be awarded in the first year. It is hoped that this pilot programme will evolve into a broader programme, available to all those with an active involvement in karst management, from reserve rangers and managers, to caretaker groups, students and scientists.

The ACKMA Guide Fellowship is not intended to supersede the range of guide exchanges which already occur more informally, but to be a more formal process, with specific outcomes, that benefits a greater range of ACKMA members and karst operators through the sharing of knowledge and ideas.

The idea of ACKMA funding such a program is twofold. Firstly, the role of ACKMA is to foster excellence in cave management. Contributing to the exchange of experience and ideas is a concrete way of achieving this aim. Secondly, in normal circumstances the expense of funding an exchange may restrict the ability of smaller cave operators, or casual guides, to participate in this type of exchange. With ACKMA funding up to \$500 transport expenses per exchange, it should ensure a more equitable program.

To participate in the program either the guide, the manager of the cave system which employs the guide or the manager of the selected host cave system must be a member of ACKMA. The duration of the stay is to be negotiated between the guide, their employer and the host, dependent upon the professional development needs of the guide. The exchange must have a specific learning or development aim.

ACKMA will facilitate the exchange and cover up to \$500 transport costs for the guide. For the pilot program up to three exchanges will be funded.

Ideally, the guide's employer should agree to pay their guide for the days they are at the host cave system, or on a pro-rata basis. The host system must provide suitable accommodation for the duration of the stay. Most importantly they must provide appropriate opportunities for learning and the exchange of ideas.

In anticipation of a strong degree of interest in partaking in the program a sub-committee is developing a selection process. Copies of the selection questionnaire will be published in the Journal and available for downloading from the ACKMA website by September. Submissions will open in December and



*Dave Smith, Wombeyan Caves in Jersey Cave, Yarrangobilly
Photo: Steve Bourne*

close in March. They will be assessed in April and the successful candidates will be announced at the ACKMA AGM.

Guides who wish to participate in the program must complete the questionnaire, which will be used to select the successful candidate/s. They must agree to write a report on their experience and learnings, to be shared with management and guides, and with permission for publication in the ACKMA journal. All expenses must be receipted and the guide must complete a pro-forma financial report/statement.

Selection will be based on the quality of the application and the potential for sharing of information; the exchange of interpretive and operational ideas, and also on the benefits to the guide, their employer and the host system.

The Selection Committee will consist of the ACKMA President, ACKMA Interpretation Officer and a third, independent selector. There will be the option to change the composition of the committee when perceived conflicts of interest arise.

So guides, start thinking of ways to develop your skills; managers, start encouraging your guides to participate. Be ready with some proposals when the questionnaire is published.

CAVES GUIDES WORKSHOP and ACKMA AGM: YARRANGOBILLY CAVES, NEW SOUTH WALES 2014

Steve Bourne

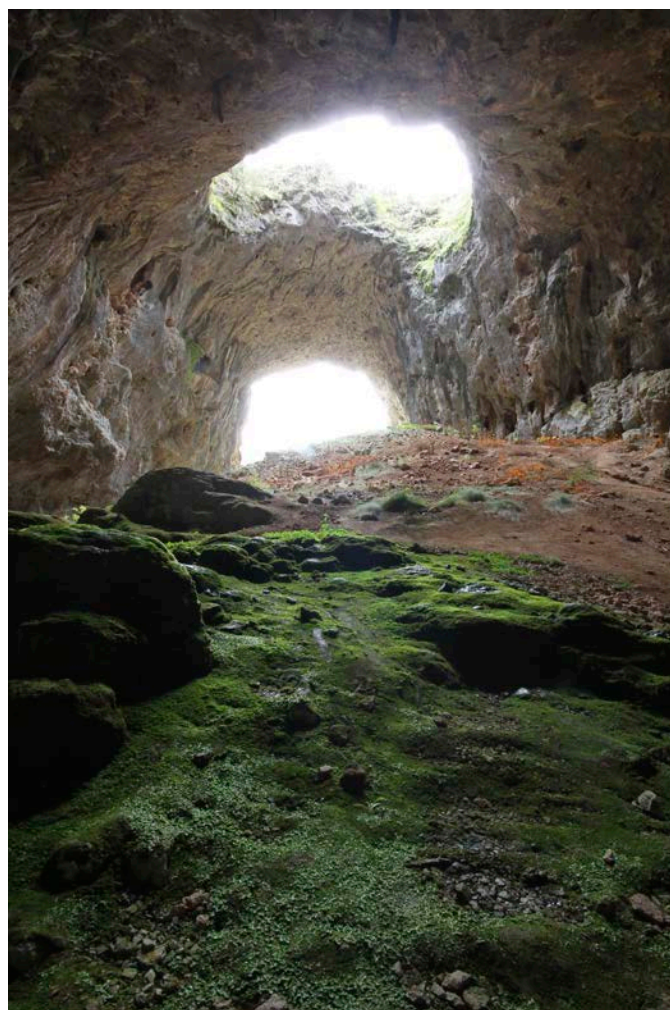


*The magnificent Caves House
Photo: Alexander Whadcoat*

The biennial Caves Guides Workshop and ACKMA AGM were held during the week of 4-9 May 2014 at Yarrangobilly. Holding these two events makes sense where it is possible as it enables participation in both with a single lot of travel expenses. They were previously held together in Tasmania in 2004 and are set for the same at Rockhampton in two years' time.

The Cave Guides Workshop was held first, with most participants arriving on Sunday 4 May. An afternoon caving trip led by Yarrangobilly Caves Manager George Bradford visited Mill Creek Swallet. A report on this trip is provided by Sasa Kennedy in this journal. On Monday morning, a *Welcome to Country* was provided by Sue Bulger, who works for NSW Parks and Wildlife Service as the Aboriginal Community Officer. Sometimes this important acknowledgement is overlooked. At times, it may fail to convey a really good message. Sue's message was excellent and reminded us that it's not just Aboriginal people welcoming us onto their traditional lands, but that the lands belong to everyone now and we need to care for the land and welcome others to share it with us. Sue repeated her *Welcome to Country* later in the week to ACKMA delegates.

The whole group then visited South Glory Cave, the self guided offering at Yarrangobilly. It has been relit with LED lighting and my first impression was that the lighting is perhaps a little too subdued for a cave of this size. I visited the cave again later in the week and noted how some people were struggling to see the steps. George informs me that additional lights are to be placed soon to improve safety and improve illumination of the cave.



*South Glory Cave
Photo: Steve Bourne*

The group split and toured Jillabenan and the other half into Jersey. The brochure description of Jersey Cave reads;

Noted for its rare display of black and grey flowstones, Jersey Cave is home to some of the most stunning and diverse cave decorations found at Yarrangobilly. Cleopatra's Needle, a remarkable 4 metre stalagmite that almost touches the cave's ceiling is just one of the many fantastic features that you will see as you journey back in time.



*Sasa Kennedy admiring Cleopatra's Needle, Jersey Cave
Photo: Steve Bourne*

I was fortunate to have Neil Kell leading the Jersey Cave group and enjoyed Neil's delivery, and depth of knowledge of the cave and park. We had good discussions regarding the black and grey flowstones, which are likely as a result of bush fires in the past. Neil recounted the cleaning of Jersey Cave in 1996, when he and two others spent three months cleaning the cave from end to end. I am sure there are images of before and after their work, which would make interesting viewing.



*Above. Dogtooth spar crystal, Jersey Cave
Below. Helictite, Jillabenan Cave
Photo: Steve Bourne*





*Above. Monitoring equipment in Harry Wood Cave
Below. "Stalagmate" in place monitoring drip rates
Photos: Steve Bourne*



I later visited Jillabenan Cave, and although it is much different in character to Tantanoola Cave in South Australia, it reminds me of this cave. This is because Jillabenan is a tiny cave, but extremely richly decorated.



*Monica Yeung delivering her geology lesson to (L-R) Ted Matthews, Ian Raymond and John Brush
Photo: Steve Bourne*



*Cave guides at the workshop learning to make rope the Wogdali way with Talea Bulger
Photo: Alexander Whadcoat*

Two papers were presented after lunch. The first, Owls, Caves and Fossils, was by Steve Bourne, Liz Reed and George Bradford, and presented by me. Two years ago, I visited Yarrangobilly on the way home from the ACKMA AGM at Wee Jasper. George Bradford showed us a Sooty Owl which had taken up residence in North Glory Cave. I was excited to see dozens of owl pellets on the cave floor and Liz and I applied for a permit to collect pellets. George collected about 50 and sent them to us for analysis. Our presentation covered owls as biological surveyors, how different owls consume their food, what information we have learnt from the Sooty Owl pellets to date, and a summary of Liz's work in Blanche Cave at Naracoorte.

The second presentation was by Carol Tadros, from ANSTO*, on behalf of the large team that has been studying speleothems and drip water at Yarrangobilly for several years. Advances in technology now mean much smaller samples are required for analysis and greater chronological resolution is being achieved. As Carol noted, speleothems are providing an alternative to ice cores and other means to examine past climatic conditions.

Monica Yeung is a long term Yarrangobilly guide who wears many hats and brings many skills and knowledge to the park. Monica showcased the geology lesson she delivers for school children. This is an excellent and engaging workshop and I am sure all guides gathered some new ideas to take back to their worksites.



*Sooty Owl, North Glory Cave
Photo: Steve Bourne*



*King Solomon's Temple, Castle Cave
Photo: Steve Bourne*

Talea Bulger, a Wiradjuri Aboriginal woman and NPWS Aboriginal Discovery Ranger, presented the Aboriginal Cultural tour delivered at Yarrangobilly during the holiday seasons. This included a number of traditional practices including how to make a rope using the bark from stringybarks, how to make a fire by rubbing two sticks together (which I failed miserably), making an axe and throwing a boomerang. Talea has a fabulous style of presentation of what was an engaging and authentic Aboriginal experience.

George Bradford, Yarrangobilly Caves Manager, led behind the scene tours of the hydro electricity plant and Caves House. The attention to detail in the restoration of the house, utilising the best of energy efficient technology whilst preserving the heritage features of the house is a real credit to George and his team. One day I will convince George to write his story about the development for printing in this journal.

Participants were shown through North Glory Cave and asked to provide feedback on how the cave may be presented. The Sooty Owl was in residence with plenty of fresh pellets. This provides an excellent opportunity to interpret what was presented in the paper the previous day, with lots of props to support the guide. When owl pellets are presented as "vomit bombs" to school children, they are immediately engaged!

Castle Cave is an old show cave which is now shown as a torchlight tour during busy holiday periods. It is highly decorated including the King Solomon's Temple. Oliver Trickett's description reads:

From gracefully rounded snowy-white ledges, rendered luminous by myriads of crystals, which sparkle like diamonds, hang gorgeous, orange-tinted shawls. Under the canopy thus formed are grottos of exquisite beauty. No dream could conjure up any scene to outrival the splendour of this masterpiece of Nature's handicraft.

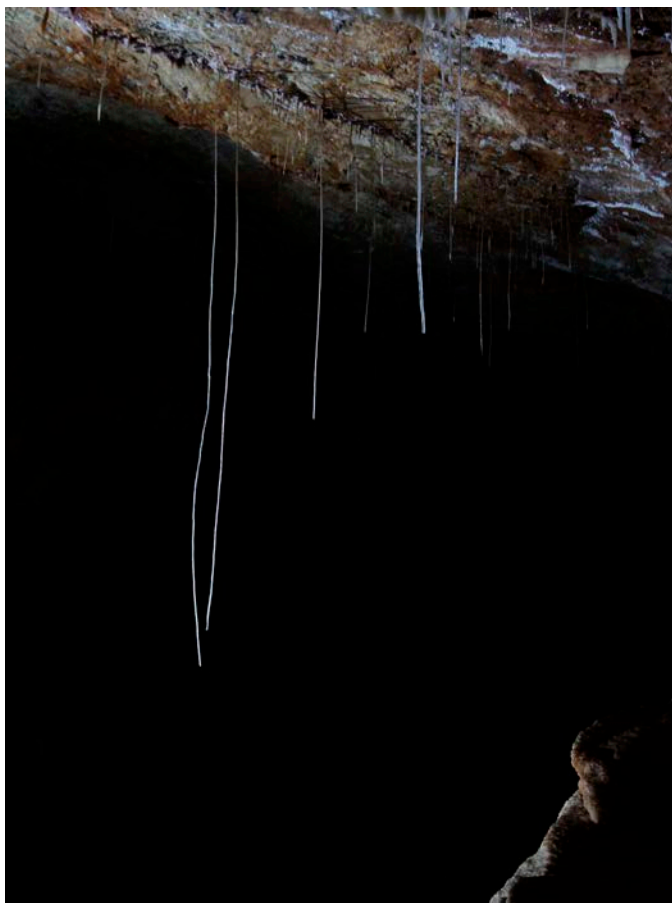
Compare this description to the current day description of Jersey Cave above!

I last visited this cave about 14 years ago and had always wanted to get back in there to photograph this feature, which I was able to do, while Andy Spate sat patiently as I took numerous images until I managed one I was satisfied with. Andy then pointed out a straw with a cluster of crystals hanging off the end of it, resulting in another lengthy photography session seeking that perfect image.

Harry Wood Cave is where the ANSTO team have been doing its drip water research. This research has been running for six years, probably the longest study of its type in Australia. The rate of dripping is measured using Australian-made invention called a "stalagmate".

John Brush and Marjorie Coggan lead trips into Restoration Cave and East Deep Creek Cave on Thursday. Restoration Cave is beautifully decorated. The entrance is a short scramble down over rocks into essentially a single large chamber. Access is restricted to the edge of the chamber with spectacular views of straws and large flowstones throughout the cave.

As I understand it, we only visited a small part of the East Creek Cave, but what a special part. Beyond the



*Straws, Restoration Cave
Photo: Steve Bourne*



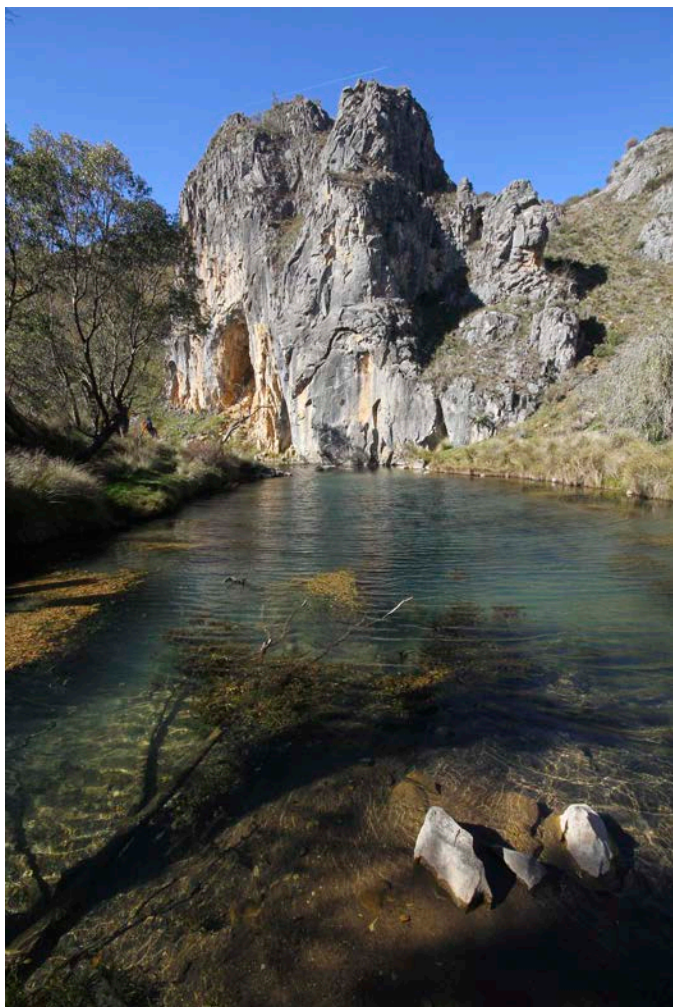
*Tiny helictities, Restoration Cave. The image is approximately 4 cm wide.
Photo: Steve Bourne*



*Ted Matthews and Sasa Kennedy negotiating a short path to reach the decorated area of East Creek Cave.
Photo: Steve Bourne*

gate we came to a detrog area, and with overalls off and clean shoes on, we accessed a small area of immense columns, flowstones and shawls. It was one of the most heavily decorated pieces of Australian cave I have ever seen and it was real privilege to be able to view it.

On Friday we visited Cooleman Plain and the Blue Waterholes area. This is a popular camping location which is closed during winter to reduce the amount of damage to the roads while there is rain and snow. The more energetic and nimble did a longer walk and visited Barbers Cave and Murrays Cave. Both of these caves are open access and receive lots of visitors, particularly school groups. Barbers Cave is excellent for school children with multiple passages, three entrances, climbing and squeezing, and little decoration, although the moonmilk has suffered badly from inquisitive fingers. John Brush set up a tape to assist with the exit on the gorge side of the cave and we entered via one of the two entrances on the other side of the hill. Our large group of ten split up and explored the cave, Laura Dawson, Dan Cove and Neil Collinson exiting the cave first and headed



*Blue Waterholes, Coolman Plains
Photo: Steve Bourne*



*Dan Cove demonstrating his acute sense of balance at a creek crossing
Photo: Steve Bourne*



*A view looking up the creek at Coolman Plains. Laura Dawson provide scale atop the small hill in the foreground.
Photo: Steve Bourne*

up the hill for lunch. The rest of us left the cave and removed the tape, assuming everyone was out. As we were about to leave we heard a cry of “is anyone there”? Miles Pierce was still in the cave! The tape was hastily put back in place for Miles and we regrouped over lunch.

Murrays Cave was an hour’s walk from Barbers Cave over a steep hill and then along a marked trail. A large boulder had dislodged and rolled down the hill at one point, which had apparently occurred within the last month. It missed the track, but would have been quite an experience to be close when it happened. Murrays Cave is a simple walk along a stream passage with some interesting features. A quick visit to the old Coolamine Homestead filled in the day nicely.

The ACKMA Committee met on Saturday morning with the AGM held immediately after. A key decision at this meeting was that ACKMA offer a \$40 membership which entitles members to an electronic journal, with hard copies available for an additional \$35. Overseas members will pay a \$20 fee to cover postage costs. These figures more accurately reflect the cost of the journal,



the production of which has been exceeding membership fees by a considerable margin for some time. Only conference “profits” have enabled the organisation to function as effectively as it has. Considerable work has been done over the past 12 months in trying to get non-financial members up to date. We still have some work to do to upload the journal to our website and provide for individual password-protected downloads, which webmaster Rauleigh Webb has been working on. We are fortunate to have someone with Rauleigh’s skills and willingness to do this work for us.

Dave Smith and John Brush are reviewing ACKMA’s rules, a task that is overdue to ensure we are compliant with the Victorian legislation, as this is our home base. The Committee also recommended \$1500 is provided as fellowships for guides, to support exchanges or visits to other sites. See Sasa Kennedy’s announcement of this programme in this journal. Selection criteria will be developed and more information on how to apply will be circulated through the journal. It is important that this information reaches all guides. The Committee discussed that guides at some sites are not aware of ACKMA activities nor Guides Workshop that is held every two years. Those who participate find it enriching and worthwhile. Membership of ACKMA is open to anyone with an interest in caves and karst, and entitles you to attend ACKMA conferences. The \$40 membership with an electronic journal is an excellent way to keep in touch with cave-related activities and members can join the

email list and receive additional information circulated by other members.

I departed early Sunday morning with a 1000km drive ahead of me. Less than an hour into the trip, I had a setback 48 km from Tumbarumba, when the computer on my car decided that I was out of fuel, even though there was still plenty in it. The steep road must have jammed the fuel float and the computer registered the car had zero kilometres left in the tank. No phone reception and extremely limited passing traffic created an interesting situation. After about 30 minutes, a Snowy Hydro employee called into the parking bay and offered to bring some fuel back from the hydro station, saying he would be back in an hour. Two hours later and still no sign of my saviour, a 4WD and caravan pulled into the parking bay (the second car of the day) and fortuitously had some fuel on board. An exchange of \$50 for a jerry can of fuel convinced the car’s computer it had fuel and I was on my way. It gave me some time to write most of this report, but made for late arrival at home.

The week was excellently hosted by George and his team; Neil Kell, Ian Raymond, Monica Yeung, Margot Bulger, Sue Prosser, April McArthur, Jen Emerson, Larissa Lembke, Regina Roach, Rick Hargreaves, Nicola Beckett, Melinda Judd, Gilly Crundwell and Bernie Sims. The accommodation was excellent, the food likewise and, as always, the company great fun.

*ANSTO = Australian Nuclear Science and Technology Organisation

MILL CREEK SWALLET ADVENTURE TOUR

Sasa Kennedy



*Sasa Kennedy in East Creek Cave
Photo: Ted Matthews*

rain. There is an array of stunning fossils here, with forms easily seen. The rock itself is also very interesting, with streaks of pink through the dark grey limestone. This is an ideal spot to squeeze in a little bit of interpretation, as it is one of few spaces large enough to accommodate a full tour group.

After this comes a series of low, rocky crawls broken up with small chambers and a challenging chimney leading to the lowest level of the cave. The crawls are long enough and low enough to provide a buzz for most adventure cave participants. The chimney, as a free



*Jenny Emerson and Anne Musser in Mill Swallet Cave
Photo: Sasa Kennedy*

On Sunday 4 May, prior to the start of the Guides Workshop, a cheery group of Yarrangobilly guides and other adventurous types from Jenolan and Wombeyan headed off to check out Yarrangobilly's proposed new intermediate level adventure tour, Mill Creek Swallet, ably led by George Bradford.

The tour began with a scenic stroll along the track which leads to Harrie Woods Cave, before turning off down a gully to Mill Creek Swallet. Although we took a gully path into the cave, it is proposed that the adventure tour groups will abseil in from the pathway above. The abseil looks from below to be fairly straightforward, finishing with a descent into the cave entrance – plenty of fun for tour participants to be had entering the dark cave by the light of their headlamps. For those abseiling early in the group there is plenty to interest them in this twilight section of the cave as they await the rest of the party.

After the entrance is a beautiful series of water carved descents leading to the middle level of the cave. This stepped passageway must look amazing after heavy

climb, might prove too much for many at this level, so George has wisely decided to present this as a ladder ascent/descent. For adventure visitors cave ladders can add a new dimension to the experience, being a very popular aspect of the Mammoth Cave Tour at Jenolan.

The trip into the cave ends at a small sump, another chamber with stunning rock colouring and fossils.

From here we returned, as the adventure cavers will, to the entrance of the cave, made our way back along the gully and up the Castle Cave Track to the main walkway.

This tour will be a valuable addition to the Yarrangobilly visitor experience, providing an extension activity to entice longer stays. It will be quite a challenge for guides and adventure participants alike. For the guides the challenge will be managing the group with few large gathering places in the cave, tiring crawls and quite a lengthy walk in and out. For the participants the crawls will provide a physical challenge and the chimney a mental challenge. They should be well pleased with themselves when they complete the trip!

LAVA CAVE MEANDERINGS in the GALAPAGOS ISLANDS

John Brush - Canberra Speleological Society Inc



The final pitch into Triple Volcan
Photo: John Brush

The 16th International Symposium of Vulcanospeleology was held on the Galapagos Islands in March 2014 and trips associated with the symposium provided opportunities for visiting a variety of lava caves on several islands. This article briefly describes some of the caves visited and offers some management observations.

The symposium attracted more than 70 participants from around the world and was the largest such gathering since the 13th symposium in Korea in 2008. ACKMA was well-represented with 6 members attending (Greg Middleton, Julia James, Cathie Plowman, David Butler, Marjorie Coggan and John Brush). Formal presentations covered a broad range of topics (see separate article by Cathie Plowman) and while there were a few organisational hiccups and frustrations (see *13 rules for conference organisers*), practically everyone appeared to come away with very positive feelings towards the islands, the local inhabitants and their caves.

The Galapagos Islands sit astride the equator about 1000 km off the west coast of South America. Politically, the islands are a province of Ecuador and in geological terms, they have been formed by effusions of ash and lava above a mantle hot spot over the last three to four million years. The most recent eruption was on Fernandina Island in 2009. Lava caves (or tubes) have been recorded on at least 5 of the 14 or so major islands. A reasonable number of caves on three different islands are accessible to the general public by one means or another. Symposium participants were able to visit more than 20 different caves during their time on the islands.

Some 97% of the land area of the Galapagos Islands falls within the boundaries of the Galapagos National Park (GNP) which, because of its World Heritage status and diverse, delicate and, in places, unique habitats, is highly protected with tightly controlled access arrangements. The remaining 3% of the land area is privately owned and comprises urban areas and cleared

or partly-cleared rural lands (largely cattle ranches and market gardens). Four islands are permanently inhabited and most of the 30,000 residents live in the towns of Puerto Ayora (the largest town), Puerto Baquerizo Moreno (the provincial capital) and Puerto Villamil (a sleepy village) on the islands of Santa Cruz, San Cristobal and Isabela, respectively.

Much of the land area is a virtual desert and it is only in the 'highlands' (approximately 200-700m ASL) of the larger islands where higher precipitation levels support significant growth of 'greenery'. Not surprisingly, it is the relatively lush highland areas of the above-mentioned three islands that have been most developed for agricultural use. This is significant for lava caves because it is much simpler to gain access permission to visit lava caves on private property and it is considerably easier to locate entrances in a grassy field than it is in thick 'jungle'.

Several of the caves we visited were public access caves within the GNP, but the majority of caves visited by symposium participants were on private property on Santa Cruz Island. Several of these privately-owned caves have been developed as low-key show cave operations. Most of the show caves are on cattle ranches where the cave operation has developed as a sideline to providing facilities for tour groups to observe giant tortoises. The tortoises roam freely across the highlands but are attracted by the green pastures of the ranches - local regulations require the bottom wire on fences is high enough for tortoises to push their way under. Thus the ranches are using caves to generate additional cash flow but observations suggest visitation levels are modest. Modifications to the caves generally comprise little more than rudimentary lighting, a few steps, trail markers and occasional handrails.

Gallardos Cave (also known as Bellavista Cave or Tunnels of Love)



*Cave guide and client meet the vulcanospeleologists in Bellavista Cave
Photo: John Brush*



*Lava straws and tree roots, Bellavista Cave
Photo: John Brush*

This arguably the most widely-known and visited show cave. Unique in the Galapagos, it is a stand-alone commercial cave operation and benefits from being the closest cave to Puerto Ayora; just a 15 minute trip by taxi. The cave is approximately 2km long, about a third of which, between an intermediate entrance and one towards the up-flow end, has been developed as a through trip. It appears to operate on either a guided or self-guided basis.

Widely-spaced compact-fluoro lighting has been strung along the show cave section. This would be adequate if all lights were operational but it is quite dark when they are not, such as at the time of our visits. Symposium participants were free to wander through this cave at will and from what we saw of the tour groups, a few torches are provided to guided and self-guided parties alike. Beyond the stone entrance steps, the easy walk-through route is along a passage that is generally 4-5m wide and 3-6m high, mostly on a solid and relatively robust lava floor. A few changes in direction, for example over low breakdown piles, are indicated by small painted arrows. There is a minor mud tracking and a small amount of littering, including the odd condom wrapper! Hmmm.

The longer down-flow section of passage contains some of the most impressive, varied and delicate lava speleothems ever seen by the author. The entrance to this part of the cave is in the same elongated collapse pit as the show cave entrance. Fortunately it is at the opposite end and is not visible from the show cave trail. This section of cave has a couple of breakdown piles and the passage dimensions are generally more modest - roof height rarely exceeds 3m and trends lower towards the inner end, meaning that speleothem development on the roof is within easy reach and so is quite vulnerable.

The inner end of the passage contains a profusion of lava straw clusters up to 20cm long, lava stalactites and shawls and forests of slender conical stalagmites up to

50cm high. At present, this decorated section is protected only by its distance from the entrance, the rock piles and the crawls. This cave deserves better protection such as restricted access, track marking and ideally, a locked gate. This was stressed to the owner when we took her into the cave, but how effective these representations will be remains to be seen. The cave is still in remarkably good condition, but has suffered from some irreparable damage to lava straws, stalactites and stalagmites and to secondary calcite encrustations and superficial tracking of mud onto the solid lava floor and around some of the tall stalagmites.

Soyla Cave

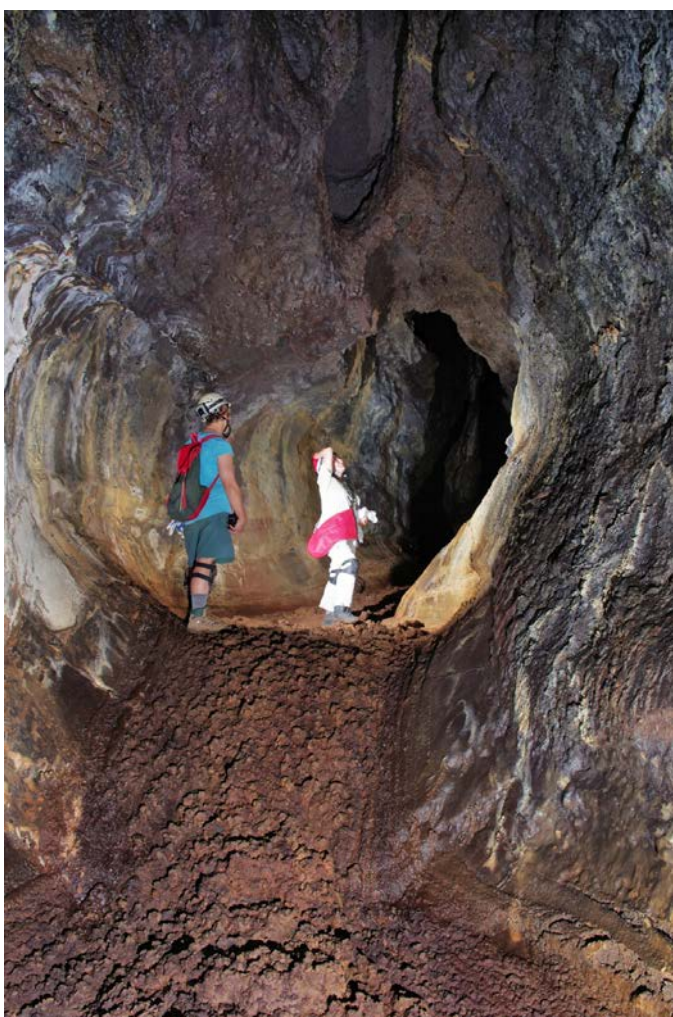
The sole entrance to Soyla Cave is in a field only a hundred metres from the 'visitor centre' at Gallardos Cave. From the entrance, the passage heads down-flow for about a kilometre (parallel to the nearby Gallardos Cave) and it does not take long to conclude this is a gem of a cave. It has a bit of almost everything one hopes to see in a lava cave: a variety of nice passage cross sections, very little breakdown, lava falls and cascades,



*Lava straws with secondary calcite encrustations,
Soyla Cave
Photo: John Brush*

lava incisions, rolls, benches and levees, pahoehoe (ropey lava) floor, red, grey and yellow lavas, tube-in-tube structures, glazed wall lining, driplets and other delicate lava speleothems, secondary calcite encrustations and rafted blocks to name but a few.

Despite being so close to a road, the cave appears to have had little visitation and it is in excellent condition.



*Lava falls, Soyla Cave
Photo: John Brush*

Primicias Cave

On the several occasions that we visited the Rancho Primicias, it was common to see taxis and buses disgorging or picking up loads of visitors. The ranch appears to generate a considerable amount of business from its large restaurant and bar, the gifts shops and tortoise viewing operations. However, a few visitors pay an extra fee to visit Primicias Cave, located several hundred metres away along the ranch access road. The down-flow end of the cave is spacious but unlit, unspectacular and a tad muddy and so attracts little attention. The lit section is far more interesting and in



*Rudimentary lighting along the show cave route in
Primicias Cave
Photo: John Brush*



Healthy lampenflora in Primicias Cave
Photo: John Brush



The leafy upper entrance to Royal Palm Cave
Photo: John Brush

theory operates as a through trip. However, a short but low and muddy crawl a short distance from the exit means that most visitors, including many hardened cavers, retrace their steps to the lower entrance. Most visitors appear to be self-guided and the cave is well lit. In fact, too well lit. Unfortunately, the lights appear to be left on all day, every day, thus creating so serious a lampenflora (or as the Editor put it, lampenforest) problem that it is sufficient to make a pteridophile's heart flutter. The cave is showing a few signs of superficial wear and tear (eg mud tracking and minor littering) but is quite robust and, apart from installation of the lights and stone steps at both ends, the cave has been little modified to accommodate visitors.

It also seemed highly unlikely that a bunch of 60 or so scruffy cavers would be granted permission to visit the cave. However, for a mere \$1 per head, we not only gained access but were accompanied by the recently-appointed resort manager who was keen to receive our comments on the cave.

The cave is about 800m long, with the show cave route between two entrances accounting for about two-thirds of the length. Both entrances are set in thick regrowth scrub and neatly mown tracks make for easy access and exit. A combination of stone and timber-edged steps lead into the cave and further in, the route is generally defined by a scoria path edged with stones and, where necessary, with wooden handrails.

In places there are two levels in the cave. These formed when a flow that half-filled a pre-existing tube solidified on top and the remaining fluid lava drained away, leaving a secondary roof in parts of the cave. Subsequent partial collapse of the secondary roof has left a series of bridges which the tourist path meanders its way over and under. In areas where the later flow did not crust over, there is a deep floor channel. At one point, the trail crosses the channel on a large wooden bridge. Elsewhere, steep wooden ladders or steps lead from one level to the other.



Unlit down-flow section of Primicias Cave
Photo: John Brush

Royal Palm Cave

Hidden away in the misty highlands of Santa Cruz and protected by a security guard at the entrance gate, the exclusive Royal Palm Resort seemed to be an unlikely place for a caving trip. It sounded even more unlikely that a cave on the property had been equipped with pathways, ladders, bridges and lighting for the exclusive use of the few guests who can afford to stay at the resort.



Colourful lavas in Royal Palm Cave
Photo: John Brush

Apart from the lava bridges, arguably the most striking feature of the cave is the variety of colours seen - black, red and orange lavas sometimes topped with white, yellow and orange secondary encrustations. In one stunning area, the lower walls are bright red, but above that the upper walls and roof are black basalt.

Participants were eager to check out one section of the lower level which, we had been told, was used as a wine cellar. Sadly, all the bottles had been removed, perhaps in anticipation of our visit.

Beyond the end of the tourist route and the exit ladder, the passage continues for a couple of hundred metres. In this section, there is more breakdown but sections of roof lining remain intact and in places there are clusters of colourful lava straws. The passage terminates at a boulder pile where there are signs of digging and blasting, presumably in an attempt to extend the cave. We could not figure out why somebody had gone to so much trouble.

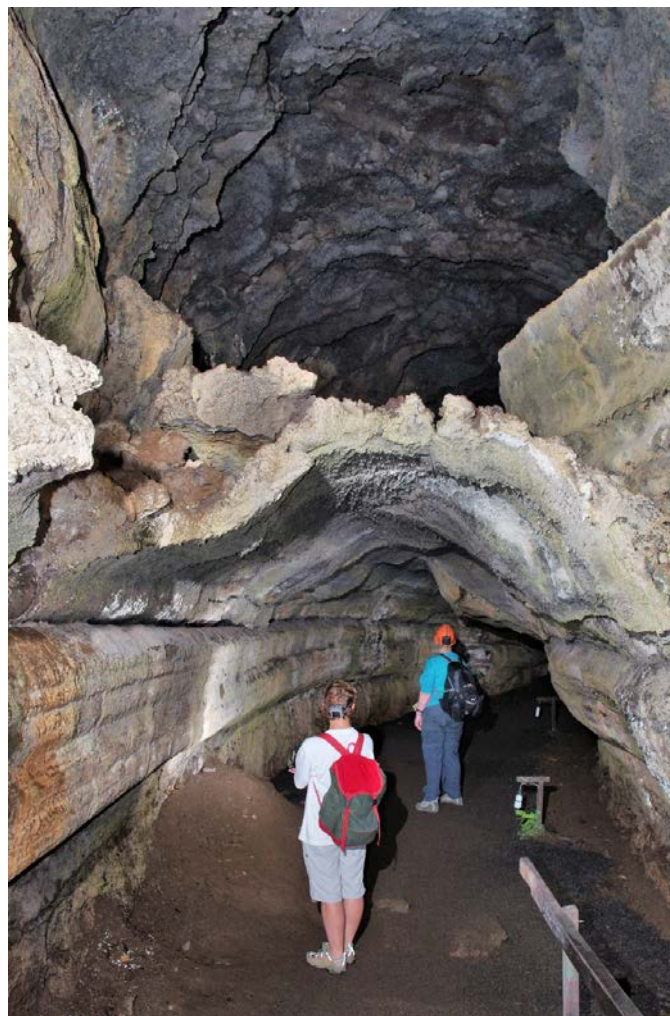
Although this is an impressive cave, it was probably the most highly modified of the show caves that we visited. The constructed path, extensive use of wood (for steps, ladders, handrails and bridges) and two generations of cave lighting have all had an impact. There is also lampenflora around some of the lights as well as a scattering of rubbish. As with other local show caves, there is minor littering beside pathways, but in addition, discarded wooden handrails and bridge planks appear to have been thrown into the nearest convenient pit. Off-trail, there is detonation wire leading into the terminal rockpile, and at one point, there is, curiously, a 200 litre oil drum. Several of us had a good discussion on these issues with the new Manager, who was receptive to addressing them within the constraints of his limited budget.

Tortuga Crossing Caves

Tortuga is Spanish for tortoise or turtle and Tortuga Crossing appears to be a relatively new tourist operation in the Santa Cruz highlands near Rancho Primicias. In fact, much to the chagrin of field trip participants, the Conference Convener directed some people to walk there by road from Primicias, only for them to discover that after a hot 4km walk under an unrelenting equatorial sun, they ended up less than 200m from where they had started out. Needless to say, the return trip was considerably quicker – with not even a fence to cross.

As with Primicias, the giant tortoises are the main attraction. However, there is also a lava tube. This has been divided into sections by roof collapse and one section has been developed for visitors with entrance steps, lights and a pathway. It appears to run as a self-guided operation.

The stone entrance steps and timber handrail lead down to a flat earth floor that has been partly covered with a layer of basalt aggregate to provide a mud-free surface. Lighting is by means of compact fluoros fixed to low wooden posts. Although the lights were turned off



*Inner roof in Tortuga Crossing Cave;
note ferns growing under the light
Photo: John Brush*

during one of our visits into the cave, the luxuriant growth of mosses and ferns around the lights suggests they are not always turned off so promptly. The cave also supports some healthy fungus displays around the timber lamp posts. There is a whole new ecosystem down there, it seems.

It would be interesting to know what the longevity of the lighting system is. American cavers who were mapping the cave a year or two back had to retreat in haste when water started pouring into the cave after a heavy downpour and covered some of the lights. That can't be good.

The lit section of cave is quite short but is well worth a visit if only to observe the spectacular lava bridge which divides the passage in two for some distance. The bridge is as thin as 30cm in places and provides an aesthetic inner roof over the pathway. Keen visitors may also be able to find remnants of a second false roof high up near the inner end of the show cave trail.

A few hundred metres further down-flow, a tricky descent over slippery breakdown leads into a long section of passage that is generally 2-4m wide and 2-5m

high. Through much of the cave there are lateral shelves on either side of the passage indicating former levels of lava that once flowed along the passage. In places the original lava floor has been covered with a layer of mud – most likely transported in by running water. A few hundred metres into the cave, the trampled bones of a giant tortoise can be seen sitting in the mud. How did it manage to get so far into the cave?



*Lateral lava benches and shelves in
Tortuga Crossing Cave
Photo: John Brush*

El Chato Caves

El Chato is yet another tourist-oriented ranch in the Santa Cruz highlands. The operation appears to be more low key than some of the others, but is worthy of mention. The comfortable open air restaurant is a pleasant spot to take in the views down to the coast while enjoying a cold beer after an afternoon of hard caving. And what could be more convenient than having the show cave exit right beside the restaurant?

The entrance to the show cave is about a 300m walk from the restaurant. From the entrance collapse, passage extends in both directions. Access to the shorter (300m) unlit section, known as Chato II, involves a 3-4m climb and features some undamaged lava straws and untrampled bones of an extinct giant rat (*Megaoryzomys curioi*). The show cave section is about 800m long and consists of two parallel passages joined at either end. Only the smaller of these two passages is lit. This is arguably the less interesting part, but it does have a smoother floor with less breakdown and so makes for an easier trip for visitors. We did not see any other visitors in the cave during our two visits to the ranch and so it is not known whether the commercial trips are guided or self-guided.

As with other local show caves, the lights are compact fluoro tubes fixed to wooden posts. That the system does not have great longevity in the moist cave environment is suggested by plastic bags wrapped around some light fittings and a succession of disused fittings and electric wires along the show cave trail. The cave has also been equipped, where necessary, with rope and timber handrails on wooden posts and at the end of the cave

trail, a long flight of stone steps leads out of the cave and back to the restaurant.

Another unlit cave on the ranch is located a few hundred metres down-flow from the show cave entrance. This has a thickly vegetated collapse entrance pit where we found a thick rope handline affixed to trees leading down into it – and then out again the other side without revealing where the cave entrance was. Whether this is a conservation measure, or just reflects rapid regrowth of vegetation we could only guess. Further investigations revealed a 3m by 5m entrance hidden behind a blackberry and vine thicket and after forcing our way through, we discovered a rope handrail affixed to wooden posts leading down a steep slope into the cave. At the bottom, broken giant tortoise shells suggested this was not a good place for a tortoise to find itself. Not far into the cave, the only feasible route was along an exposed traverse high on a narrow ledge with few handholds. This weeded out the party and made us wonder why so much trouble had gone into the entrance handlines. The cave passage continues for about 300m, mostly over breakdown.

Sucre Cave

Sucre Cave is an unlit public access cave within the GNP in the forested highlands of Isabela Island. It takes its name from a former local resident, Señor Sucre Gil, who apparently found the cave, hidden deep in the forest, was a good place to track down wild boars; thus ensuring his family a regular supply of fresh meat. Today, there are no signs of boars and there is a well-marked forest walk to the entrance and stone steps leading down into the cave, which is in excellent condition.



*Marjorie Coggan examining lava dribbles and yellow
bacteria in Sucre Cave
Photo: John Brush*

Sucre is like no other cave that we visited on the islands. It is a relatively short (~400 metres) but branched system on several 'levels', suggesting a complex formation history. At a glance, the higher levels appear superficially similar to a phreatic cave in a limestone

area. At the lowest level, there is a floor of rough (a'a) lava bounded on one side by a lava levee bank up to 50cm high. Also in the lower levels, the roof and walls were festooned with lava drips and stalactites and thin yellow and gold microbial (mostly bacterial?) coatings were common. These often sparkled in our light beams because of a surface layer of condensation drops.

Triple Volcán

Triple Volcán is another feature in the highlands of Isabela Island. The cave lies beneath a rugged volcanic landscape and despite the number of nearby vents and cones, it does not take its name from these features, but rather from a set of triplets born into the family of the owners.

The cave is a partially drained lava chamber that is entered through a steeply-inclined closed depression - more correctly called a volcanic vent or an extinct (hopefully) volcano. A local landowner has established an adventure caving operation into the cave and as a result, the steep entrance slopes and lower vertical drop are festooned with a profusion of fixed ropes and wooden-runged ladders, most of which seem to be tied back to a couple of small trees on the surface. This infrastructure appears to be of varying vintages and condition and makes for easy but nerve-racking access.

In the limited time available, most people had an opportunity to descend 20m or so on the upper steeply inclined sections but only a few were able to descend all the way to the bottom of a large breakdown floored chamber that bells out beneath the narrow entrance throat.



Greg Middleton trying to decide which ropes are safest for a descent into Triple Volcan
Photo: John Brush



Entrance to Post Office Cave on Floreana Island
Photo: John Brush

Caves on Floreana Island

Although there were no formal symposium field trips to Floreana, a number of participants organised a day trip by boat prior to the start of the symposium and were able to visit the Caves of the Pirates on private property towards the centre of the island. The caves are a series of short overhang caves developed in volcanic ash. They have been substantially modified by digging over the years and their interest is largely cultural rather than speleological.

In addition, Marjorie and I visited Post Office Cave on the north side of the island during a boat trip around the Galapagos a week or so before the symposium. The cave lies within the GNP and is a site approved for public access. All that is required is (a) for the tour boat to have its itinerary approved by the GNP, (b) for the boat to have booked a time slot for that part of the island, (c) for shore parties to keep to marked tracks and (d) be accompanied at all times by an accredited naturalist. The tour boat we were on does not usually do trips into the cave, but when staff became aware of our cave interests, they arranged to extend the normal walk on the island to include a visit to the cave. About a dozen people chose to join us for a trip into the 300m long cave.

There is a marked track to the cave and wooden steps and a handrail leading down into it. Further in, a handline has been fixed for assistance down a steep lava cascade. At the bottom, the passage bells out to a lofty chamber some 8-12m high and 10-15m wide. Beyond the chamber, the passage pinches down to 3-6m wide and 4-5m high and in the final 50m of passage, a shallow lake extends across the full passage width. The lake is apparently tidal and gets progressively deeper before sumping. In some parts of the cave, such as near the base of the entrance steps and in the lake area, the original glazed lining of the tube remains intact, along with some small lava drips, but the chamber area has been substantially modified by breakdown.

Conclusions

Symposium participants were able to experience a wide range of public access, commercial and wild volcanic caves across several islands of the Galapagos. Most of the caves are in good condition and some that are both spectacular and delicate are worthy of more protection through more stringent access controls, track delineation and improved local understanding of the values of the caves and their contents.

According to official government figures, the Galapagos attracts about 170,000 visitors a year and it would be fair to assume that only a very small percentage of visitors go there primarily for the caves. Nevertheless, many tour group itineraries include a highland ranch visit to see tortoises and some groups appear to include a quick cave trip. Some independent visitors, especially younger ones looking for more adventurous activities, also find their way to a cave operation or two. But overall, visitor levels to the commercial caves appear to be relatively low, perhaps in the order of 20-60 visitors per cave per day, at most. This helps to limit direct impacts on the caves but it also means the revenue

generated is unlikely to be sufficient for cave owners to consider using lower impact materials (eg plastic and stainless steel rather than timber), making substantial improvements to lighting systems or to providing interpretive information.



*Wading along the terminal lake in Post Office Cave
Photo: John Brush*

13 RULES for CONFERENCE ORGANISERS

John Brush

This list was drawn up after experiences at recent cave-related symposium and may be helpful as a checklist for convenors of future ACKMA conferences.

1. Do not be afraid to seek help while planning and organising a conference; people will not think poorly of you if you don't do everything by yourself.
2. Never advise a cave/karst speaker to "talk as long as you like, we have plenty of time".
3. Ensure there is scope in the program to devote another day to presentations in the event that Rule 2 is ignored.
4. Compile and distribute a list of speakers, preferably before presentations start but, as a fall-back, before the conference ends.
5. Before presentations start, confirm the data projector /DLP is actually projecting all three colours; and make prior arrangements to ensure a backup data projector is available somewhere in town.
6. Avoid the temptation to provide continuous tea, coffee and snacks at the back of the meeting room and use this as justification for cutting out morning and afternoon tea breaks.
7. If lunch is to be provided at a location distant from the meeting room, ensure someone has a key to get back in again.
8. Designate someone (anyone?) to chair presentation sessions and to co-ordinate the order of speakers and the timely loading of their PowerPoint files.
9. Ensure hotel room bookings made for participants are confirmed for the full duration of their stay.
10. Express (at least some) concern when participants are told by hotel staff to vacate their rooms at short notice "but only for a night" because the hotel had lined up someone else for the room.
11. Ensure that any cavers designated as guides to run field trips actually know where the caves are located and how to get to them.
12. Never allow all of the guides to go home before the field trips end.
13. When all else fails, provide free beer.

GALAPAGOS ISLANDS CAVING, MARCH 2014

Cathie Plowman¹ with Aaron Addison²

¹ Northern Caverneers

² Galapagos Volcanospeleology Conference Organiser



*Galapagos National Park, World Heritage Area
Photo: Cathie Plowman*

The air is filled with the sweet scent of guava as I walk uphill after another day underground. We often see the fleshy guava fruits on the ground when walking to and from the cave; they're a dull-yellow to green on the outer skin and pink inside. They're soft and readily squash beneath your boot to reveal the pink flesh and their many seeds. I'm certain that the guava would be a delectable item for the giant tortoises that we've also been seeing en route to and from the cave each day. But guava is no fruit of paradise; Greg Middleton reminds us that it's a rampant weed here, as it is in many tropical countries.

I'm hot, sticky and grimy, a near constant feeling here in the Galapagos, but I'm also very satisfied after another rewarding day in Cascajo Cave, or indeed Cueva del Cascajo in the local Spanish language.

It's the end of my fourth day in Cascajo. David (Butler) and I have come to the Galapagos for the 16th International Vulcanospeleology Symposium that will be



*En route to the Cueva Cascajo compete with tortoise and machetes
Photo: Cathie Plowman*

held here next week, but we've also been lucky enough to have been included in the surveying expedition led by Aaron Addison and his team from the USA.

Most days there have been three surveying teams either in Cascajo or in one of the other caves nearby. I'm happy to have ended up just in Cascajo; I'm enjoying following the cave, improving my surveying skills and enjoying the company of the people I've been working with. Mostly this has been with Aaron (from Missouri) and Guinevere McDaid (from Texas).



*Descending a lava fall in Cueva Cascajo
Photo: Cathie Plowman*



*Far Left Bella Vista Caverns (including the Tunnel of Love)
Left. David Butler in Soyla Cave
Below Left. Coastal lava cave
Above. Outside the cave pictured below left
Photos: Cathie Plowman*



Our fourth day in Cascajo was to be our last. The cave has now been surveyed to 2590 metres (making it the longest surveyed lava cave in South America). It's not because we've run out of cave that we're stopping. The cave keeps going, and I would sure love to see where to. But there are other things to do, limited time and we've come to a fourth lava fall, with not enough vertical rigging between us to descend this one. There's also the dead cow...

This is the fifth caving expedition to the Galapagos that Aaron has coordinated since 2007. Most of the core team have had several trips here. The 'core' this year is Aaron, Bob Osburn, Rick Haley and Mick Sutton (all from Missouri), Scott Linn (Oregon), Geoff Hoese (Texas), Rick Toomey and Elizabeth Winkler (Kentucky). This year, there were also entomological surveys being done by Steve Taylor and JoAnn Jacoby (Illinois) and photographic work being done by Anne and Peter Bosted (Hawaii), Dave Bunnell (California) and Franz Lindenmayr (Germany).

The team is dedicated to the systematic documentation of the caves in Galapagos, which includes the survey, map production and also gathering photographic, biologic, geologic, and paleontological records. This is no easy task, surveying on Santa Cruz (the island with most services and also 30,000 people) needs time, flexibility,

liaison with local land owners and national park managers re access and permits. There is coordinating taxis and the team as well as the logistics of accommodation and equipment, poor internet access, a different language, different culture and the ever-present heat. Any work on the other islands has added complexities starting with transport, accommodation and added costs.

To date, the team has surveyed over 40 caves, with some of the more notable efforts as follows:

•Cueva Cascajo	2590m
•Cueva Gallardo	2316m
•La Llegada	2066m
•Cueva Royal Palm	1039m
•Cueva Soyla	1037m
•Tuneles de los Piratas	1026m
•Cueva Kubler	929m

Cueva del Cascajo had quite a lot happening besides its length. The cave has multiple entrances, including many 'pukas' or skylight holes. Puka is the Hawaiian word for 'skylight'. Two pukas became very notable to us. The 'owl puka' - there is usually one or both birds of a pair of barn owls, *Tyto alba*, the same species of barn owl we have in Australia. I was thrilled, never having realised that 'our owl' is one of the most widespread birds on Earth. A short distance from the 'owl' was the 'cow puka'. On our first day in the cave, there was dismay that there was a cow with a broken leg. The following day, there was general relief that the cow had died. By day four, not only was the cow abuzz with flies, but its death stench was permeating deep into the cave and it was only going to get stronger. It was time to abandon Cascajo until another time.

Cascajo also had the complexities of up to six layers in places. Geologist Stephan Kempe from Germany spent much time musing and discussing the formation of the



*Fish market, Puerto Ayora
Photo: Cathie Plowman*

different areas of the cave. Stephan also gave a very informative talk on the ways that lava caves are formed during the symposium. (And he is also coordinating a team working on a book on lava caves.)

During the course of the survey week, additional people arrived every day, until by the Sunday evening there were about 80 people gathered for the commencement of the 16th International Symposium on Volcanospeleology. There's a small 'backbone' of people who are the mainstays of the Volcanospeleology Commission of the International Union of Speleology and who are active in the management, conservation and study of volcanic caves around the world. This includes Greg Middleton and Julia James. Some of the group has been involved in lava cave management since the 1960s.

The main organisers of this year's event were Theofilos Toulkeridis or 'Theo' and Aaron Addison. Theo's enthusiasm for the lava caves seems limitless, taking guests from the hotel out caving, and having authored and co-authored two significant books on the Galapagos Island caves. Theo also has a host of former students throughout the Galapagos and we continually met people who had studied under his guidance.

The enthusiasm for this year's symposium meant that there were too many papers for the allotted time, and the program needed to be altered to allow everyone to present their efforts. Aaron Addison coordinated this, making the best of the limited facilities at the venue. There was plenty of time for field trips, including a trip to the very picturesque Isabela Island where the volcanic vent of Triple Volcan was a highlight, with several

members of the group abseiling into the chamber. There were also some pretty impressive meals and we also delighted in seeing giant tortoises, penguins, sea lions and flamingos.

While the logistics of the large group in a remote island environment required patience at times, you would have to say that this was a successful event. Many people saw and were inspired by the lava caves of the Galapagos and the discussion and forums meant that there was increased learning and understanding. Thanks to the organisers and support team as well as the participants who all shared and extended their appreciation of caves.

Following the symposium, Julia James coordinated about 22 people either horse-riding or walking up onto Sierra Negra caldera on Isabela. This is currently the most active volcano in the Galapagos and had a significant eruption in October 2005. Ten of us joined a four day cruise on the boat Tip Top IV, and others found last-minute berths on other boats to see more remote parts of the Galapagos. The Tip Top IV cruise visited a number of islands and had many highlights, including the high cliffs, cactus trees and land iguanas of South Plaza Island, the extensive lava fields of Santiago Island and the volcanic cones of Bartholomew Island, as well as snorkelling with sea lions. While the islands have many conservation issues, they are indeed an ecological inspiration.

I very much enjoyed our Galapagos trip, made especially great by the opportunity to participate in Aaron's survey expedition. We met many good people and enjoyed their friendship and conviviality. Thanks to all.

A FAMILY AFFAIR

AN INTERVIEW with NICK POWE

DIRECTOR of KENTS CAVERN, UNITED KINGDOM

Nick Powe



Nick Powe, Director of Kents Cavern

How did your family get involved with Kents Cavern?

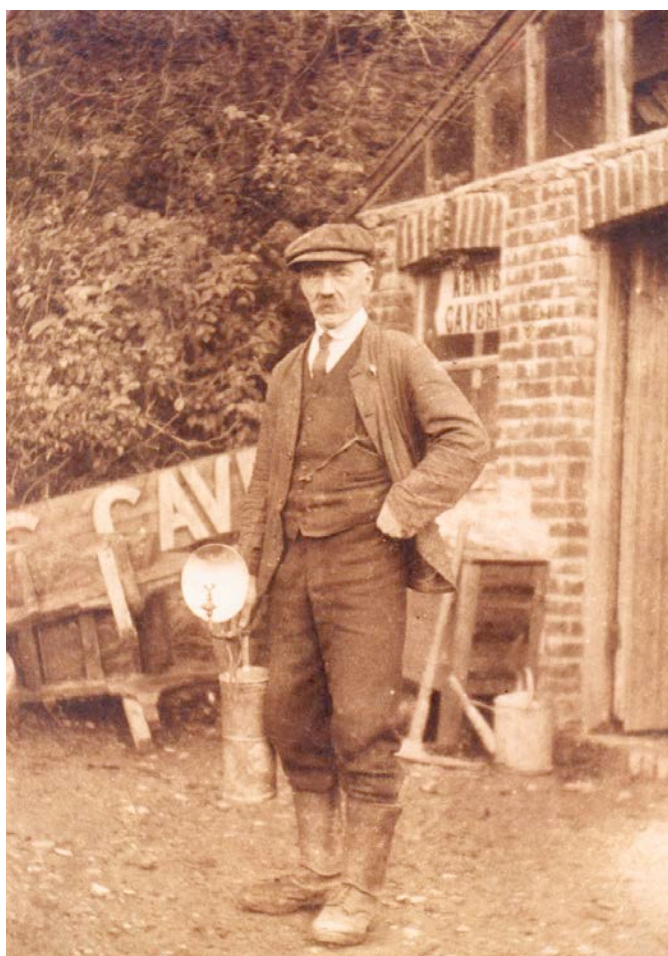
My great grandfather, Francis Powe, originally rented the caves from Lord Haldon – he used them as a workshop to make beach furniture, boats and bathing huts, he also made use of the quarry and woodlands nearby to support his business, supplying building materials locally. A thriving Victorian and Edwardian holiday resort provided him with plenty of business at Ansteys Cove and Meadfoot beach, and in 1903 he was able to buy the caves from Lord Haldon!

Francis already had a strong family connection to the cave. His father in law (my great great grandfather) was foreman to William Pengelly during the Great Excavation of Kents Cavern between 1865 and 1880. At the end of this pioneering work, which established scientific proof for the antiquity of humankind, Francis saw a business opportunity.

Francis and his son (my grandfather), Leslie, transformed the underground caverns from an archaeological site into what we see today, installing paths, electric lighting and visitor facilities. They formed a business partnership which later became Kents Cavern Limited and is the company that manages and protects the cave.

At 86, Leslie (my grandfather) handed over the reins of Kents Cavern to my father, John, who returned from France in 1986, following a successful career in the Cognac business, to take over running of the caves. He arrived at the time when the demise of British seaside resorts was about to begin and he saw visitor numbers plummet from 150,000 in the late 80s to 70,000 by 2000.

Whilst we have seen little change in this figure in the past 14 years, we've moved with the times and we've



Francis Powe

Photo: Supplied by Nick Powe



*Guided cave tour in Kents Cavern circa 1930s
Photo: Supplied by Nick Powe*



*Ticket kiosk pre 1939
Photo: Supplied by Nick Powe*

introduced more activities and events to deliver better returns.

What makes Kents Cavern different?

Kents Cavern is by far Britain's most important cave site, and unusually it is privately owned. We are most frequently asked "when was it discovered?" to which we answer "...it wasn't!". The caves have been used for hundreds and thousands of years for shelter, and remarkably it is the only place in the world where three separate species of humans have used the same site, virtually continuously, for over 500,000 years.

The caves were first explored in 1825 by Father John McEnery (a Roman Catholic priest to the Cary family at Torre Abbey). He unearthed extinct animal bones lying alongside stone tools shaped by ancient humans, and these finds inspired William Pengelly to lead the Great Excavation, which over a 15 year period revealed a treasure trove of prehistoric remains.

Today, Kents Cavern has the highest level of state protection in Britain as a scheduled ancient monument and it also has a high nature conservation value. The cave achieved international recognition in November 2011 when a human jawbone was dated at over 41,000 years old, making it the oldest human fossil in North Western Europe.

I now have to balance our commercial operations within some very strict statutory frameworks, managing the business under the onerous shadow of being accountable to Natural England as a Site of Special Scientific Interest, to English Heritage and to the Secretary of State within the Department for Culture, Media and Sport.

What major challenges is it facing?

Our main challenge is to attract new visitors! In a resort which attracts such a high percentage of repeat visitors (many of whom could virtually be regarded as residents), we need to respond to the "been there, done that" factor. Attracting new visitors and keeping the offer fresh and vibrant so that there is always something new for repeat visitors.

We also need to work hard to eliminate weather dependency, which is more challenging. A significant proportion of our business is unaffected by the weather, so you won't hear me blaming the weather for poor performance, if I did that I might as well give up!

We work hard to achieve sufficient cash surpluses for us to invest in the long term sustainability of the business and to keep the attraction interesting.

Our main market, Cultural Heritage, is non-commercial (education, research and conservation work). Therefore, we undertake this work on the back of our commercial activities. We are competing with a number of large visitor attractions and museums who fulfil these objectives under a "not-for-profit" business model; unlike us, these attractions can access public funds and obtain tax breaks to deliver these benefits for the public benefit, in some cases providing a free visitor experience. It means an interesting and challenging environment but we manage fairly well!

What are its aims for 2014?

We're projecting growth in 2014, both with our existing markets and with the introduction of new innovative products aimed at locals and visitors.

We'll be enhancing our popular underground theatrical productions and art events, we'll also be improving the



*A view of the guided tour route
Photo: Nick Powe*

restaurant and introducing new exhibitions. I'm particularly excited about the forthcoming "Europe past and present" exhibition, which will be funded through our network of top Neanderthal and Ice Age sites in Europe.

In marketing terms, we will continue to expand our online presence both across all social media platforms and e-commerce activity, a route which raises our profile and secures business. With so much of our work online, we have just introduced free WiFi in the visitor centre, which will enable and encourage visitors to engage, share pictures and give feedback instantly.

I believe Kents Cavern and its prehistoric heritage has much more to offer and we have the potential to deliver huge economic benefit to the region – my key aim in 2014 is to make this happen! My first step was to set up the 'Kents Cavern Foundation', a conservation, research and education charity. Through a board of trustees, the foundation is working on a number of European and national funding bids to develop our prehistoric and geological educational offer, facilitate on-going research into the caves and the worldwide Kents Cavern collection.

I truly believe this type of model will enable us to access significant investment to deliver my objectives and make a real difference to the visitor economy of Torbay.

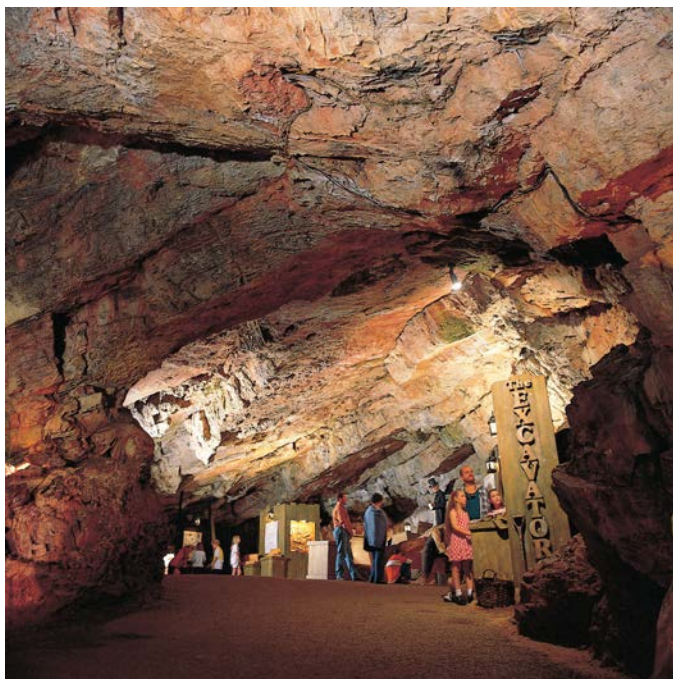
How did you come to join the company?

I took over Kents Cavern in 2000, a little earlier than I was expecting, while it was something I wanted to do, it was also something I had to do. My father, John, was taken ill and died in November 2000, and my brother Tony (co-owner of the business) who lives in New York, was not in a position to run Kents Cavern, so with this backdrop, I stepped in.

It was a "baptism of fire" for me – I knew very little about the Stone Age and geology and even less about the tourism industry of Torbay. Now 14 years later, I have an entirely new and interesting career, and thankfully, a great knowledge of the Stone Age, geology and tourism: brilliantly, not just a local knowledge, but a national and international one.

What was the company like then?

I needed to take a step back and make some real changes – quickly. Visitor numbers were at an all-time



Exhibition area in Kents Cavern

Photo: Nick Powe

low and our overhead structure at an all-time high – the business was facing a crisis and needed to change its ways of working.

We had not reviewed or substantially invested in the business since the 1950s, now was the time to change the experience for our visitors. Customer expectations were changing, our visitors were becoming more discerning and we were facing stronger competition from new attractions across the South West, many with a better offer than ours.

I arrived at the right time to give Kents Cavern an injection of energy and passion, and I've worked hard to make our offer the best it can be.

What is your background?

I'm a French speaking Chartered Accountant – my background is in consolidating European management accounts, preparing long term strategic financial plans, and costing up new petfood product launches across a European supply chain. A great career choice, for so many reasons – not only great foundation for making Kents Cavern as productive as it can be, but also, and most importantly, that's how I met my wife Sheena. Sheena, as well as being a fantastic mother to our 4 children, is also a very competent accountant, and together we make a formidable team!

So, I walked into Kents Cavern on my first day at work without the experience and background you expect anyone running a visitor attraction to have, suffice to say the day to day workload and the salary package at Kents Cavern was entirely different from that of my days at Nestlé.

Regardless, it's the best move I ever made. With Sheena's and my skills, we have been able to cut out many professional service charges and run a complex visitor attraction business with minimal back office support staff. This goes a long way to explaining how we have managed to survive the recent economic recession in a very competitive market.

What has been the company's greatest achievement under your management?

That's easy – the new restaurant and visitor centre in 2004 was the single best thing we decided to commit to. Whilst the caves are our cornerstone (forgive the pun), these developments mean we are now so much more than 'just a cave' or a wet weather attraction for tourists. We're now a hospitality and entertainment venue, offering facilities all year round to locals and visitors alike.

We're still paying back the money we borrowed (in excess of £500,000) for these improvements, and this does impact on our ability to commit to any meaningful step-change investments as I don't want to commit the business to more borrowings.

I am well aware, however, that running a visitor attraction demands constant investment and improvements. I've seen some outstanding investment in new museums and visitor centres across the country recently – so I know I need to find the right business model to secure the necessary game changing investment to improve the presentation of our fantastic prehistoric story.

What major challenges have you faced?

Kents Cavern was dismissed by many institutional bodies as being a purely commercial operation; we were perceived as being uninterested in conservation, research and education. This shocked me considerably and I have worked hard to change this perception of Kents Cavern amongst the academic and scientific community. This has been a demanding task and one of my biggest challenges!

Thankfully, in the last 10 years, I have raised the profile of the caves and we now have regular scientific interest and research taking place in the caves. This provides another interesting aspect for our visitors, delving deeper into the prehistoric story inside the caves.

I am also very proud of the success we've had with 'cultural activities' – our Shakespeare Underground week in November sells out to local secondary schools and the general public and the audience is always asking for more!

How would you describe your management style?

I am creative and dynamic and always encourage a pragmatic approach in all we do.



Early human jaw bone
Photo: Dr Chris Procter



Ursus deningeri Cave Bear skull
Photo: Dr Chris Procter

I'm passionate about delivering excellence in all areas of our operation, particularly in the customer experience, and I encourage this throughout the organisation.

My experience outside of the tourism industry and with international organisations means that I can draw on many examples of best practice, and I am constantly learning and implementing what I learn at Kents Cavern. I encourage my team to do the same and this has seen excellent results and continuous improvements!

How do you keep enthused and keep things fresh?

Every day is different and every day I discover another amazing fact about Kents Cavern, which inspires and enthuses me! Just recently, I read about Sir William Petre, from Torbryan, secretary of state to Henry VIII and Elizabeth I, at the new Torre Abbey exhibition. Amazingly, the oldest inscription in Kents Cavern is dated 1571 and is by William Petre – it must be the same person! That's the sort of stuff that excites me.

For myself and my family, Kents Cavern is a way of life – we live and breathe it 24/7, even a family holiday would not be complete without a visit to a cave or to new visitor attractions searching for new ideas and inspiration!

The most important factor – we cannot relocate the business, so it's not just about me and Kents Cavern, it's about the whole bay, its visitor economy and the importance of the economy of the English Riviera rather than just its profile as a holiday destination.

What awards have you (or the company) won?

We're lucky to have won loads of awards – all of them proudly displayed in our café – and too many to list here.

The most prestigious was when Kents Cavern was awarded best attraction in South West England in 2008, a real achievement for our business! Then we received National success when our hospitality manager, Claire Preece (with a little help from our social media genius and mascot Cavog the Caveman) was awarded

VisitEngland National Tourism Superstar award and I believe we are the only attraction in Torbay that has ever been awarded an Excellence in England Gold award.

Awards are great – they really give us a boost, and it's even better when it's not just about the physical place, but also about the team who works there too – they are what make Kents Cavern what it is today and I am enormously proud of them (and in case Cavog is reading this, I also have to mention his award for Innovation in Marketing at the English Riviera and South Devon Tourism Awards in 2012!)

What other organisations are you involved with?

I'm chair of the board of Trustees of the Torbay Coast and Countryside Trust, and have actively worked with the Trust over the last 3 years to bring about a culture change to use its commercial assets more effectively to enhance the delivery of its charitable objectives.

In 2004, I helped create a Global Geopark in Torbay – and this is a particular favourite! So if you're in Torbay you're in UNESCO's English Riviera Global Geopark – how fantastic is that? Many people think the Geopark in Paignton is the Geopark but it's only part of the Geopark.

The Geopark designation is in place to bring about economic and social benefits to Torbay and, with the limited resources available, I think we're doing a pretty good job putting the English Riviera's natural environment firmly on the world destinations' map with stunning geology and coastal features. Just now, we're working on a bid to host the 2016 Global Geopark conference in Torquay.

I am proud to be so actively involved in two organisations which are so vital to Torbay's international tourism appeal.

Internationally I am a director of the International Show Cave Association and actively involved in Ice Age Europe, a network of top Neanderthal sites in Europe.

KELLY HILLS CAVES, KANGAROO ISLAND, SOUTH AUSTRALIA : AN UPDATE

Katrina Wills¹

Matthew McDowell²

¹ Senior Guide Kelly Hill Caves

Kelly Hill Cave (KHC) contains the longest-known record of Late Quaternary vertebrates on a land-bridge island anywhere in the world! Both the modern and palaeo-entrances take the form of solution pipes (Figure 1). The modern entrance is apparently home to numerous invertebrates and small vertebrates (Figure 2). The main excavation (Pit 1; Figure 1; 3) has yielded at least 72 species, including 44 mammals, 9 of which had not previously been found on Kangaroo Island.

Staff from Kelly Hill Caves have been working collaboratively with Matt to provide a more natural history focused interpretative story on adventure tours at Kelly Hill Caves. It helps to have Matt's fossil site right alongside the adventure tour path.

Pit one is a 2 metre x 2.5 metre area that has recently been expanded to a depth of 3.6 metres and tells a story of the fauna of Kangaroo Island over the past possible 100,000 years. The excavations have been dated using Radiocarbon, Uranium series and Optical Stimulated Luminescence dating techniques and as of March 2014 the excavations record faunal change from 55kyr to 1kyr but since then almost 2 metres of sediment has been excavated from beneath the oldest known date. In the interest of communicating science to the public Matt has provided labels to the wall of the excavation in pit one to show the ages of the excavation where different colours represent different dating techniques. As visitors go past on their adventure tour they are able to stop at the pit and observe these labels, ask questions and hope, get a better understanding of what a fossil site looks like and how it all works. If Matt and his team are there visitors get an added bonus as they are able to ask him questions directly. Within both pits fossil preservation is excellent and many articulated specimens have been recovered. In addition, megafauna have been found in deeper strata. Mammal species recovered from KHC were examined to assess the effects of late Pleistocene climate change and Holocene

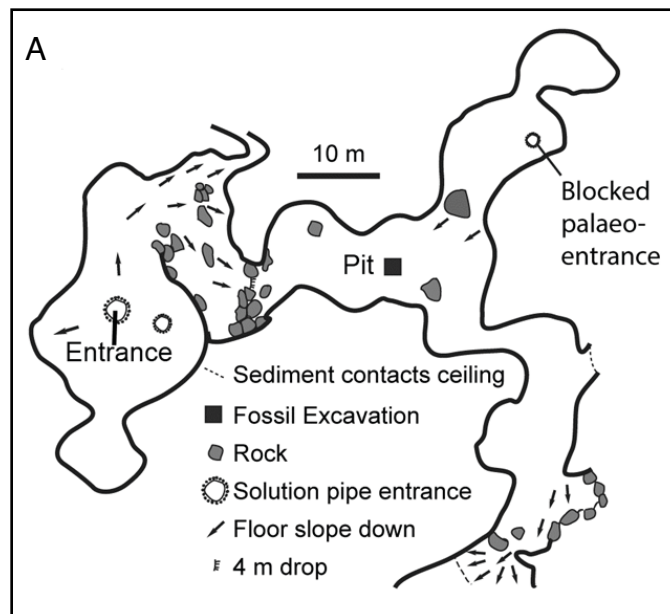


Figure 1

- A.** Part map of Kelly Hill Cave showing the modern and palaeo entrances and the pit location
- B.** Looking into the Modern natural entrance to Kelly Hill Cave
- C.** Looking up into a now-blocked palaeo-entrance to that is thought to be the source of excavated sediments and bones.

Photos: Matt McDowell

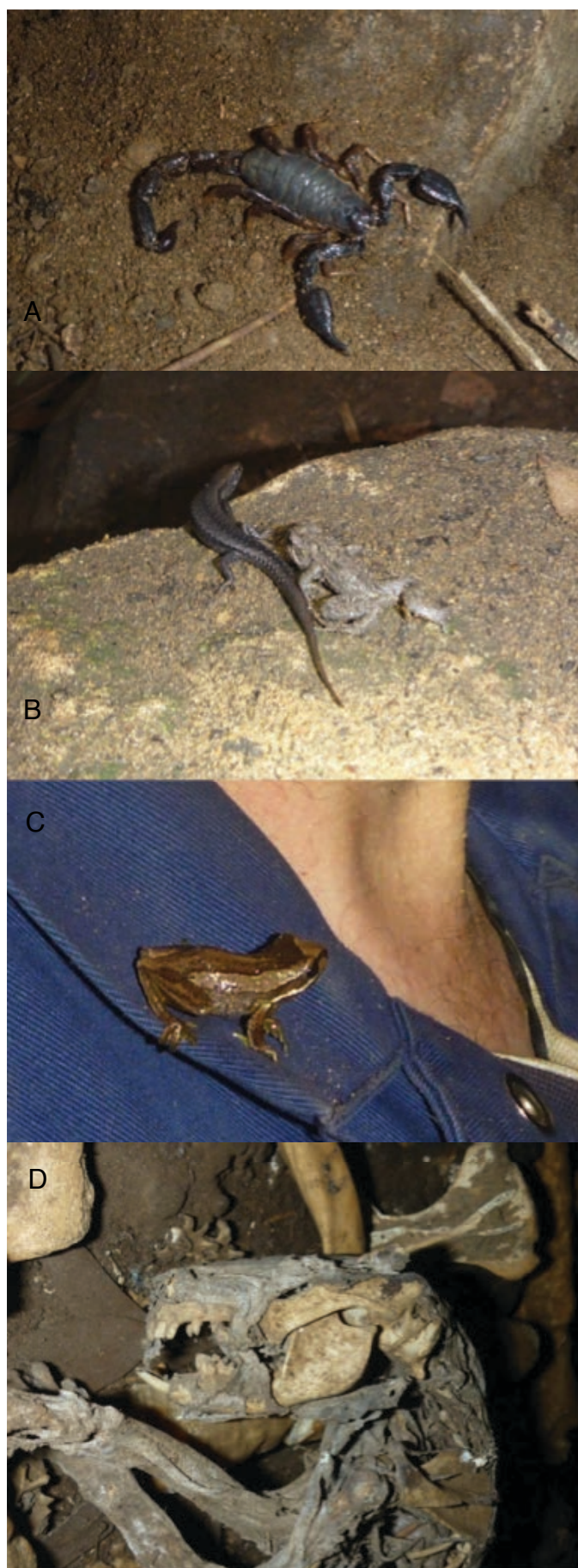


Figure 2 Meet some of the locals that regularly drop in to visit at the natural cave entrance!

- A.** *Scorpion* (*Urodactus* sp. indet.)
B. *Skink* (*Egernia* sp. indet.) and *Common froglet* (*Crinia signifera*)
C. *Brown tree frog* (*Litoria ewingii*)
D. *Common Brushtail Possum mummy* (*Trichosurus vulpecula*)

Photos: C. Burke

isolation due to rising seas. Total species richness, evenness and composition did not vary greatly with time, though relative abundances of ecologically divergent species changed dramatically (McDowell 2013).

Matt and his team have been working on identifying the species from the site and as previously mentioned so far 72 species have been identified with many bird and reptile species still to be identified. Highlights in identification have included the following species of animals:

- Bridled Nailtail Wallaby (most common kangaroo)
- Red kangaroo (identified from DNA only)
- Megafauna
 - ‘*Procoptodon*’ *browneorum* (Extinct short-faced kangaroo)
 - ‘*Procoptodon*’ *gilli* (Extinct short-faced kangaroo)
 - Protemnodon* sp. indet. (Giant wallaby)

Numerous scientists and volunteers have worked collaboratively on the fossil sites and fossils and whenever visiting Kelly Hill Caves are more than happy to answer questions of the Kelly Hill staff or visitors. This allows Kelly Hill Cave staff to gain more knowledge and be able to provide more information to the visitors. The scientists include:

- Dalal Haoucher, James Haile, Daithi Murray, Nicole White, Richard Allcock, Matthew Phillips, Michael Bunce (Ancient DNA)
- Erick Bestland (Palaeosol)
- Linda Ayliffe (Uranium series geochronologist)
- John Hellstrom (Uranium series geochronologist)
- Geraldine Jacobsen (Radiocarbon geochronologist)
- Fiona Bertuch (Radiocarbon geochronologist)
- Lee Arnold (OSL geochronologist)
- Nigel Spooner (OSL geochronologist)
- Sander van der Kaars (Pollen)
- Mark Hutchinson (Reptiles)

Some of the highlights for staff and visitors in the past couple of years have included:



•In 2013, 37 palaeontologists and archaeologists from five different countries visited Kangaroo Island as part of the pre-conference fieldtrip of the 14th Conference on Australasian Vertebrate Evolution, Palaeontology & Systematics (CAVEPS). The fieldtrip, led by Matt and Dr Keryn Walshe (South Australian Museum), visited several palaeontological and archaeological sites on the island, but for many of the visiting scientists, a first-hand view of the scientific research being conducted in KHC was the highlight of the trip. They were also very impressed with both the quality of cave formations and the guiding staff.

•Science Week 2013, over 130 local school children attended Kelly Hill Caves for a day of dry fossil sieving, fossil identification, and observation of wet sieving,

talks on DNA and the fossil history of Kelly Hill Caves.

•March/April 2014 20 Parndana Area School students and over 120 Black Friars College Students visited the fossil site while Matt was on-site. The Parndana students were also able to sieve fossils to help them better understand the fossils.

Ongoing research at KHC will include the pollen record, further dating and identification of bird and reptile species within the site. It is believed that the excavation may record the penultimate glacial period allowing us to compare the effects of the last two global cold periods to see how fauna responds to similar stimuli. Adventure tours with more information from Scientific Research can only get better!

Figure 3

A. McDowell's main Kelly Hill Cave excavation before work began Photo: Sam Arman

B. The excavation September 2013 Photo: M. Barham

C. Shoring installed April 2014 to facilitate excavation to depth of 3.6 m Photo: Matt McDowell

Below. Clockwise from top left. Veronica Pfizner, guide, with 2 visitors: scene in Kelly Hill Cave: adventure tour; the "Fish hook" prior to its accidental breaking. Photos: Steve Bourne





ANNE WOOD RETIRES

Jay Anderson

Recently, Anne Wood retired from her position as the Cave Manager of the Leeuwin Naturaliste National Park. Jay Anderson asked her to reflect on her time in this role.

When did you come into the role?

Just over 15 years ago in 1999. The role was created following on from initiatives flowing from the 1989 Leeuwin-Naturaliste Management Plan. The Cave Manager's position was born from lots of very hard work from CMAC [Cave Management Advisory Committee], the caving fraternity, and Neil Taylor. At that time Neil, a former ACKMA member, was the Parks and Visitor Services Coordinator for the Department of Conservation and Land Management (CALM)

What positions had you worked in prior to that?

After doing a BSc [Zoology] at University of Western Australia (UWA), I worked as a science teacher before moving to Margaret River. We had 3 children and farmed beef and dairy cattle. My passion for caves then led to cave guiding at the local show caves; initially Moondyne, then Lake, Jewel and Mammoth, which are vested with a totally separate organisation to the National Park (which contains the vast majority of karst features). The National Park karst was, at the time, under rapidly growing visitor pressure from a variety of recreational activities.

What are your specific interests in caves?

I came to caving as a caver, so I have that crazy bug. But, speaking of bugs, it was my interest in cave biology that first made me think that these environments are as unique as they are fragile. I have always been interested in all the scientific aspects of karst.

I understand that you undertook Postgraduate studies in Karst Management - How did the karst Management studies assist you in the role?

It helped me to understand different karst landscapes, and the unique environmental and management challenges we face with the aeolian calcrenites of the Leeuwin-Naturaliste, as opposed to say the older, harder limestone of eastern Australia. The course broadened and deepened my understanding of karst processes and also exposed me to areas of management including environmental management and general tourism.

What is the greatest threat to the management of caves at this current time?

In a word, people. First, human impact in karst within a state as huge as WA. Geography has determined that it is primarily after the fact that changes in visitation and/or development come to the attention of managers.

Even here, at home on the Leeuwin-Naturaliste Ridge, we find that firebreaks and other works installed at the expanding urban-National Park interface have impacted the karst, or that a new recreational activity such as geocaching or mountain biking has created an unacceptable impact, only after these activities are established. Statewide and further afield, be it the Nullarbor, Kimberley or in between that particular problem can be magnified.

Second, the glacial pace of bureaucratic awareness of karst issues. Some senior environmental managers made it to the ACKMA conference in Margaret River, which was wonderful, but we are yet to fully see that translate to greater recognition of karst related issues.

The rapidly expanding use of GPS technology is going to become an ever increasing problem for the management of many caves in this region as previously the greatest protection of those caves has been their hidden or secluded location.

How important is environmental management in your role as cave manager?

Probably less important than I'd have liked. It's a very "nuts and bolts" role. Of course, our day to day work schedules include the environmental and human impact monitoring of various caves to help provide information for assessing total access numbers, group sizes and infrastructure requirements. I have carried out water level and quality monitoring at some caves. Unfortunately there is no longer any water at most of the sites previously monitored, and little hope of the situation changing, with ongoing rainfall decreasing in southwest Western Australia. Hydrology of the Leeuwin-Naturaliste karst is one area that definitely requires more study. One of the adventure caves, Golgotha, is the site of research being carried out by Dr Pauline Treble of ANSTO. She is using trace elements and isotopes in calcite to research past climate. I have been assisting her with this work. There are now several years' records of various air and drip water parameters.

If you could change one thing in your time as cave manager what would it be?

I would have liked to have left a more engaged department behind. One that gives greater recognition to karst and would perhaps be contemplating the establishment of a State Karst Office.

What are some memorable moments as an ACKMA member?

Breaking my leg at Mulu! Being made a Fellow. Seriously what can you say? Every ACKMA conference. Gaining inspiration from seeing the trials of different managers in so many different karst regions and the

solutions that come from initiative and managerial courage. For example, my first conference was at Naracorte seeing the amazing work of Brian Clark. The positive way the Kiwi's interface private and public management and making so many great and supportive relationships. It is just a privilege sometimes to be at the same conference with some ACKMA members.

How did membership of ACKMA benefit your role?

I probably covered a bit of that above. How can the benefit of cross referencing management concepts in an ACKMA conference be over stated. I really don't believe that it can. The opportunity for feedback and advice from fellow ACKMA members, and the proceedings of previous conferences were an enormous help in all aspects of my work.

What is your most memorable moment as a cave and karst manager?

Personally, seeing so much karst. Professionally, exhausting as it was, the Margaret River ACKMA conference. We drew a great team together and it was great to host fellow ACKMA members in and around the Leeuwin-Naturaliste Ridge.

What do you think have been the major achievements in WA Cave management in the past 20 years?

I do regard that as an historical question, and it needs to be put in that context. From about 1899 until 1911 under Winthrop Hackett, who was the first Chancellor of UWA, Le Souef who established the Perth Zoo and others, WA had a golden age of cave management under the WA Caves Board. Unfortunately, from WW1 until the launch of the Leeuwin-Naturaliste Management Plan in 1989, there was pretty much a sad vacuum in cave management, filled only in part by the ASF affiliated WA caving groups, and the local tourist bureau in four specific show caves. If anything, I would like to think that with the adoption of the Permit System, Cave Classification and Cave Leadership Accreditation we have, 100 years later "righted the ship" and reintroduced more proactive management in the Leeuwin-Naturaliste. In other parts of the state the first things that come to mind are an improvement at Yanchep, where truly terrible infrastructure and lighting have been replaced and an advisory committee formed, and Cape Range which is now a World Heritage area. The challenge now is to maintain the course in the Leeuwin-Naturaliste and expand into new, perhaps rougher waters in other karst areas. Various regimes are in place throughout WA and I would like to see a statewide karst unit such as exists in NSW. It would be very sad if the ball was dropped and we had to wait again another 100 years for some sort of professionalism in karst management in WA.

How has the existence of CMAC (Cave Management Advisory Committee) aided you as Cave Manager?

What can I say in gratitude? Enormously. And in that regard I must specifically mention Rauleigh Webb, Norm

Poulter, Neil Taylor and others. I will be leaving so many out, Jay Anderson, Peter Wood and all the others who sat on CMAC or the Cave Leadership Panel. All our management concepts mentioned above, as well as the intellectual "grunt" and resource knowledge has been developed through the caving groups, CMAC and ACKMA. Having representatives of all user groups has also been useful. For example, the presence of commercial operator representatives has enabled them to hear and understand some of the environmental concerns, and pass this back to their customers.

The department, and the public, owes a debt of thanks that can never really be repaid. One thing I would like to think we have all learned through the whole process is the value of exhaustive and honest consultation.

Many people have negative views about Permit Systems and restricted access to caves – what were some of the benefits to caves in the Leeuwin Naturaliste karst as a direct result of the implementation of the permit System and a specific leadership scheme for cave leaders?

There is no doubt that some user groups have been vocal in their opposition, and continue to be. However the state of accelerating degradation with increased adventure and recreational activity by the early 1990s was unsustainable. Not just in the sense of speleothem, fauna habitat, archeological destruction etc, but even structurally in some caves. The aeolian calcreon was disintegrating to points of potential collapse. Under the central rockpile in Giants Cave between the surveys of 1979 and 1993 some 53 cubic meters of soil and other material had been removed, purely by human traffic. Impacts can now be monitored and managed appropriately.

Management of visitor numbers via the permit system has resulted in a decrease in visitor impacts. I would like to say that we now have a system that allows sustainable access and we have the management concepts in place to maintain a level of sustainability in the face of ever changing and increasing visitor pressure. However even with reduced numbers unacceptable impacts have been known to occur and infrastructure, where appropriate, can and has been installed.

Another benefit, particularly of the accreditation course is that we now have a group of recreational outdoor leaders who are more aware of the specific environment in which they operate and the impacts they have. Hopefully that environmental awareness is in turn passed on to their different client bases, including groups of school children.

Any closing thoughts?

Only that the whole experience of fulfilling this role has been as much a privilege as a challenge. And I hope that the conservation benefits of sound cave management will stay with the Department of Parks and Wildlife well into the future.

THE BLANCHE CAVE BODY

Steve Bourne and Liz Reed

Note: Some of the references to the body are inappropriate in today's society but are reproduced as stated in the original texts to maintain historical accuracy.

One enduring mystery at Naracoorte Caves in South Australia is the Aboriginal body that was found in Blanche Cave soon after the cave's discovery by European settlers in 1845. Many myths surround the body, how it came to be in the cave and what happened to it. Some locals still claim to have seen the body, but this is not possible given it is 150 years since it was stolen.

Hamilton-Smith (2003) provides a well-researched account, beginning when a travelling showman named Thomas Craig stole the body on 10 September 1861, and that it was taken to London. We were recently sent an intriguing newspaper article by Adam Lindsay Gordon expert Alan Childs, who operates Adam Lindsay Gordon's cottage near Port MacDonnell in lower South Australia. Gordon is a well known Australian poet who knew Julian Tenison Woods well and shared books and poetry with him (see ACKMA journal 90 "Old Cave, New Stories: Blanche Cave, Naracoorte", for more of Woods contribution at Naracoorte Caves). The article recounts an interview with Charles Mullalay, a close associate of Gordon and was published 5 January 1914. It reads:

Once Gordon got an awful shock. It was just before the wreck. I fancy I can see him now. We were sleeping in a hut on Mitchell's place. I was lying on my bed when Gordon suddenly said 'What's that under your bed Mac? What's that under your bed? Get up Mac, get up, it's looking at me.' I hopped out of bed and looked underneath and there was a petrified blackfellow. I pulled him out, and it was the same I had seen in the caves a day or two before. I kicked up a row about it, and Mrs Mitchell said the girls had told her that a man had asked if he could leave a parcel for the night, and they told him he could leave it in the hut. Next morning, Sergeant Jones, of Mount Gambier, took the blackfellow and the man who brought him there in charge.*

*The wreck refers to the SS Admella, which ran aground on Carpenters Reef in the early hours of August 6 1859. Rescuers struggled for a week to reach people stranded on the wreck with 89 lives lost over 8 days and the many failed rescue attempts making the wreck one of the worst maritime disasters in Australia's history.

An intriguing possibility that a small piece of the puzzle had been filled in, however the dates don't quite line up. Court documents relating to the case when Thomas Craig stole the body suggest he took it 10 September 1861 and that it was seized by Police Sergeant Young at Mount Gambier 12 September 1861.

Was Charles Mullalay mistaken with the dates and the incident occurred after the Admella wreck? Or is this another one of the many myths surrounding this case?

The second part of this story relates to what happened to the body after it was taken to England. In all likelihood, the body simply fell apart from being handled and travelled around. Hamilton-Smith (2003) states the last reliable account appears to have been in the Ipswich Express 3 April 1866:

SALE OF A PETRIFIED AUSTRALIAN ABORIGINE _ On Tuesday, Mr J.C. Stevens, of King Street, Covent Garden, submitted to public competition one of the aborigines of Australia in a petrified or mummy state. This remarkable specimen of a native Australian was found in a cave on Mosquito Plains, South Australia. It is the only specimen of the kind known in the scientific world. It is believed to be of great antiquity and is perfect in every detail. The biddings commenced at 10 guineas, and the lot ultimately realised 18 guineas.

During research for the article "Old Cave, New Stories: Blanche Cave, Naracoorte", we came across a brochure advertising "The Murdered Australian Savage" (reproduced on the following page). Written on the front of the brochure is;

Admission to see the above 1d. The above is called The Petrified Man and is exhibiting at 230 Westminster Bridge Road, (Jones Stables) Friday Jan'y 8th 1869 (first day).

This is nearly three years after the last account and would appear to show the body was placed on show again after the sale reported in the Ipswich Express. The chances of the body being preserved seem slim, but this find adds a few more years to the story.

Reference

Hamilton-Smith, E. (2003) People and caves: changing perspectives. In Finlayson, B. & Hamilton-Smith, E. (Eds) "Beneath the surface: a natural history of Australian Caves". (UNSW Press, Sydney).



THE MURDERED AUSTRALIAN SAVAGE.

*Admission to see the above 1^d
The above is called The Petrified Man, and
is Exhibiting at 230, Westminster Bridge Road
(Stones) Saturday Jan. 8th 1869 (first day)*

The following particulars of this remarkable specimen of the antiquity of man, are copied from the Australian papers, viz.—The “Sydney Empire,” of January 28th, 1862; the “Adelaide Register,” November 27, 1862; and the “Adelaide Advertiser” of the 25th

“Some months ago it became known in South Australia that very extensive lime and stone caverns existed at Mcquito Plains, in the south eastern districts of that colony.

The Caverns are said to be several miles in length, and up to the present time, have not been fully explored.

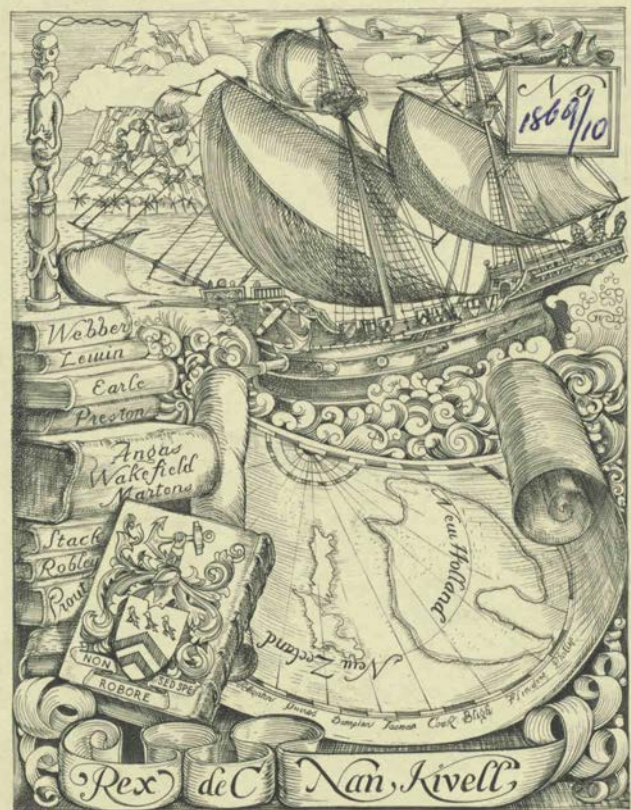
On exploring one of these caverns, some 8000 yards in the interior, was discovered the body of this black man, (Homo Nigra.)

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Mr. Collins determined to add this rare species of man to his collection, and having wrapped him in a travelling rug, he emerged from the cavern and then started, and travelled over 100 miles, until he reached Mount Gambia, almost in a state of starvation and exhaustion. However, nothing daunted, he again started with his singular burden, and after undergoing numerous privations, reached Adelaide in safety.

This is certainly the most extraordinary instance on record, for how long the body lay in the cave it is impossible to say, it may be as antiquated as the pyramids or as youthful as Stonehenge.”

*FRM / NK 3019
Re: Man: Petrif. Collection
In black case*



FRM / NK 3019



Top. "Fingers" of calcite, North Glory Cave, Yarrangobilly Caves (image approximately life size)

Bottom. 2014 Cave Guides Workshop. Standing L-R Steve Bourne, Monica Yeung, Geoff Deer, Danny Mitton, Barrie Richard, Anita Eddison, Ian Eddison, Phil McGuinn, Sasa Kennedy, Lawrie Dunn, Scott Melton, Dave Smith (sitting on ledge), Andy Spate, George Bradford, Ian Raymond, Nicola Beckett, April McArthur, Ted Matthews, Larissa Lemke, Margot Bulger

Sitting back row L-R Regina Roach, Anne Musser, Anne Augusteyn, Judy Christiansen,

Sitting middle row L-R John Brush, Leanne Hodge, Heather Johnson, Lex Whadcoat

Sitting front row L-R Bernie Sims, Jen Emerson

Photos: Steve Bourne

