

Journal of the

Australasian Cave and Karst Management Association



The ACKMA Journal

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EDITORIAL

Steve Bourne

This journal reaches you after September due to a combination of factors. Pleasingly, I had a good amount of material to work with for the journal, but a major meltdown of my computer has meant preparing it on a 12 inch laptop, somewhat different from a 24 inch screen! And in a new version of the software to learn as well. Although I use multiple backups, not one contained all of the contents of the computer. My partner Liz salvaged the ACKMA journal material before the computer ceased to function at all. It is currently keeping a local IT person busy copying the 51,000 image photo library. I estimate about 40,000 are backed up to various drives, but again, not in a single place. Guess who has learnt his lesson with computers and backup storage. Just to add a further complication, my back also suffered a meltdown and I spent a week in hospital on a veritable cocktail of medication. The side effects of these are disappearing and I seem to be able to concentrate and actually remember what I am doing!

There is some movement in management in Australian caves. Deborah Carden has moved on from Naracoorte and Tantanoola Caves with Nick McIntyre appointed as an interim manager. I have been advised the full time ongoing position will be advertised before the end of the year. This journal contains an article on Deborah's time at Naracoorte.

I also understand the position of Director of Jenolan Caves has been filled with Jodie Anderson, ex-Wellington Caves commencing work there in early November. I wish Jodie all the best in this role but am somewhat that she won't complete the exciting projects at Wellington Caves. But the vacancy has created an opportunity for someone else!

ACKMA members John Brush and Marjorie Coggan visited Naracoorte and provided some staff training in cave cleaning techniques. Nick McIntyre has provided a short report on this visit. I managed to catch up with John and Marjorie while they were in Naracoorte and enjoyed a meal with them.

The major event in caves and karst since the June journal was of course the 2017 Speleological Congress held at Penrith in July. Many ACKMA members attended; unfortunately I was not one of them due to work commitments. My partner Liz Reed attended as a keynote speaker and made a couple of nice book purchases. One of these was *Caves: Exploring New Zealand's subterranean wilderness*, by Marcus Thomas and Neil



Silverwood. ACKMA's newest Life Member Dave Smith had previously put me in contact with Neil, who in turn kindly provided me with a good number of his images for use in the journal. One graces the front cover of this issue. The photography in this book is simply world-class, and the stories of exploration quite compelling. I will review it more fully for a future journal. This journal contains a number of reports of the congress itself and excursions held pre and post congress.

Liz Reed and I hosted a group of 8 at Naracoorte, commencing the trip with visits to the South Australian Museum and Adelaide University laboratories where Liz works. We spend two days at Naracoorte with a dinner in Schultz's Cave, where we took ACKMA members at the 2015 Naracoorte Conference. Treasury Wines who manage the vineyard, had held a dinner for their executives the previous evening so the cave was set up with white table clothes, LED candles and a fine selection of wines. The caterer was engaged for the second night and we enjoyed a simply outstanding evening. We visited sinkholes and volcanics around Mount Gambier and then travelled the Great Ocean Road to reach the Melbourne Airport by 6pm to catch flights. A few nervous moments through peak hour Melbourne traffic but we reached the airport at the desired hour.

Andy Spate hosted an "arm chair" tour of the karst of eastern Australia, while John Brush and other members of the Canberra Speleological Society hosted a group recreational caving at Yarrangobilly Caves. Janine McKinnon took a pre conference vertical caving trip in Southern Tasmania, which unfortunately resulted in a fall and rescue. Appropriate safety measures were in place and the rescue was achieved efficiently, with the injured caver in hospital within 13 hours of the fall. It is possible (probable?) that all caving areas are not as well organised as this situation was managed. Tony Culberg has prepared a short survey, which will appear in the next journal. I hope everyone can provide responses so we can assess just how well prepared we are. The two rescues in Tasmania this year have highlighted the need for some additional equipment and crowd funding for this is promoted inside the back cover, adjacent to Janine's rescue report.

Many ACKMA members have been to the Shades of Death Cave, at Buchan, Victoria. Nicholas White reports that Rimstone Co-operative has purchased the cave, with plans for both recreational caving and public access.

Capricorn Caves seems to go from strength to strength. Ann Augusteyn's report on the fossil day held there with the support of Scoot Hocknull and Rochelle Lawrence shows just what be achieved with good partnerships between research and presentation. People love fossils and Capricorn has developed some great products in its ever expanding offering. Just as this journal was being completed, Ann emailed me to say they had won a Queensland Tourism Industry Council Award for Innovation, as joint runners-up with Australian Age of Dinosaurs (AOD).

Scott and Rochelle published an article in the AOD magazine. Dave Elliott, the driver behind the AOD and publisher of the magazine has been kind enough to allow me to reproduce the article in the ACKMA journal. His request was that I retain the formatting from their journal, hence the article is different to the regular ACKMA format.

PRESIDENT'S REPORT

Dale Calnin



Pilgrim Dale on the Camino de Santiago in Spain

As I sit and ponder what to write for my report for the journal, I am amazed how quickly we have arrived to the joy of Spring weather, farewelling the departure of the bleak winter weather conditions that have hounded us over the past few months.

But I shouldn't complain since I managed to dodge a large portion of the Australian winter season.

A fortnight after our fabulous AGM at Te Anau in New Zealand I flew to Paris, then jumped on a train to St Jean de Port in France, where the following day commenced an 800 kilometre walk across Spain, known as the Camino de Santiago.

People have walked the Camino de Santiago for over 1000 years and this time-honoured tradition is how most people experience the Camino.

The concept of the pilgrimage on foot was largely a necessity for the poorer Pilgrims in medieval times as few could afford to go by horseback. For the modern day pilgrim, walking offers the chance to slow down the hectic pace of modern life and revert to a gentler more reflective rhythm. Known as the Way of St James this 800-kilometre-long walk passes through breathtaking landscapes of Spain and France and takes you over the Pyrenees mountain range. For me it was a blend of "pleasure and pain", all at once. Walking approximately 30-35 kilometres each day in temperatures that reached the high 30 degrees by mid-afternoon.

Anyway, long story short, I survived. A tough way to lose weight, despite a high calorie diet of beer bread and pizza but a wonderful experience that I would highly recommend to anyone looking for a challenge and to escape the demands of life for a few weeks.

Moving onto more important things.

Following an invitation from the new Commercial Manager for East Gippsland Tanya Taylor, I recently visited my old stamping ground of 40 years, the Buchan Caves Reserve. It was fantastic to catch up with my old colleagues and those new to the Buchan operation to share knowledge in the Cave and Karst Management of Buchan and the wider Murrindal areas. With the inevitable prospect of current staff either moving on or transitioning to retirement over the coming years we are very keen to have in place well documented protection and maintenance programs for any new staff arrivals in the Buchan Caves operation.

On behalf of ACKMA, I congratulate the Organising Committee of the 17th International Congress of Speleology recently held in Sydney. Unfortunately, I was unable to attend but from all reports it was a huge success and thoroughly enjoyed by all those who attended.

Also to Andy Spate and others, on their successful submission regarding the nomination of the Cliefden Caves to the NSW State Heritage Register. The listing was published on the 30 August 2017 in Government Gazette No. 96. Cliefden Caves Area was listed due to its heritage significance to the people of the state of New South Wales. Details including the statement of significance can be viewed on the State Heritage Register via the Heritage Division, Office of Environment and Heritage website at www.heritage.nsw.gov.au

A big shout out and thank you to our Treasurer Tony Culberg who has worked feverishly since his appointment at the AGM in Te Anau, sorting out ACKMA financials, bank accounts, authorisations and other governance requirements. To finalise this good work in our business and administrative systems will make ACKMA stronger and enable us to focus more on the planning and management of Cave and Karst.

As time ticks closer to the 22nd ACKMA Conference in Margaret River Region of Western Australia, it is encouraging to learn that some of our members have already booked their flights and made the necessary planning arrangements to attend. I look forward to seeing program details on what promises to be another fantastic conference well attended by our ACKMA members.

Until then, keep up the good work you all do in cave and karst management.

		Lev 6, 10 Valentia Ave Parramatta NSW 2150 Locked Bag 5020 Parramatta NSW 2124 DX 8225 PARRAMATTA	Telephone: 61 2 9873 8500 Facsimile: 61 2 9873 8599 heritage@environment.nsw.gov.au www.environment.nsw.gov.au
DOC no: 17046395 File no: SF1542976			
Mr Dale Calnin President Australasian Cave and Karst Management Association dale.calnin@parks.vic.gov.au			
Dear Mr Calnin			
Listing on the State Heritage Register: Cliefden Caves Area — Natural and Cultural Landscape Notice pursuant to 37(1)(a) of the Heritage Act 1977 (NSW)			
I advise that the Minister for Heritage has, on the recommendation of the Heritage Council of NSW, directed the listing of the above-mentioned heritage item on the State Heritage Register. The listing, a copy of which is attached, was published on 30 August 2017 in Government Gazette No. 96.			
The item was listed due to its heritage significance to the people of the state of New South Wales. The details of the item, including the statement of significance, can be viewed on the SHR via the Heritage Division, Office of Environment & Heritage (OEH) website at www.heritage.nsw.gov.au by selecting Search the State Heritage Register and following the instructions.			
Should you have any enquiries regarding this matter, please contact Christina Kanelaki Lowe, heritage officer at the Heritage Division, OEH on (02) 9873 8558 or christina.kanelaki@environment.nsw.gov.au .			
Yours sincerely			
			
05/09/2017 MS KATRINA STANKOWSKI Acting Manager, Listings Heritage Division Office of Environment & Heritage			
As delegate of the Heritage Council of NSW			
end.			

17th INTERNATIONAL CONGRESS of SPELEOLOGY

SPELEO 2017: CAVES in an ANCIENT LAND

Cathie Plowman

Four years ago, the Australian Speleological Federation's bid to host the 17th International Congress of Speleology (ICS) was approved in the historic Czech city of Brno. The venue for the Australian congress was to be Sydney and specifically Panthers Leagues Club at Penrith. As the International Union of Speleology has pre-determined months for its congresses, it would be held in July ; mid-winter.

The ASF asked Denis Marsh from Orange Speleological Society to convene the congress and preparations for Speleo 2017 began in earnest in May 2014. David Butler and I came on board then, David as treasurer and myself as field excursions coordinator. Initially a team of five, the organising committee grew to include a core of 11 people, plus another 4-5 who were regularly 'on the fringes'.

From the beginning the congress was the usual story: too much work for a small team, over-worked people constantly taking on extra jobs and, always, the worries about not having the funds to meet our expenses. The latter causing much consternation about a registration fee that would cover costs, but which wasn't prohibitive. But somehow it all came together and the 17th ICS, held 23–29 July 2017, was a wonderful success.



Major congress sponsor, thanks to the ever-generous support from David Head and Weidmuller.

Photo: Janice March

How do you define a successful congress? There were close to 500 registrants, all presentations were well-attended, most field-excursions were booked to capacity, the feedback from participants was very positive and the financial books are balancing nicely. But more than any of that, when you see people you know haven't met before, and you know they work in similar areas, coming together to talk and share meals and ideas, then the congress is working.

There were many 'fronts' to the congress organisation and, as readers will understand, it's impossible to mention them all. But here's a few pieces of the massive jigsaw that was the 17th ICS:

Behind the scenes

Walking to an evening abseil practice at the Cataract Gorge in Launceston in early 2015, Janice March (from Northern Caverneers) mused over what she might do to support the congress. I mentioned that we needed a lot more funds and within weeks Janice had immersed herself in seeking sponsorships and subsequently wrote hundreds of letters and emails trying to gain support from the business world. Sponsorships came in many varied ways, from monetary support, advertisements in congress publications and donated products which were auctioned or used for competition prizes.

Justin Wilkinson (from Sydney Speleological Society) led the team that put Speleo Olympics together where teams competed for the best time through a series of 'cave-like' challenges: not breaking 'straws' or treading on 'oolites', and pushing a squeeze and that was filled with hundreds of used PET bottles. Lots of fun and team-work.

The plenary lecture theatre at the Brno congress was a sea of colour with the flags of the countries that make up the IUS. We didn't have access to flags or funds to buy them so congress committee member and primary school teacher Ann-Marie Meredith (from Western Australian Speleological Group) engaged her year 2 students to draw and colour the flags from the 56-member countries of the IUS, as part of a learning plan.

Like it or not, money does matter. ACKMA stalwart and treasurer Tony Culberg provided professional assistance to congress treasurer David Butler on the complexities of GST, BAS and much more.

Congress presentations

Having missed the Welcome to Country, given by Aunty Edna Watson, and the official opening, I made sure that I got myself away from the registration desk to hear the keynote addresses. I'm so glad I did. After all the hard-yards to pull the congress together, these were three excellent presentations and I left feeling up-lifted about where the coming week was heading.



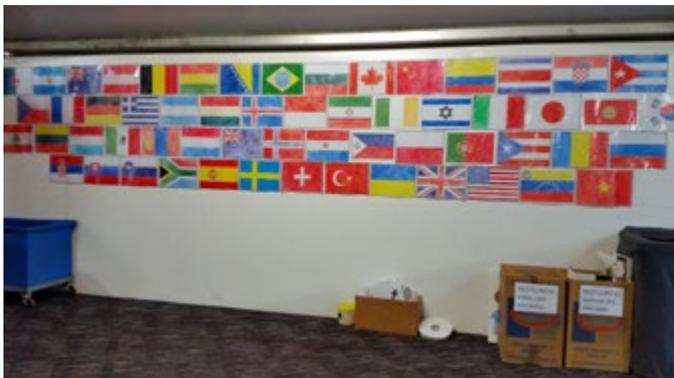
Associate Professor John Webb delivers his keynote address.

Photo: Janice March

Professor John Webb, La Trobe University, Victoria. John spoke to the congress theme of Caves in an Ancient Land and how the long and diverse geological and climatic history of Australia has impacted karst development in this country. This presentation was a wonderful introduction to Australia's karst and the scientific program of the congress.

Dr Elizabeth Reed, University of Adelaide and the South Australian Museum. Liz spoke on the contribution of cave sites to the understanding of Quaternary Australian megafauna records. Liz was particularly enthusiastic about the benefits of working closely with cavers to achieve research in this area. Greg Middleton described Liz's talk as 'one of the best at any cave meeting or conference I've attended in recent years'.

Ken Smith, Cave Divers Association of Australia and Cave Exploration Group of South Australia. Ken gave a highly-visual presentation on the beauty and challenges of cave diving in several sites in Australia and New Zealand. I was in awe of the beauty and enthralled by the skill shown in Ken's presentation.



Flags of International Union of Speleology member countries, thanks to the efforts of Year 2 students, Collier Primary School and their teacher Ann-Marie Meredith from WASG.

Photo: Janice March

There were five concurrent streams of presentations over four days. Coordinating these to streams, allocating rooms, and juggling the time-table and session chairs was the work of Jill Rowling and Susan White. Hiccups to contend with included people not having arrived in time for when their presentation was due and rescheduling. These issues were generally well-resolved.

The presentations showed the breadth of speleological efforts and research that people are engaged in around the world, often with very limited resources. The papers were organised as follows:

- Archaeology and Palaeontology in Caves
- Australian Caves and Karst
- Biospeleology, Evolution, Ecology and Problems
- Cave Management and Education
- Cave Climate and Palaeoclimate Records
- Cave Mineralogy
- Exploration and Cave Techniques
- Extra-terrestrial Caves
- Geomicrobiology of Cave and Karst Environments
- History of Speleology and Karst Research
- Karst and Caves in Carbonate Rocks, Salt and Gypsum
- Karst and Cave Survey, Mapping and Data Processing



Inside the exhibition marquee.

Photo: Janice March

- Karst, Pseudokarst and Caves in Other Rocks
- Lava and Volcanic Caves
- Medicine, Philosophy, Social Aspects
- Modelling in Karst and Cave Environments
- Speleological Research and Activities in Artificial Caves
- Speleogenesis
- Speleothem Research
- Sustainable Development of karst
- Other Topics

Like many in the organising team, 'things to do' limited when I could get to presentations, but some stand-out ones that I attended included:

- Val Hildreth-Werker and Jim Werker (USA): Cave Conservation and Restoration workshops with cave guides in Brazil.

- Leda Zogbi (Brazil): Lights in the Darkness, a cave photographic project in Brazil.
- Barbel Vogel (Germany): Cave Animal of the Year, as Barbel is my inspiration to get a similar program off the ground in Australia.
- Steve Peerman (USA): Caver Quest, showing new options for the use of digital technology in cave interpretation.
- Douglas Soroka (USA): Recovery of cave fauna after cleaning heavily-impacted show cave.
- Armstrong Osborne (Australia): the geo-heritage of Cliefden Caves.

The crowd-funded scholarships

It was a pleasure to get to know the recipients of the crowd-funded scholarships and attend their presentations. Several ACKMA members contributed to the crowd-funding effort.

Roxanne Tsang (Papua New Guinea): Roxanne presented on a research project in Nakanai karst area in East New Britain Province, PNG where she has been interviewing local people on their perspectives of the caves and karst.

Isma Dwi Kurniawan (Indonesia): Isma presented on the impacts of human activities in show caves in Pacitan, East Java Province, Indonesia.

Exhibition Marquee

The 1800 square-metre marquee might have looked and felt like an over-sized lifeless space but for the planning efforts of Janice March and Justin Wilkinson. When set-up, it included a 100-seat lecture room that was used for presentations, the cartography salon with more than 20 high-standard cave maps displayed, the arts salon area with cave-inspired textile arts, the photographic salon where the photographic entries were viewed on a screen. There was the poster area with over 50 posters relating to many varied aspects of cave research. There were book stalls and cave-related merchandise, lounge areas for resting and catching-up with people. The Sixteen Legs Tasmanian Cave Spider exhibition was accompanied by staff from Bookend Trust.

A 'book launch' evening saw four cave books launched and an 'open night' coinciding with the adjacent Penrith Night Markets saw local people come and viewing the displays and activities. Hopefully they learnt a little about speleology. And it was certainly warmer inside than out!



Post-congress excursion at Tuglow Caves, NSW, led by Andrew Baker. Photo: Janice March



Roxanne Tsang, from Papua New Guinea at Jenolan Caves. Photo: Janice March

Field Excursions

Coordinating the field excursions was my main congress job. Initially, 27 pre-and post-congress field excursions were offered. Locations and caving pursuits offered were widespread and varied; from Chillagoe to Margaret River, New Zealand to the Nullarbor. Show caves, cave diving, vertical trips and arts-in-caves were amongst the wide range of experiences offered. The excursions were reviewed mid-January 2017, those with inadequate bookings were removed from the program leaving 17 excursions. I cannot express enough thanks to the people who put the effort into organising the excursions. Whether they proceeded or not, it took a lot of time and effort just getting an excursion to the point where it could be advertised.

The mid-congress excursion day included options for the Australian Museum, a Blue Mountains bush walk, a Blue Mountains dry canyon trip and a day at Jenolan Caves. Coordinating the Jenolan Caves excursion was my biggest single challenge of the ICS, and during the process I worked with three different cave managers. I wanted a memorable day with a variety of cave experiences, and no 'people jams'. Our eventual

day was four buses, 188 people and a complex schedule including science talks and tours, show cave tours, cello concerts, a photography 'open cave' and dining room lunch. And it all worked. I was so grateful, especially that everyone had boarded the departure buses by 6.45 a.m. The cello concerts in the Cathedral Cave were given by from Blue Mountains musician Georg Mertens. You can listen to one of these concerts via YouTube at: <https://www.youtube.com/watch?v=urugWCMDBmw>

Social Program

Evening activities included a reception hosted by the team from Lyon, France who are hosting the 18th ICS.

Bookend Trust showed the completed film Sixteen Legs which combines art, science, humour and more to present the Tasmanian cave spider.

An Australiana Night featured a supper of sausage rolls and bread and vegemite (the supper at the French night was far more interesting) and raised money for the Karst Conservation Fund via the ubiquitous auction.

David Butler won the 'over 55s' prusik competition, coming second-place overall, just 13 seconds behind the overall winner (Greg Thomas from WASG). David won a rope-cleaning machine for his exhausting efforts.

International Union of Speleology

Two general assembly meetings of the International Union of Speleology were held in conjunction with the congress. Delegates elected a new president, George Veni from the USA to take the reins from retiring Kyung Sik Woo. A second woman was elected to the Bureau (i.e. the executive), this is Barbel Vogel from Germany, and Tim Moulds was also elected to the Bureau. Well done Tim and best wishes with your efforts.

In Summary

- Seven days, including associated International Union of Speleology meetings.
- 23 July to 29 July 2017.
- Held at Panthers Leagues Club, Penrith, Western Sydney.
- 461 Registrants, plus approximately 20 day-registrants
- Registrants from 46 countries.
- Five concurrent streams of papers over four days.
- Over 50 posters.
- 20 maps in cartography salon.
- Photographic salon featuring 350 photos from 24 photographers (including some seriously impressive photos and places).
- 27 pre-and post-congress excursions offered.
- 17 pre-and post-congress excursions run.
- 198 people attended pre-and post-congress excursions.
- 4 mid-week excursions attended by 249 registrants.
- 4 partners' program day trips attended by 20 people.
- Congress dinner attended by 345 people.



*Cleaning caving equipment to guard against White Nose Syndrome.
Photo: Janice March*

Feedback from some of the registrants

It was a fantastic congress - in the top 2 or 3 that I have attended anywhere in the world, very well done and great thanks. Andy Eavis, UK

I had wonderful time in Australia and I don't forget you and your Society. All cavers are one family. Yong Gun Choi, Korea

Know that the congress you organized was thoroughly enjoyed by everyone I spoke with. I repeatedly heard about how friendly and attentive the organizers were. In fact, I heard and saw that repeated about the Australian people in general. It was a privilege to work with you and attend your ICS. George Veni, USA

We would like to thank you and the whole organizing team for all the work you did to make this congress successful and for us unforgettable. Ernest and Taraneh, Austria.

We (in Indonesia) certainly need a lot of networks amongst speleologists from around the world. We have much to do and to establish linkages is one of the urgent things. I hope this link (with Australia) goes on and on. Hilary Reinhart, Indonesia.



*The team for the Brazil Cave Photographic Project with Philippe Crochet (France) proudly displaying the project book.
Photo: Janice March*

ANDY AND THE UIS CONGRESS

Andy Spate



The "Taste of Australia" group.

Photo: A Bystander

I had intended to have nothing to do with the UIS/IUS Congress in Australia but I found myself enmeshed in the Congress – firstly reviewing some presentations and then involvement in an excursion and then chairing sessions.

I was volunteered into being the boffin on an excursion titled "A taste of Australia" led by Grace Matts with the professional bus driver Larry Zanker piloting a coaster bus with Rob Stenson as support with a 4WD and trailer hosting the morning and afternoon teas and our lunches. Our American friend were most impressed by the concept of morning and afternoon teas – they seem not to be part of the American psyche.

Our brief was to look at some landscapes in southeastern NSW over a week – with an emphasis on karst. A "Taste of Oz" in a week is ridiculous – but we tried.

Twenty-three of us embarked on Larry's bus – meticulously counted by Larry on the many times the bus was boarded. Grace and I had planned an "armchair trip" – just as well as we had several guests who were not marathon runners. Most were Americans with two from Germany.

First off we visited Royal National Park and had an introduction to Australia's remarkable flora by an NPWS expert. On to Symbio Wildlife park to allow our visitors to see kangaroos, koalas, echidnas etc. Then to look over the Illawarra Escarpment to discuss the southern Sydney Basin landscapes and the remarkable Sea Cliff Bridge and the Austinmer Coal Measures. The next day up to the Mount Kiera Lookout and then off the Sydney Basin Rocks to The Lachlan Fold Belt – limestone at last!

A few hours at Bungonia visiting the various lookouts and explaining to our guests the significance of cubic turds – the wombats! Then to Yass for the overnight stop.

Up early the next day to Wee Jasper. First a trip up the valley to talk about the remarkable Punchbowl Hill with its stacked vadose and phreatic levels. Then down to the Cooradigbee Homestead where Ian and Helen Cathles gave us morning tea

and an exposition about the remarkable Devonian fossils followed by a brief visit to the fossil outcrops.

Onto Careys Cave for lunch followed by Geoff Kell's unique cave visit experience - very much appreciated by our guests. Then to Goulburn for the night.

Now to Wombeyan – inspection of all the caves by most with a reverse Fig Tree Cave inspection by the less energetic. Much photographing of kangaroos! In the evening, we had a great talk by the local wildlife carers on their laudable efforts to rehabilitate injured native fauna.

The next morning off to Abercrombie Caves via an interesting, and ultimately not very successful stop at a tiny village post office to send international postcards. We did the Abercrombie Arch backwards including various off-shoots. Still on the Lachlan Fold Belt rocks we set off to Bathurst to visit the remarkable Somerville Mineral and Fossil Museum. Our guide there was the redoubtable Ernie Holland – former ACKMA President – the first time we had met for very many years.

The next day we set off for the Sydney Basin again via Hassans Walls. Govetts Leap and so on. Filled the day well and the next we got all adventurous and went on the Scenic Railway and Skyway . Later we visited some Aboriginal engraving sites lower down the Blue Mountains on our way to Penrith – the UIS Congress site.

So, for the next few days I frequented the Congress. Much was interesting but the necessary concurrent sessions were frustrating. One criticism that I would make that it was a pity that presentations on the Nullarbor were spread across concurrent sessions so that one could not hear all the Nullarbor stuff. The organisers did a wonderful job in getting the Congress up and running. ACKMA should have had a stall running to promote our organisation. We did pick up a new member – a very enthusiastic young lady from Japan who may well be at Margaret River next year – and a few renewals from our American friends.



Geoff Kell does his "candle-magic" in Careys Cave.

Photo: Gordon Smith

17TH INTERNATIONAL CONGRESS of SPELEOLOGY YARRANGOBILLY PRE-CONGRESS EXCURSION

John Brush

Canberra Speleological Society Inc

An international caving congress in southern Australia in the middle of winter (to fit in with the northern hemisphere summer holiday season) is one thing, but to even think about a field trip to Yarrangobilly and Cooleman Plain in the Snowy Mountains of New South Wales seems a little crazy.

Nevertheless, the Canberra Speleological Society Inc (CSS) and Sydney-based Metropolitan Speleological Society Inc (MSS) somehow agreed to organise a field excursion during the week leading up to the congress, which was held at Penrith, NSW in July 2017.

The excursion attracted 11 participants from 5 countries (USA, Switzerland, UK, Netherlands and Tasmania). The participants were looked after by a team of 16 locals from CSS and MSS, who did all the driving, catering and cave guiding. Several ACKMA members, including Marjorie Coggan, Dirk Stoffels, Regina Roach and John Brush, were involved in running the trip, and in addition, David Wools-Cobb was one of the participants.



*Participants and local guides at Caves House, Yarrangobilly
Photo: Dirk Stoffels*

The field excursion was based in the warmth and comfort of Caves House Yarrangobilly, which was greatly appreciated by everyone as it rained and snowed the whole week, apart from the last day, when the sun made a welcome appearance after an overnight snowfall. As our group took over the whole building, we had the run of the place with its 3 kitchens, 4 lounges and a function room. The function room was temporarily converted into a gear storage and drying area by stringing clothes lines everywhere and placing tarpaulins on the floor to catch any drips and mud balls.

To cater for the varying interests of participants, and also to keep all the locals gainfully employed, we organised a comprehensive trip program that offered 3 or 4 options at any given time, including trips into moderately challenging wild caves, visits to easy show caves or former show caves as well as non-caving and local touring options that included trudging through deep snow around the old gold-mining sites of historic Kiandra.

On the first day in the area, all participants were introduced to the Yarrangobilly area through special guided trips into several



*Mark Tringham (UK) about to climb into the upper level
of Coppermine Cave
Photo: Sabrina Honegger*



*John Brush and Joxz Burgers (Netherlands) in Coppermine Cave
Photo: Sabrina Honegger*



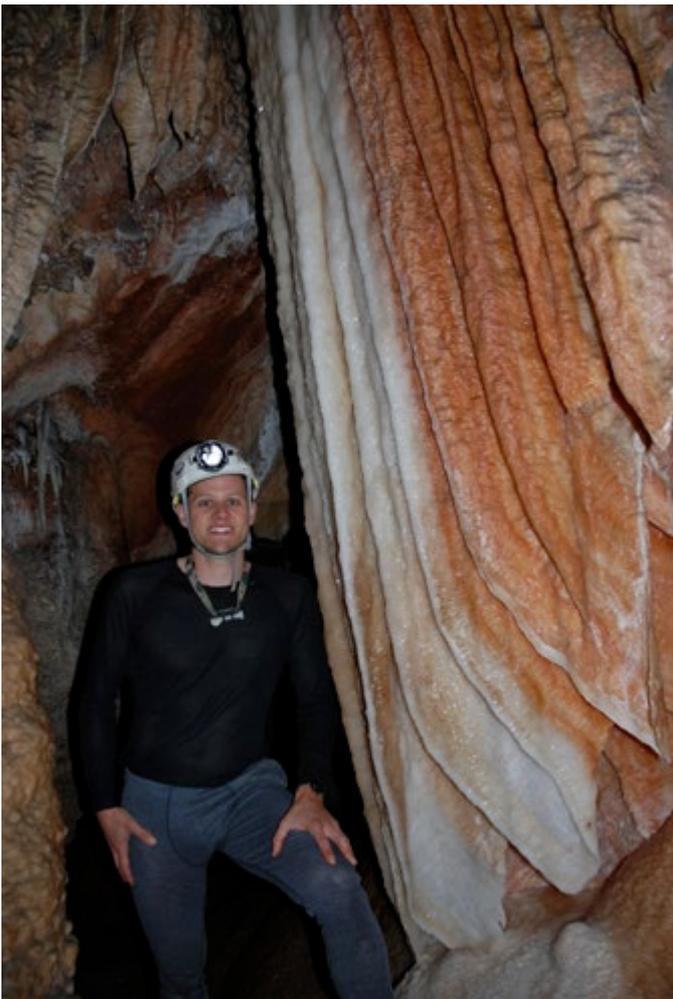
*Sabrina Honegger and Andreas Christen in the crystal streamway area of Eagles Nest Cave
Photo: Cathi Humphrey-Hood*



*Jozs Burgers (Netherlands) negotiating snow-covered logs at the stream entrance of Barber Cave, Cooleman Plain
Photo: Sabrina Honneger*

of the show caves. However, most participants were more interested in seeing some of the wild caves in the area and the most popular caves proved to be East Deep Creek Cave, Restoration Cave, Coppermine Cave and the Eagles Nest

System. On our final day in the area, we were granted permission to access the Cooleman Plain area which gave participants an opportunity to see some of the major caves of the area, such as Barber and Murray Caves, as well as experience the serenity of the Cooleman Plains area under a thin cover of snow. It also gave them some insights into the difficult issue of trying to manage the feral horse problems of the area. During the day we must have seen at least 100 horses on the high plains of the area.



*Andreas Christen (Switzerland) in the beautiful upper level area of East Deep Creek Cave
Photo: Sabrina Honneger*

Everyone appeared to have a good time and seemed to be impressed with the (relatively small, by world standards,) caves at Yarrangobilly. Organising the trip – and trying to herd a group of 27 cavers – was a lot of work, but looking back, it was really enjoyable. The trip would not have been possible without the huge effort put in by all the locals, especially the catering team led by Marjorie Coggan and the caving and driving teams lead by Beth Little. I also acknowledge the assistance provided by staff of the NSW National Parks and Wildlife Service, in particular George Bradford for the Caves House and show caves arrangements; Glenn Stroud for allowing access to Cooleman and participating on our trip to the area; and to Simon Allender for providing special access to, and showing participants around, the restored courthouse building at Kiandra.



*Participants and Ranger Glenn Stroud at the entrance to Murray Cave, Cooleman Plain
Photo: John Brush*

NARACOORTE AND TANTANOOLA CAVES: CHANGING of the GUARD

Deborah Craven-Carden

After eight and a half years as Manager, Naracoorte and Tantanoola Deborah Craven-Carden handed over the keys to Acting Manager Nick McIntyre on Saturday 26 August '17.

Deborah arrived at Naracoorte in January 2009 to backfill the position while previous manager Steve Bourne trialled a new role based out of the Mt Gambier for the then Department of Environment and Heritage. After the trial period finished Steve was offered the role of Deputy Regional Manager and Deborah was offered a five-year contract as Caves Manager. Contract periods were extended until Deborah decided the time had come to get involved in other things on her 'Bucket List'.

At the handover ceremony Deborah noted the very special aspects of each Cave Park - Tantanoola Cave with its ultra-exquisite cave decorations and the listing of Naracoorte as South Australia's only World Heritage Area - the southern sister of 1994 serial-listed Australian Fossil Mammal Sites - Riversleigh and Naracoorte (AFMS).

She outlined some of the many projects that had been done during her time, starting with a review of the Naracoorte Caves education package in 2009, followed by a visitor strategy, a brand strategy and interpretative concept and then an interpretation plan. These were the basis for the two-years of Master Planning that laid the framework for capital asset upgrades. The key aspect that emerged from the planning was that science is the 'brand' for Naracoorte.

The discovery of the fossil deposits in 1969 led to years of palaeontological research through Flinders University. In 2011 a Federal Government 'Caring for our Country' grant enabled three years of sustained research and in 2017 a four year Australian Research Council granted to University of Adelaide brings 'Science Alive' back to the AFMS Naracoorte.

In 2013 Naracoorte was targeted by the Federal Govt World Heritage Division to receive 'Caring for our Country' funding whereby the first Executive Officer was appointed with a key task of servicing the WHA's first community governance group. The first appointee set-up the strong framework from which the second EO bases his role.

Deborah noted the superb efforts of the Friends of Caves volunteer group and thanked them for their dedication to the Park's gardens and grounds. Tantanoola Cave has a regular volunteer whose efforts are transforming the site.

In 2015 special Federal tourism development funding was granted and a series of infrastructure upgrade works began. In a couple of months the 'Roof-top' Loop Walk will be completed. The target audience is wheelchair users and others who cannot, for various reasons, get into caves. On a recent visit Andy Spate and Deborah agreed this walk will be great for old cavers. Yes it will, as along with other visitors old cavers will be able to stand on the observation platforms along the 'Roof-top' and peer down through cave roof holes into caves below, reminiscing about the good old days when....

Paths in the Stick-Tomato (Wet) Cave and Cathedral Cave area have been redirected, old cave fences replaced, feature fences will have name blades identifying for visitors the cave they are looking at. The Wonambi Visitor Centre and the Bat

Observation Centre have each had a face-lift in the smart new black and white colour scheme. By the end of September new wayfinding signs will be installed about the main Visitor Precinct and interpretation panels along the Roof-top walk. The Wonambi Visitor Centre foyer will be upgraded by Christmas and the Victoria Fossil Cave Precinct upgrade will be finished by March/April '18.

The relighting of all the show caves with LED lights and the installation of more stainless steel handrails in Stick-Tomato, Alexandra, Victoria and Tantanoola Cave were important upgrades.

These interesting projects ran in tandem to the usual operational aspects - staff management, Work Health and Safety, business operations and financial controls, cave maintenance, cave monitoring etc. and so on.

Naracoorte and Tantanoola are two of the eight Iconic Tourism Sites under the umbrella of the Adelaide based Economic and Sustainable Development Division. At Naracoorte there are three commercial enterprises - the guided and self-guided cave tours and the 'Learn by Activity' education program, the Caves Café and the Wirreanda bunkhouse accommodation and campground. Tantanoola has the one show cave.

Both Parks have loop walks - Tantanoola's goes around the 'Up and Down Cliffs' from where visitors can get 360 degree views. Naracoorte's new 'Roof-top' Walk adds to the suite comprising the World Heritage Walk in the main Visitor Precinct that links to the five kilometre World Heritage Hike. The hike goes past Victoria Fossil Cave to Stoney Point, a really attractive part of the Park.

Having South Australia's only breeding site for the endangered *Miniopterus Southern Bentwinged* bats at Naracoorte Caves and being able to view them in their breeding chambers via remotely operated infra-red cameras is a very special aspect of the site.

Deborah says the Caves Manager job has been a culmination of a great 30 year career in conservation and protection that started on New Zealand's South Island West Coast. The NZ experience - administration and finance, endangered species, heritage, helping set up and implement the Te Wahipounamu South-West World Heritage Area and the management of Papparoa National Park (caves) was able to be wrapped into one package for managing Naracoorte and Tantanoola. They may be comparatively small but they are complex and ever interesting.

A review of the Master Plan will be done shortly to reassess the original concepts and update costings. From this a Business Case will be completed, the intent being that it will pave the path for the next phase of the World Heritage Area's upgrades.

Acting Manager Nick McIntyre's usual job is Public Lands Manager, based in Mt Gambier in charge of National Parks and Reserves in the South East of SA. He will remain as Acting Manager until a new long-term manager is appointed. Deborah advises that when the role is advertised it will be broadcast via the ACKMA email.

EARLY SPRING CLEAN for NARACOORTE CAVES, SOUTH AUSTRALIA

Nick McIntyre

Spring cleaning got off to an early start at the World Heritage listed Naracoorte Caves during August with staff being involved in a series of workshops and practical demonstrations on cave cleaning and restoration. The workshops were conducted by John Brush and Marjorie Coggan from the Australasian Cave and Karst Management Association (ACKMA).

John and Marjorie were invited to the Naracoorte Caves to share their cave knowledge with local guide staff who as a result will now initiate regular cave maintenance programs. The caves at Naracoorte are unique and have an international reputation being a major visitor drawcard locally and in the region however, over time the impacts from providing visitation services and public access also needed to be managed.

John and Marjorie have worked for many years on cave cleaning and restoration projects in both show caves and wild caves in southeastern New South Wales and the Australian Capital Territory.

Comparing his experiences John noted that *“The New Zealand limestones are very porous and easily damaged and are more akin to the soft and friable nature of the Naracoorte limestones. Working in caves in these soft and geologically-young rocks is a relatively new experience for us’. It is very different from the 300-400 million year old limestones and marbles of southern New South Wales.*

Every cave, every cleaning project is different and each project proposal has to be carefully assessed prior to starting. It was good to share experiences and techniques with the Naracoorte

guides. They know the caves intimately and are quick to notice any changes in ‘their’ caves”.

These changes include damage to the internal surface of the cave by more recent graffiti along with unwanted growth of green algae and mosses near some of the installed cave lights. Whilst the growth of lampenflora such as mosses, green algae and other plants occurs naturally around cave entrances where light and moisture combine to create the right conditions, it is unwanted growth internally around cave lights and requires treatment.

Naracoorte staff were enthused by the results of cleaning trials using methods suited to the caves such as low dosages of hydrogen peroxide for lampenflora applied for up to twenty minutes at a time. As the new Naracoorte Caves Site Manager I was impressed with the benefits of using hydrogen peroxide to control lampenflora as it became quite obvious with a background and treatment site established showing a notable change. More recent graffiti was also removed with ‘scrubbing and dubbing’ techniques using steel wool or sponging to provide a more natural finish to cave walls.

While the in cave LED lighting highlights the internal features of the caves and provides a unique visitation experience, alterations to the positioning and intensity of the lights will also be considered as a way of controlling unwanted lampenflora establishment.



*John Brush demonstrating a graffiti removal technique to Danielle Smith, Naracoorte Caves Guide.
Photo: Nick McIntyre*

M-3 SHADES of DEATH CAVE, MURRINDAL, VICTORIA

Nicholas White

Many members will know this cave possibly as Murrindal Moon Cave. It was developed by cavers from the late 1960's. Dennis Rebeci (ACKMA treasurer) and his wife Carol operated it as a Show Cave in the 1990s to early 2000s Graham Shaw and Geoff Rebeci were amongst the original developers and decided managing the cave had become too difficult for them. They offered the property to Rimstone Co-operative Ltd which is a Community Advancement Society.

After careful consideration the Co-operative has now purchased the cave for which it needs funds to pay off a loan provided by ASF. This will be a valuable addition to the existing Homeleigh members guesthouse at Buchan and the Scrubby Creek Cave property also at Buchan.

At this stage Rimstone is initially preparing a Strategy Plan for the cave. This plan will embrace a new survey and assessment of needs such as zoning areas, cleaning in places and track marking. Some of the infrastructure in the cave needs repair to provide safe access. We intend providing recreational access for accredited caving groups as well as Open Days for the public once we have appropriate insurance cover.

This whole project takes the Co-operative into challenging new areas with many opportunities for interacting with the public.

There is a targeted fundraising campaign to support this purchase. Details of how to donate directly or via the ASF Karst Conservation Fund (tax deductible) are at <http://www.rimstone.org.au/>



Looking down entrance chamber of cave with Geoff Rebeci (left) and Graham Shaw on landing
Photo: Daryl Carr

BRINGING LOST WORLDS to LIFE at CAPRICORN CAVES, ROCKHAMPTON

Ann Augusteyn

“Capricorn Caves has the longest palaeontological record of faunal change for a single tropical cave system in Australia, with over 500,000 years of prehistory from ancient rainforest fauna through arid adapted fauna to modern times. The development of these new fossil tours will allow visitors to discover the direct evidence of our past, understand how our modern environment came to be and then contemplate a future for us all”

Dr Scott Hocknull, Senior Curator Geosciences, Queensland Museum

Our challenge at Capricorn Caves is twofold: the preservation of these significant fossil deposits discovered by Dr Scott Hocknull (Queensland Museum) and Rochelle Lawrence (Capricorn Cave palaeontologist) and how to tell this story to our guests. That message is about a key period of global environmental and climatic change, faunal and floral extinctions and the evolution of the modern Australian environment.

On the day, all fossil tours were fully booked within 30 minutes of being posted on Facebook! Families enjoyed clay modelling, colouring in, bone sorting and primitive instinct skills including fire lighting with sticks. The media attended in full force and Facebook was flooded with an abundance of posts. The local Caves Bush Fire Brigade volunteered essential help with parking and raised \$2000 with their sausage sizzle. The event was deemed a huge success and the fossil tours have been fully booked throughout the winter holiday period.

But this doesn't just happen: months of planning, guide training and innovative marketing preceded the launch.



*Scott and Rochelle identify fossils on Open Day
Photo: Ann Augusteyn*

On Saturday June 3rd we launched our signature palaeotourism experience: *“Bringing Lost Worlds to Life”*. Three thousand people flocked to Capricorn Caves to assist our team to sift through fossil rich sediment sampled by Queensland Museum from the Mt Etna mine fossil salvage, now part of the Mt. Etna Caves National Park. Dr Scott Hocknull and Rochelle Lawrence and our team of trained palaeo guides were on hand to identify these discoveries. One tooth discovered by a ten year old girl was new to science, a fossil species belonging to a mammal 300,000 years old. Several hundred unique specimens were discovered and all formed part of the Queensland Museum research collection. These fossils represent similar material only recently discovered at Capricorn Caves, providing a direct link between the fossil heritage at Mt. Etna with the fossils found in our cave system. A great collaboration that had been discussed and planned for many years between science and education has been realised. We are excited about what discoveries will be made and what the future will hold for our ongoing work with the Queensland Museum.



*Elise Augusteyn examines a bone
Photo: Ann Augusteyn*

"Learning the information for the new fossil tour absolutely blew my mind. It is amazing to be able to look at the evidence of what has happened in the past , to discover why everything looks like it does today. I have a passion for learning and interpreting this information to the public. Working as a Palaeo guide never gets repetitive. Every day I am learning more and more, it is so exciting to be part of something so unique."

Christian Bom Palaeo Guide Capricorn Caves June 2017



*L to R. Scott Hocknull, Rochelle Lawrence, Amanda Hinton, Jordan Wheeler, Kath Herring, Jay Bond
Sitting Chenoa Wells, Alex Lydell
Photo: Ann Augusteyn*



*Christian Bom introducing marine fossils
Photo: Ann Augusteyn*

Fossil assets

First and foremost we were able to contract the services of palaeontologist Rochelle Lawrence, thanks to a Commonwealth Industry Skills Fund grant. Rochelle co-discovered the new fossil deposits at Capricorn Caves and has developed a scientifically accurate fossil asset package that included fossil fact sheets, guide manuals, training assets, videos, palaeoart and helped coordinate 2D laser print outs of life sized megafauna.

Digital technology

Delegates at the ACKMA AGM 2016 at Capricorn Caves will recall Scott's presentation on digital technologies and the preliminary 3D scans of Capricorn Caves. In collaboration with Jon Baginski (Geovirtua), Scott and Rochelle have captured most of our cave system in high resolution 3-D. Application of technology generates more accurate research and allows

visualisation of huge amounts of data from sites, specimens and objects. Capturing this data digitally allows these experiences to be transportable, accessible and interactive while being delivered to a wider audience. We are looking into innovative ways to bring this 3-D data to the general public as part of our public programs, especially considering those visitors with mobility or sensory difficulties. Using these processes Rochelle and Scott have produced 3-D printed models of the skull of *Thylacoleo hilli* (Pygmy Marsupial Lion) and our very own *Conilurus capricornensis* the Capricorn rabbit rat.

Guest experience

Guides and palaeontologists collaborated to develop a fossil tour route through the caves with appropriate maximum numbers, minimal impact on other cave tours and the environment. Alternate routes were developed to accommodate seasonal bat roosts. Three tours are available daily at set times.



*Paleo Guide Jay Bond assists young fossicker
Photo: Ann Augusteyn*



*Scott Hocknull shows Capricorn Cave guides a fossil bone
Photo: Ann Augusteyn*



*John and Joan Mylroi, Greg Middleton and David Foran check out the fossil collection
Photo: Ann Augusteyn*

Being able to see the fossils, in context of where they come from is a key hook for staff and visitor. One of the greatest challenges for our tour is that many of the fossils we have are very small. Rochelle developed a resource kit that allows people to get up close and personal to these original fossils whilst keeping them safe and secure. 3-D technology has also been used to assist in this area.

Guide training

Guide training to deliver the best possible experience was critical. Rochelle and Scott hosted a four day training workshop for the guides. This included product knowledge but also delivery of the fossil interpretation. Rochelle has developed training videos as a permanent resource for our guides. We also organised on site workshops for all staff based on Tourism Events Queensland (TEQ) story telling experience project. As an extension we organised some professional development for eight guides to attend the Savannah Guide School and Australian Age of Dinosaur Museums at Winton.

Outcomes

Capricorn Cave paleo guides

The new fossil tour has transformed the guides enthusiasm and they have embraced their role as custodians of this unique cave environment and its heritage. Since the tours have commenced several guides have discovered new deposits, recorded them and alerted Rochelle and Scott to their existence. This will further the scientific understanding of the fossil sites and every site fills a gap in our knowledge.

Digital marketing

We successfully applied for a Commonwealth Industry Skills Fund grant which enabled us to engage a digital marketing strategist for a 3 day workshop with our staff. Together they developed dynamic strategies to engage the consumer and

expand our digital presence. To support this we reinvented our guests' purchase journey with on line booking options. Thanks also go to Waitomo and Jenolan for sharing their experiences with online booking.

Education

The new fossil tour is already a winner with school groups, even before it has been formally inserted into the school program. Grade three teacher, Sandra Brady commented that "I couldn't believe that you could improve the school program but the new fossil tour is absolutely perfect; it engaged the children in meaningful discovery activities with real fossils and real bones. Well done Capricorn Caves."

Community Science

National Science week was celebrated in Mackay (300 kms north of Capricorn Caves, Rockhampton) with a Megafauna Community Day hosted by Queensland Museum and BHP. We were invited to participate and showcase our fossil deposits to the 3000 attendees. Jordan Wheeler commented that it was a wonderful opportunity to "educate Central Queensland locals about the amazing and unique fauna that has existed in our own backyards and particularly how they can continue to learn about this at Capricorn Caves."

Rochelle Lawrence reported that "Some of the top comments were the enjoyment of the interactive activities especially with young kids and those with physical and learning disabilities. It was a real experience with real fossils and they were meeting real scientists and guides."

The National Science Week Community Day was a demonstration of how government, tourism and science can come together to celebrate and communicate science to regions usually absent from this opportunity. It demonstrated that our contribution to understanding our fossil heritage from our caves has broader implications within the region, creating linkages between towns and communities that might not have traditionally been formed.

Partnerships

We have made a commitment to provide opportunities to continue to assist Queensland Museum to sift and sort the fossil rich sediments from Mt Etna, salvaged by QM during the mining era, and now part of a scientific reserve within Mt. Etna NP. We also committed to understanding our own prehistoric story through analysis of the deposits within Capricorn Caves. This provides an opportunity for great citizen science linkages, where the public is directly engaged with and contributing to the scientific research - perhaps even discovering a new species. This will provide a wonderful resource for future citizen science days, events and ongoing educational programs, including the development of stage 2 - a working preparation facility.

For 130 years people have walked through Capricorn Caves. But it is only in the last decade thanks to palaeontologists Scott Hocknull and Rochelle Lawrence and local caver Noel Sands that the secrets of the caves are being discovered and their story is transforming Capricorn Caves into a true living museum that is engaging people from all walks of life.



*Life size laser print out of Protomnodon
Photo: Ann Augusteyn*

RESCUE of CAVER from IB-11 MIDNIGHT HOLE, IDA BAY, SOUTHERN TASMANIA 13 JULY 2017

Janine McKinnon

This is a very brief abstract of a full report in the Southern Tasmanian Caverneers (STC) club newsletter - Speleo Spiel.

Ola and Isabelle were visitors from Europe, here to attend the UIS congress being held in Sydney in late July. They had come to Tasmania for some pre-congress vertical caving with Janine and Ric Tunney. This was the first of four planned trips.

Both Isabelle and Ola are experienced cavers. Ola is Swedish and Isabelle is a French woman living in Switzerland for 20 years. They both do vertical caving and came with all the necessary personal equipment.

Janine had planned to start really easily, with a simple Midnight Hole (MH) pull through trip. MH has 6 pitches, and almost no horizontal development. Pitches are: 19 m, 11 m, 39 m, 8 m, 34 m, 49 m. A short crawl leads to a horizontal system with walk in (or out, in this case) entrance.

Ric observed Ola and Isabelle attach to the rope correctly on the first pitch, and descend. Isabelle was the fourth in the line of six. All went smoothly until the fourth pitch; the 8 m pitch. This is where Isabelle fell. She was in great pain and it seemed almost certain that she had broken her right femur. Ola and Ric arrived at the accident site at 12:57, about 10 minutes after the accident. It was decided that 3 cavers would stay with Isabelle and two go for help. Ola would accompany Ric out to raise the alarm.

Alan Jackson was the designated emergency callout for the trip and was aware of caving location and party. Alan received a text message from Ric Tunney at 13:30 which read:

"Broken femur pitch 4 Start call out Reply Calling police"

Alan mobilised other cavers and liaised with Tasmanian Police (TasPol) search and rescue (SAR) to facilitate the rescue. Helicopters were used to transport to the nearest suitable landing site, 20 minutes fast walk from the cave.

Summary

- Isabelle fell approximately 5 m of the 8 m pitch 4 of Midnight Hole.
- She fell at 12:47pm on 13 July 2017.
- Her medical training (a nurse), experience as a cave rescuer, and calm manner enabled the assessment of her injuries and initial treatment to be accomplished effectively and efficiently.
- Isabelle had sustained a simple fracture of the right femur. This was the only major injury. Bruising was a secondary injury.
- Ric and Ola proceeded down through Midnight Hole and out Mystery Creek Cave to seek rescue.
- The first paramedics, and relief cavers, both arrived at the accident site within minutes of each other, and after 4½ hours from the time of the fall. This was at 17:30.
- Paramedics had experience as SRT cavers with STC.
- TasPol SAR have experience in SRT caving.
- Isabelle was lifted back up through Midnight Hole to the surface. She reached the surface at approximately 00:30.
- Both SRT caving and TasPol SAR lifting rescue techniques were used.
- TasPol SAR SKED was used as the stretcher in-cave.

- Isabelle experienced severe pain due to the discomfort of the SKED
- Isabelle was lifted into the helicopter at approximately 02:00 on 14 July 2017. This was 13 hours after her fall.

Postscript

Isabelle arrived safely at the Royal Hobart Hospital approximately 20 minutes after leaving the rescue site. She was operated on at approximately 10:00am on 14 July 2017. The operation was successful with a pin placed inside her right femur, with no complications. She remained in hospital until Monday afternoon, 17 July. She was discharged to the care of Janine McKinnon and Ric Tunney, with whom she stayed and recuperated until Friday afternoon 21 July, when she flew to Sydney. She continues to recuperate well and even managed to attend two days at the UIS congress.

The full report can be found here:

<https://southerntasmaniancaverneers.wordpress.com/spiel/>

Notes

A good working relationship with Police SAR is vital to efficient cave rescue. Current, active, vertical caver STC members of many years standing have an excellent relationship with the current members of TasPol SAR team.

This was the second rescue from this cave this year. The previous one was a visiting caver from NSW, who was uninjured but unable to get himself out of the cave.



SOUTHERN TASMANIAN CAVERNEERS Inc

ABN 73 381 060 862

TASMANIAN DEPARTMENT of JUSTICE IDENTIFIER I 03329 C

CROWD FUNDING APPEAL

Southern Tasmanian Caverneers Inc (STC) is the oldest caving club in Australia, having been established in 1946. Since then it has systematically explored caves in many regions of the state, and has concentrated its recent efforts in the two major karst regions in southern Tasmania, Ida Bay and Junee-Florentine.

STC has organised a number of conferences for ASF and will be assisting in the running of field trips for the next ASF Conference, scheduled for Northern Tasmania in December 2018, with field trips extending into January 2019.

STC members are very aware that the deepest caves in Australia are located in our two primary areas of interest and that many cavers based on the mainland of Australia will take the opportunity of an ASF Conference to visit one or several of the deeper and more challenging caves.

Our members are also aware that there have been two rescues in southern Tasmanian caves in 2017, both reported in Caves Australia. Both rescues were successful – the cavers involved, neither of whom was a local, returned to a normal life!

The rescues were pleasing to STC members, as they showed that our regular training has paid off. The rescues also showed that we really need specialised equipment, specifically a Petzl cave rescue stretcher, and enough spare rope and hardware to be able to parallel rig our deepest caves.

So, we have launched this direct request to you as an Australian caver to donate to STC so we can buy the specialist gear we may need to rescue you! Our target is over \$8000 and a budget can be sent to anyone who asks. Email your request to the STC Treasurer, Tony Culberg, at culbergf@bigpond.com

DONATION FOR CAVE RESCUE EQUIPMENT

NAME CLUB

MAILING ADDRESS
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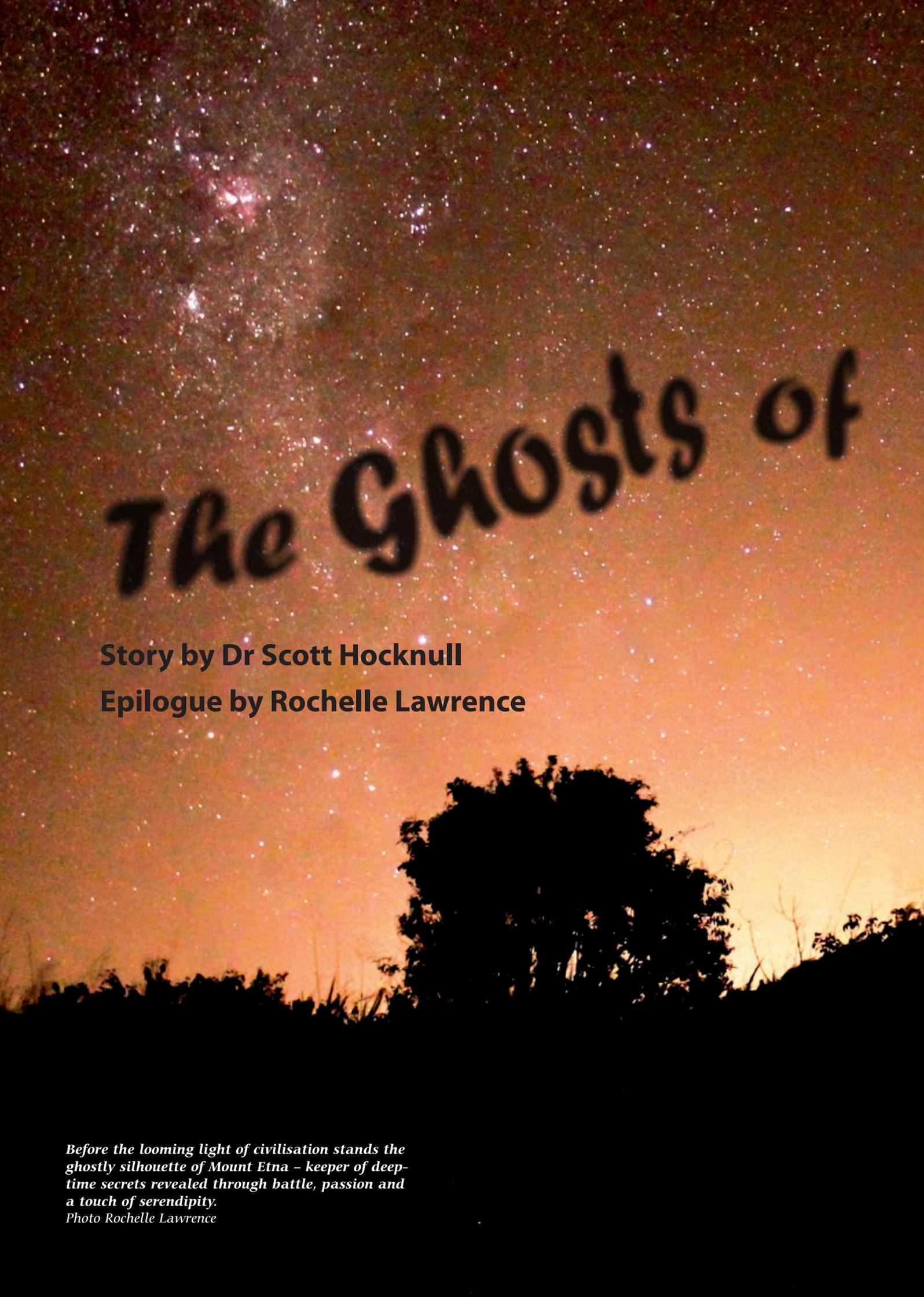
Suggested donations are \$10.00, \$20.00, \$50.00, \$100.00, other larger amount \$.....

Make cheques payable to Southern Tasmanian Caverneers Inc and post to the club at PO Box 416, Sandy Bay Tas 7006.

If paying by direct deposit send to BSB 067000 account 10162123 and send an email to the Treasurer, Tony Culberg, so he can identify and acknowledge your gift.

All donors will be listed in Speleo Spiel





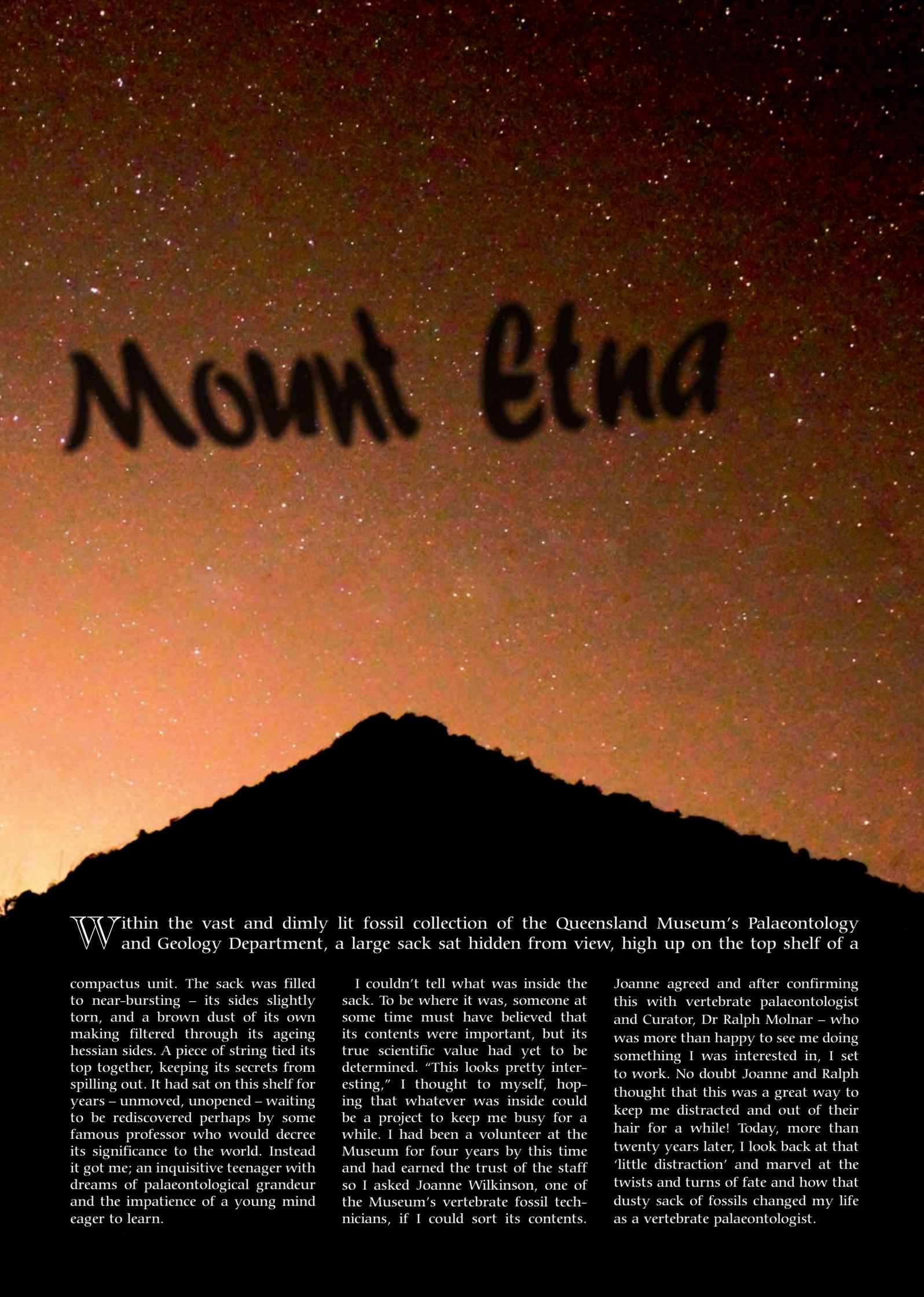
The Ghosts of

Story by Dr Scott Hocknull

Epilogue by Rochelle Lawrence

Before the looming light of civilisation stands the ghostly silhouette of Mount Etna – keeper of deep-time secrets revealed through battle, passion and a touch of serendipity.

Photo Rochelle Lawrence



Mount Etna

Within the vast and dimly lit fossil collection of the Queensland Museum's Palaeontology and Geology Department, a large sack sat hidden from view, high up on the top shelf of a

compactus unit. The sack was filled to near-bursting – its sides slightly torn, and a brown dust of its own making filtered through its ageing hessian sides. A piece of string tied its top together, keeping its secrets from spilling out. It had sat on this shelf for years – unmoved, unopened – waiting to be rediscovered perhaps by some famous professor who would decree its significance to the world. Instead it got me; an inquisitive teenager with dreams of palaeontological grandeur and the impatience of a young mind eager to learn.

I couldn't tell what was inside the sack. To be where it was, someone at some time must have believed that its contents were important, but its true scientific value had yet to be determined. "This looks pretty interesting," I thought to myself, hoping that whatever was inside could be a project to keep me busy for a while. I had been a volunteer at the Museum for four years by this time and had earned the trust of the staff so I asked Joanne Wilkinson, one of the Museum's vertebrate fossil technicians, if I could sort its contents.

Joanne agreed and after confirming this with vertebrate palaeontologist and Curator, Dr Ralph Molnar – who was more than happy to see me doing something I was interested in, I set to work. No doubt Joanne and Ralph thought that this was a great way to keep me distracted and out of their hair for a while! Today, more than twenty years later, I look back at that 'little distraction' and marvel at the twists and turns of fate and how that dusty sack of fossils changed my life as a vertebrate palaeontologist.

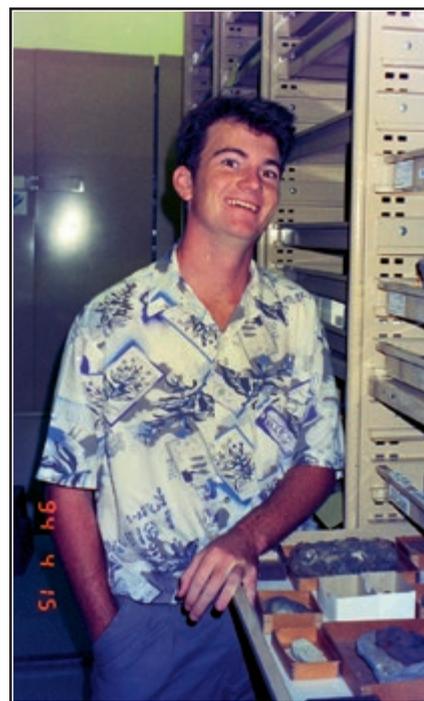
I lugged the sack into our small department lab and cleared a spot on one of the tables. I undid the string tie, opened the sack and looked inside. I still remember the puff of dust that came out, along with a distinctly musty smell that I would come to know so well. It was the smell of cave dirt and bones – thousands of bones! These tiny bones and teeth were light brown to yellowish in colour, and the surfaces of many were covered with weird dendritic manganese patterns. “Wow,” I thought, “It is going to take me forever to sort through this lot and identify what these little bones belonged to.”

The tray upon which the sack had sat had no label, but it had been placed within the shelving units dedicated to cave fossil deposits. These are conspicuous within the Museum’s fossil collection, with most of them consisting of thousands of bones and teeth collected from old owl-roost deposits. After they have eaten their prey, owls roosting in caves regurgitate the bones, teeth, fur and feathers of their meal on to the cave floor.

This process, repeated over thousands of generations, leads to fossil deposits that provide a broad survey of the surrounding area over extensive periods of time. Just below the sack’s tray were trays of specimens labelled ‘Fern Cave, Chillagoe, far north Queensland’. Naturally, I assumed the fossils in the sack came from this same cave. That was my first mistake!

I began sorting the tiny bones, one ice-cream bucket at a time. First, I sorted the most obvious pieces: the teeth, jaws and complete limb bones. Over the next couple of years I dedicated every moment of my volunteering to this task. My biggest hurdle was figuring out what these specimens were and what animals they had belonged to. It was obvious that they came from species similar to those of today because they didn’t look that old; perhaps only a few thousand years old. To be sure, however, I would need to learn the telltale shapes and structures of every tooth and bone from every native species known to Australia. In order

to do this I needed some help, so I wasted no time in identifying my key museum allies and mentors. At the museum I introduced myself to zoologists Jeannette Covacevich, Patrick Couper, Steve Van Dyck and Heather Janetzki who looked after the collections of modern animals and, most importantly, collections of their skeletons! I would spend hours, days and weeks poring over these specimens, examining every bump on each tooth, documenting the shape of every bone and measuring specimens so that I could compare them with my fossils. I was awestruck by the great diversity of shape, structure and size of the many species. It was a world of confusion and a steep learning curve for a kid who had been taught at school that science was a fixed process of ‘fact accumulating upon new fact’. I’d never encountered scientific doubt, the concept of variation, abnormality, or things like *ontogeny*, *phylogeny* and *taphonomy*. These all affected the identification of the specimens I had in front of me. I had never imagined how something as simple as a tooth



The Fossil Collection Room at the Queensland Museum, Southbank in 1994 (left) where an unmarked hessian sack containing fossils and cave dirt from an unidentified cave system (top right) was ‘rediscovered’ by 16-year-old museum volunteer Scott Hocknull (above). Scott’s quest to unravel the secrets of the sack’s contents formed the basis of his PhD and the beginnings of a distinguished career in vertebrate palaeontology.

Photos Morag Hocknull



Photo Scott Hocknull

could tell you so much about the animal it came from.

Almost immediately I made my first discovery and it was a strange one: a tooth that didn't match any of the species I had been able to observe in the museum collections. After many months of trawling through papers and books I thought I knew what it was: a molar from a greater bilby (*Macrotis lagotis*). Although the museum had bilbies in the collection, their teeth were all worn flat. However, some papers showed the telltale cusps unique to this bizarre marsupial. After verifying this with my friend and mentor Henk Godthelp at the University of New South Wales, I became more confident in my identification. But how could this be – a bilby from Chillagoe? Bilbies are, supposedly, an arid-adapted species, found only in central Australia and definitely not from far north Queensland. More strange species surfaced as I continued sorting, including the pig-footed bandicoot (*Chaeropus ecaudatus*) and the central earless dragon (*Tympanocryptis cephalus*).

After three years of sorting I was nearing the end when, out of one scoop, a tattered and folded label fell. It read: 'Elephant Hole Cave', 1986, Kerry Williamson & Dianne Vavryn. No cave at Chillagoe had the name Elephant Hole Cave! After some investigation I discovered that the sack of fossils actually came from a cave deposit collected from the Mount

Etna Caves, north of Rockhampton. The name Elephant Hole Cave was well known to the University of Queensland Speleological Society because they had mapped it in the 1970s and, serendipitously, copies of their reports were kept at my university library. Even though I had now positively determined where the fossils came from, the strange arid-adapted list of species still didn't make any sense. Rockhampton is dry, but nowhere near as dry as central Australia!

Caves hold a great many secrets and my curiosity for them had been sparked the year before I made the 'rediscovery' of the Elephant Hole Cave fossils in the museum. I had heard that a meeting of Australian vertebrate palaeontologists – the Conference of Australasian Vertebrate Evolution, Palaeontology and Systematics (CAVEPS) – was to be held that year (1993) in Adelaide, South Australia, so I asked my parents if I could go. Here I was, 15 years old and wanting to travel to Adelaide in order to attend a professional science conference all by myself! I did have one ace up my sleeve however. My grandmother lived in Mount Pleasant, just a stone's throw from Adelaide, and she had supported my interest in dinosaurs and museums since I was a toddler. When Gran agreed to fund my conference experience and the post-conference field trip I was beyond excited!

On arrival at Adelaide I met three of the organising palaeontologists: Dr Rod Wells, Neville Pledge and Gavin Prideaux (who was a student at the time). I developed a great friendship with these men over the course of the conference and the post-conference field trip to Naracoorte Caves. It was during this field trip that I fell in love with caves and the secrets their fossils can tell us. Rod passionately described the discovery of the Victoria Fossil Cave and how the megafauna fossils accumulated in great sediment cones – all of which were directly beneath my feet. I was an information sponge, listening to how fine excavations can reveal amazing details of how each animal lived and died over millennia; even how the climate of the time was different and could become trapped as molecules inside the beautiful cave formations. My mind was blown. I couldn't wait to get back to Queensland and make a great cave discovery of my own and I have no doubt that this is what led me to investigate the dusty sack of secrets hidden away in the Queensland Museum.

I was in second year university when I made my great discovery. By this time I had explored many fossil sites throughout Queensland, taking every opportunity I could to tag along or venture out on fieldwork into remote areas with potential for caves. On one such trip to the Broken River in far northwest Queensland,



Scott Hocknull (far left, back row) and Paul Tierney (far right, front row) in 1995 with a Queensland Museum team outside Dodgey's Cave in the Broken River Province of far north Queensland (left). When a similar excursion to the Broken River by Scott and Paul in 1998 was abandoned due to extreme weather, they returned home via Rockhampton hoping to collect from a cave at Mount Etna known as Elephant Hole Cave. Their plans were thwarted when they discovered that much of Mount Etna had been mined for limestone (right). The Elephant Hole Cave had been blasted during mining operations and no longer existed.

Photo (left) Queensland Museum

carried out with long-term friend and museum volunteer Paul Tierney, our expedition was cut short by a massive hailstorm over our campsite. We were on a two-week trip but had to get out quickly. After many hours of mud-sliding over hail-strewn roads, we made it to Bowen where we licked our wounds and thought of where else we could go. Elephant Hole Cave was an immediate option – we would be travelling back through Rockhampton after all. Unfortunately however, we had no idea of where this cave was or how to get to it. On a hunch I called the museum and got a phone number for the Central Queensland Speleological Society.

I remember standing at the pay phone of our motel calling the number. A lady answered the phone and informed me that I would need to call back and speak to her husband, Noel Sands, after he returned from work. That afternoon I called the number again and Noel answered. I could immediately hear the apprehension in his voice. This kid had called him up claiming to be a volunteer for the Queensland Museum and wanting to find fossils in caves on Mount Etna. I had no idea of the controversy and conservation battles that had been waged at Mount Etna over the preceding decades. Noel said if we could arrange a permit to access the National Park, he'd be happy to show us some fossil sites. I'm sure he was doubtful that we'd manage to get it.

I proclaimed to Noel that we would get the permits and that we'd be very interested in visiting Elephant Hole Cave. There was silence at the end of the line and then a response came that I now know is typical of Noel: "Yeah, nah, that's not possible mate. It was part of the mine and they blew that one away, just *blew-it-a-way* – poof!"

This was quickly followed by, "But I know where there are other caves I can take you to with some bones." I was devastated. My holy grail, gone! I didn't know what to think. Based on my studies to that point, Elephant Hole Cave must have been full of amazing fossils and would have contained clear indicators of major past climatic changes, faunal evolution and extinction – all gone, just like that. I wondered if it was even worth going to Mount Etna to see these other sites.

I consoled myself and, after discussing our options, Paul and I decided to try for the permit anyway. Maybe these other caves contained similar deposits that also preserved arid-adapted fauna. So we arranged a permit and went to Mount Etna in search of an arid fossil fauna. What we found was nothing of the sort; in fact, it couldn't have been further from it, but it was a life-defining discovery for me.

We met with Noel and headed off up the limestone karst. I was soon to find out the reason for his apprehension during our phone conversation. As a long-serving member of the Central Queensland Speleological Society, Noel was heavily involved in the longest-running conservation battle so far waged in Queensland. Starting in the 1960s and still going at the time we met, this period was a monumental time for many of the close friends I was to make at Mount Etna over the years. Noel explained that two huge cave systems, Speaking Tube Cave and Elephant Hole Cave, located on the western ridge of Mount Etna, were once the main roost sites for the endangered ghost bat (*Macroderma gigas*) along with a suite of other bat species. In an effort to save their environment, Noel was just

one of the many people who staged protests, legal battles and blockades against the limestone mine but, in spite of their efforts, the entire western ridge of Mount Etna, including its vast cave systems, was blasted into oblivion for cement powder. Hearing these firsthand accounts about the mining operations during the peak of the blockades, it was clear that blasting of these two major cave systems was more a political statement than one of necessity. Indeed, soon after blasting the caves, the mine stopped operations in the area of the caves because of vast clay infill that had no economic value. It was heartbreaking to know that these same clay deposits would have contained countless fossils.

Following Noel across the limestone karst, I soon realised that he was a man with an infinite knowledge of the area and a passion for the preservation of its natural history. It was easy to find a common ground between his ideals and my own and before long we had forged a great friendship. Fortunately, I was familiar with the razor-sharp nature of limestone karst from earlier expeditions to Riversleigh and the Broken River in northern Queensland so I was in my element as we explored a number of caves in the National Park and visited the Capricorn Caves tourist caves nearby. We headed for a tiny cave aptly named Mini Cave. We ducked through a small opening in the limestone and carried on along a short chamber to the back wall. What confronted us was one of the most beautiful fossil sites I've ever seen. Layer upon layer of old cave floor sediment, jam-packed with bones and teeth that had cemented together with calcium carbonate over millennia. Over a similar time period



Photo Scott Hocknull

the entire floor had been exposed in cross section by erosion, revealing all of the layers of clay, cave formations and fossils.

Our torches zipped back and forth across the cave walls, picking out bones and teeth everywhere. Suddenly, I spotted my first jaw. Years of sorting through fossil teeth from Elephant Hole Cave had instilled a mental catalogue of shapes in my brain that I could never forget so identifying this species should have been a breeze. Nope! The tooth was large and serrated and followed by rounded molars. It was not like anything I'd seen before. The next jaw was just as unfamiliar as the first, as was the next and the next. We collected dozens of specimens, all of which were just hanging on to the

wall by the tiniest bridges of sediment and ready to fall off at any moment. I had no idea what these species were but I knew they were definitely not from the same species that made up the Elephant Hole Cave fauna. Much of the fossil cave floor had broken off and fallen as blocks on to the present floor, so we collected these for acid-processing back at the museum. We consciously decided never to collect fossils from the wall unless they were naturally exposed and in danger of becoming lost. The natural beauty and scientific value of Mini Cave remains intact today.

I couldn't make sense of the specimens from Mini Cave. They looked like species I knew well, but were clearly not. "I've found new species," I thought to myself, "and not

just one new species but dozens – a single cave deposit full of new species!" On my return to the museum I immediately started to compare the species we had found with those in the collections. Apart from some possums that are only found today in New Guinea, I couldn't find anything similar in the museum's modern or fossil collections. It wasn't until I took a trip down to Sydney to visit the New Guinea mammal collections at the Australian Museum, and got to show Henk Godthelp the rodents from these new sites, that it all became clear. We had discovered a super-diverse rainforest fauna – one with a species diversity matched only by the Oligo-Miocene faunas from the World Heritage-listed Riversleigh fossil mammal site. In search of an



The western side of Mount Etna following the completion of mining operations (above). The red clay on the upper benches is cave infill sediment within Speaking Tube Cave. To the immediate right of the red soil, a pale-brown patch (on the edge of the photograph) is all that remains of Elephant Hole Cave. Although these cave deposits contain fossils from an extinct rainforest fauna, they were once situated below a much younger deposit containing an arid-adapted fossil fauna. The arid-fauna deposits were, unfortunately, completely removed by mining processes. Photo Scott Hocknull

arid fauna, I'd found one from a rainforest!

It just didn't seem right; mammals considered endemic to New Guinea shouldn't be in a cave site at Rockhampton. I was utterly perplexed. Both fossil deposits, Elephant Hole Cave and Mini Cave, were characterised by faunas comprised of completely different species from those found at the caves today. What's more, they contained species found in environments that, today, are as far from Rockhampton as they are from each other. The sites simply didn't correlate with biogeographic or palaeoecological thinking at that time, especially the relationship between species present in Australia and New Guinea. In basic terms, the species found in Australia and New Guinea were thought to have established their current ecological and biogeographic patterns many millions of years ago, with the only significant change to have occurred in more recent times being the Pleistocene extinction of the megafauna. This meant that the fossil sites we had found must have been very, very old. That was my second mistake!

Following my initial visit to Mount Etna I mounted yearly expeditions to search for new sites and new specimens. As word spread amongst the local cavers, Noel reported to me that he had found a bone deposit on the limestone mine itself. While investigating the mine for freshly exposed caves during continued mining operations, Noel and fellow caver Clive Kavanagh discovered a vast clay deposit full of bones. Hoping that I was not too late, I immediately contacted the mine and asked for permission to come on site and collect. Expecting a negative response, I was surprised when the mine's general manager Chris White readily agreed. In 2000 we set up camp near the limestone mine and, during the weekends when the mine wasn't operating, fossicked along the exposed benches. Immediately we discovered huge deposits of bones and it was soon obvious that the main limestone quarry benches on the western side of Mount Etna consisted of two huge sediment deposits, each larger than an Olympic-sized swimming pool. These bone-rich deposits were the clay-filled interiors of two enormous cave sys-

tems. I later discovered that for nearly a decade these clay deposits had sat unmined and earmarked for revegetation once operations at the mine site had stopped. Using maps of the caves on the mountain created by cavers in the 1970s before mining commenced, I was able to align the fossil deposits and the original cave entrances. The largest was Speaking Tube Cave, and you can probably guess the other: it was Elephant Hole Cave! I had finally been reunited with the remnants of my holy grail.

On one of my first trips to the mine I met with quarry manager Don Kime who had been at the quarry for many years, including those during which the conservation battle had been waged. Don recalled the discovery of fossil bones when the caves were opened up, which occurred in the late 1980s and early 1990s. This corresponded with the removal of the sack of material in 1986. During my investigations I also made contact with Kerry Williamson and Dianne Vavryn who had originally collected the fossils from Elephant Hole Cave. The collection was essentially a salvage operation to collect samples



Photo Warwick Willmott

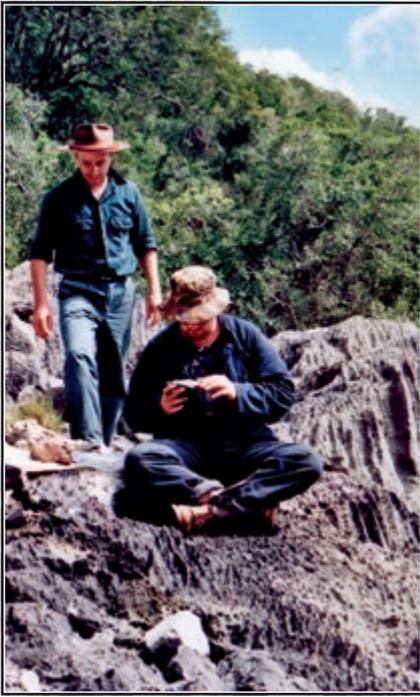
The eastern side of Mount Etna as it was in 1965 (above). Limestone mining by Central Queensland Cement Ltd commenced on Mount Etna in 1966, but operations were soon embroiled in controversy between the company and environmentalists, including the Central Queensland Speleological Society. Major conflict erupted between the groups in 1987 and 1988 (right and below right) when Speaking Tube Cave and Elephant Hole Cave were earmarked for destruction, threatening a resident population of the rare ghost bat *Macroderma gigas* (below). Unfortunately, protests were unsuccessful and the caves were destroyed in November 1988.

Photos (right) courtesy Capricorn Caves.



Photo John Augusteyn





Paul Tierney and Scott Hocknull inspect fossil specimens at the mouth of Mini Cave in 2000 (left). The discovery of fossils within the limestone mine around this time led to a major collection effort on Mount Etna by the Queensland Museum. In the photo (above), Scott Hocknull, Paul Tierney, Kristen Spring and Noel Sands climb the slopes of Mount Etna to inspect fossil deposits within the mining lease. Photos Joanne Wilkinson

before mining operations obliterated the site. Elephant Hole Cave was the first to go, followed by Speaking Tube Cave. As mining operations moved into Speaking Tube Cave the miners came across large pieces of cemented cave sediment with large bones in them. They contacted the Queensland Museum and, as I would later find out, sent a 44-gallon drum of rock containing bones to the museum. I eventually located the drum tucked away in the collection. Fortunately, Don had the foresight to stockpile a small batch of this bone-rich cave sediment but, in the absence of further communication from the museum, mining continued. Thankfully, due to the fact that the deposits comprised mainly clay and lacked economic value, mining operations soon moved to other areas and the remaining deposits were left in place.

We explored the limestone benches and a menagerie of discoveries came thick and fast – literally thousands upon thousands of specimens representing species of all kinds. Now that we were right where Elephant Hole Cave had been, I was certain we would find more of this arid fauna but, to my surprise, all of the deposits contained species from the ancient rainforest fauna. Fossils have been found of tiny millipedes, snails, fish, frogs, lizards, snakes, turtles, crocodiles, birds, rodents, bats and a menagerie of marsupials. The richness of species is outstanding. Some thirty species of possum have been recognised, ranging from species of pygmy to giant ringtail possums, cuscuses, gliders and completely new, extinct groups. There are about twenty species of kangaroo including one

of the smallest kangaroos ever found, several species of tree kangaroo, and the extinct giant tree kangaroo *Bohra*. A pygmy marsupial lion (*Thylacoleo hilli*) that lived alongside its lion-sized cousin and probably preyed on wombats, marsupial mice, bandicoots and koalas, have also been discovered. Other predators, large and small, are also present, including pythons and venomous snakes, an extinct madtsoiid snake, the Komodo dragon, thylacines, devils and the strange crocodile *Quinkana*. We have even found the vertebrae of tiny blind snakes, as well as frogs by the dozen, ranging from tiny microhylid frogs (common in northern mountainous rainforests) to a giant extinct frog with the impressive scientific name of *Etnabatrachus maximus*.

Eventually, I would discover that the Speaking Tube Cave deposit was almost entirely made up of sediments containing the rainforest fauna whereas the Elephant Hole Cave deposits included both rainforest and arid faunas. The transition between the two environments in which these faunas lived must have been preserved somewhere in one of these cave systems but, unfortunately, mining operations had removed it. Later I would find a series of photos taken of the deposits when they were first broken into. The layers, now lost, were definitely there and as clear as day. It would take another twelve years of searching caves in the area before I found anything remotely similar.

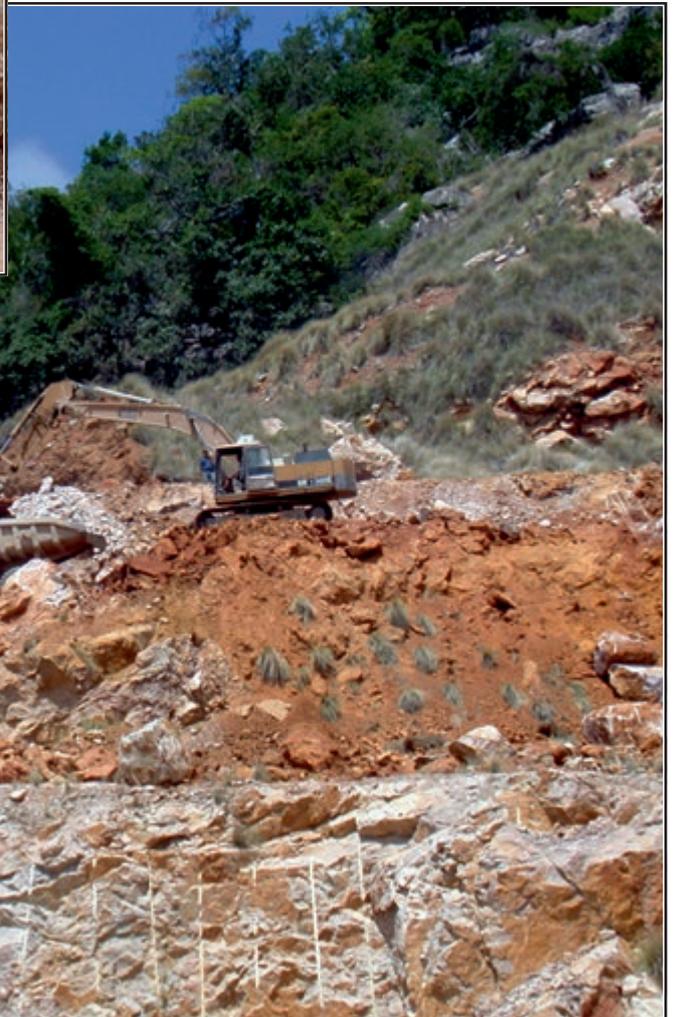
Although we have since found a replacement for these lost deposits, I still lament the unfortunate and unnecessary sequence of events that led to the loss of this material. The

apparent lack of interest from the Queensland Museum seems to be the primary reason that mining continued without further salvage. When the mine managers learned how significant the deposits were, they were surprised – and they too lamented the loss. This one lesson has guided my work in palaeontology ever since. Determined to make amends, I worked closely with Cement Australia, Central Queensland Speleological Society and National Parks to secure the remaining fossil deposits. By this time the deposits were very difficult to get to and would require significant earthworks to gain safe access. Cap in hand, I approached Cement Australia (then Queensland Cement Limited) with the bold request to stockpile the entire series of deposits – some thousands of tonnes of fossil-bearing clay and rock.

Chris White considered the proposal and agreed that they would designate an area that would never be touched as a laydown position for the deposits. It was also agreed that this area would eventually become part of a proposed new national park. Over a period of several months I travelled frequently to the Mount Etna mine and, with Noel's help, supervised removal of the fossil deposits ensuring that laying down of the sediments was conducted systematically and recorded for posterity. The process was very quick and illustrated to me how easily such a salvage operation could be undertaken. With a little bit of co-operation, the best of a bad situation can be made: these deposits are now secured and stockpiled for future generations of researchers to collect from and analyse.

Paul Tierney and Scott Hocknull inspect newly discovered cave floor deposits on the lower benches of Mount Etna Mine (right). The deposits – remnants of Speaking Tube Cave and Elephant Hole Cave – were identified by comparing their position with early cave records of the University of Queensland Speleological Society. The significance of the discovery prompted Scott to approach Central Queensland Cement Ltd with a request to stockpile the remaining cave sediments, ensuring their availability for future research (below). Under the guidance of Scott and Noel Sands (inset below) the deposits were relocated to an area designated as part of a proposed national park at Mount Etna in 2003.

Photos courtesy Queensland Museum



SPECIES FROM THE ANCIENT RAINFORESTS OF MOUNT ETNA

Photos by Scott Hocknull and Rochelle Lawrence

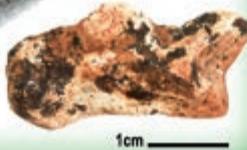


Tooth (above) and ankle bone (right) from the pygmy marsupial lion (*Thylacoleo hilli*).

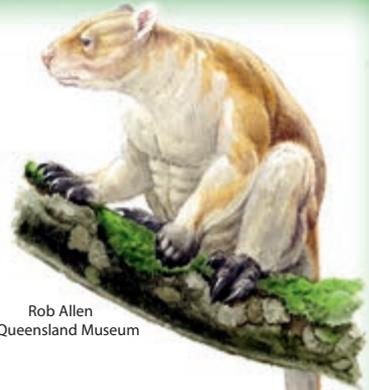
© Capricorn Caves



A. Atuchin
S. Hocknull
R. Lawrence



1cm



Rob Allen
© Queensland Museum

Giant tree kangaroo (*Bohra*, above) and beside Human for scale (below).



Vertebra of the giant madtsoiid snake (*Yurlunggur* sp, right).

A madtsoiid snake swallows a wallaby (below).



1cm



Rob Allen
© Queensland Museum



Cuscus jaws.

Vertebrae from giant goannas (below) – including the Komodo Dragon (*Varanus komodoensis*, right).



1cm



V. Konstantinov A. Atuchin S. Hocknull © Capricorn Caves



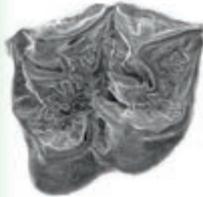
Over thirty species of possum have been found in the ancient rainforest deposits of Mount Etna. Many more await identification, including these teeth from new species (below) and this peculiar tooth (top left) believed to be from a totally new genus of possum.



Two types of striped possum (*Dactylopsila* sp.).



Giant ringtail possum (*Pseudokoala* sp.).



Woolly ringtail possum (*Pseudochirops* sp.).



Two as-yet unnamed species of ringtail possum.



Pygmy greater glider (*Petauroides* sp.).



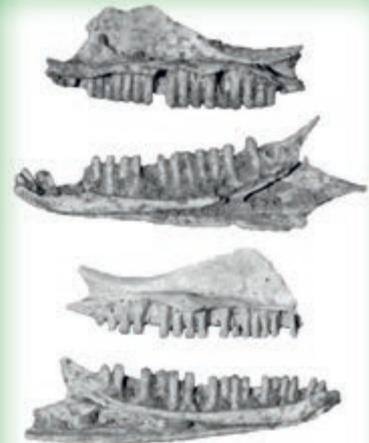
Rob Allen
© Queensland Museum

The giant ringtail possum (*Pseudokoala*).



Tooth of the (possibly) terrestrial crocodile (*Quinkana*).

Illustration Rob Allen
Photo G. Cranitch
© Queensland Museum



1cm

Fossil skink jaws from Elephant Hole Cave deposit.



Fine fossil jaws of frogs and lizards from Mini Cave.

Thylacine teeth.
(*Thylacinus cynocephalus*)



1cm



A. Atuchin R. Lawrence © Capricorn Caves



In 2006 an open day was held by the Queensland Museum and Cement Australia (formerly Queensland Cement Ltd) for interested members of the public. Over 2,000 people attended and, over a period of several hours, numerous fossils including dozens of new species were discovered. The stockpile is now enclosed within the Mount Etna National Park Scientific Reserve as a resource for future generations.

Photo Scott Hocknull

Shortly after the deposits were stockpiled, Cement Australia and the Queensland Museum held an open day for the public so that interested people could assist us in sorting through the thousands of tonnes of sediment for fossils. We had over two thousand people turn up over only a few hours, and dozens of specimens belonging to new species were discovered. This event only scratched the surface of the stockpiles: there are literally hundreds of years of work remaining for future generations.

Research into the fossils continues and, as the depth of our work expands, so too does our understanding of the diversity of species that once inhabited the ancient rainforests of Mount Etna. Much of this research has turned conventional wisdom on its head, with one of the greatest upheavals caused by my research into the age of the deposits. The fact that fossils of rodents were present in all of the deposits we had collected meant that the Mount Etna deposits were younger than the Riversleigh fossil faunas, as none of those sites record rodents. Rodents are thought to have arrived relatively recently in mainland Australia, having island hopped from southeast Asia some four to five million years ago during the Pliocene Epoch. Consequently, a Pliocene age for the rainforest fauna at Mount Etna seemed reasonable. As the species lists grew, I recognised several groups that were closely related to those from other Pliocene-aged sites, and even holdovers from the older Riversleigh faunas. I didn't see any clear marker species that would suggest anything different.

The arid fauna, on the other hand, was completely different in preservation so it would have to be much

younger. When I had some of the bones and teeth dated using a technique called uranium-series radiometric dating, the resulting age was quite surprising. I had thought the sites would date back to the Last Glacial Maximum, around 20,000 years ago, when the climate was exceptionally dry. This, of course, would explain the presence of an arid fauna. Instead the results indicated that the fossils were somewhere between 208,000 and 149,000 years old! The next question, then, had to be "How old was the rainforest fauna?"

Further sorting of the fossils revealed a couple of species common to both the Elephant Hole Cave and Speaking Tube Cave deposits. One was a new species of possum that I thought was unique to the arid fauna, until it turned up in the rainforest fauna. The second was an ankle bone from a tree-kangaroo found amongst the bones of the arid fauna. These specimens conflicted with the dry habitat idea, although it was possible that they represented animals that were living in a refugium, kept alive by the buffering nature of limestone karst. Nevertheless, this interpretation implied that the rainforest faunas were much younger than I had suspected.

In an effort to find out, I trialed a couple of samples using a new uranium-series technique that had been perfected by University of Queensland researchers led by Dr Jian-xin Zhao. I was not expecting much of a result, so I was completely blown away when samples from most of the sites were dated to between 500,000 and 280,000 years old. We had found the only Quaternary-aged rainforest fauna anywhere in Australia! In fact, we had captured a snapshot of

time when the last of the great low-land rainforests had existed along the eastern coast of Australia. It was a period of major extinction of Australian rainforests; a timeframe critical to our understanding of how rainforests responded to periods of past climatic upheaval. It also filled a major evolutionary gap in our knowledge between the ancient faunas from Riversleigh, some 15 million years earlier, and the present rainforest species found in the highlands of New Guinea and the Wet Tropics of Queensland. What an incredible discovery! After nearly a decade of working with a team of collaborators I submitted a manuscript to the prestigious journal *Nature* for publication. Within hours our paper was unceremoniously rejected without review – my third and final mistake.

The great species diversity of the Mount Etna deposits indicates that the rainforests that existed in Australia only 280,000 years ago (or less) were much more biodiverse than those of the Wet Tropics or even the mountain rainforests of New Guinea today. They show that over the last 280,000 years Australian rainforests have retracted northwards into small refugia. During this period of time dozens of small species have gone extinct and were replaced with a dry-adapted fauna. These older rainforest faunas did not return when wetter times prevailed; instead, the arid fauna was driven extinct and replaced by a third wave of species that are more representative of what can be found there today. These climatic phase shifts, which have dominated the tropical north of Australia over hundreds of thousands of years, trend toward intensifying aridity. This does not bode well for the rainforests of

today, particularly under current predictions of future climate change.

The great diversity in our rainforests is already on a hiding to nothing due to processes that started some 280,000 years ago and continue to the present day. Major changes in the Earth's climate continue to have an impact and have likely been, and will continue to be, exacerbated by anthropogenic warming. Precisely when the last of these megadiverse rainforests went extinct along the east coast of Australia is hard to tell. Their decline might have been rapid, or perhaps heralded by a slow death knell over thousands of years. One thing is for sure: they're not coming back. What is left must be protected to the best of our ability, both in Australia and New Guinea. The fossils from Mount Etna show that the rainforests of New Guinea today are

the refugium for Australia's once diverse and expansive rainforests. Consequently, in this world of major climatic change, we should not consider their plight any different to that of our own Wet Tropics.

When you walk through an Australian rainforest today you are sure to hear the tranquil sounds of a few species of birds in the trees. If you are lucky and it has just rained, you might hear a frog or two calling. However, when I compare these sounds of today to the sounds that would have echoed through Australia's ancient rainforests I hear silence. I can only imagine the sounds and sights of life in the trees, on the ground, in the logs and in the streams of what was once Australian rainforest. Perhaps it would have been similar to what one can experience in the last remaining rainforests of

Borneo or the Amazon today. Is this silence the future for the remaining megadiverse rainforests of the world? I hope not.

Coincidence plays a big part in our lives and I still marvel at how the simple act of pulling a dusty hessian sack down from its obscure position in the Queensland Museum collection could lead me to where it has. It took the unnecessary quarrying of a limestone cave, a salvage operation, a hailstorm, a persistent teenager, a big dose of serendipity, a bunch of mistakes and a great team of friends and colleagues to begin unravelling the secrets of central Queensland's fossil cave faunas. After many thousands of years the ghosts of Mount Etna have finally been given the chance to tell their stories – all we need to do is listen.

Capricorn Caves – an epilogue

by Rochelle Lawrence

In 2012 we arrived in the hot and humid subtropical climate at Capricorn Caves Tourist Park, near Rockhampton in central Queensland. Dr Scott Hocknull of the Queensland Museum led the way around the limestone karst to Colosseum Chamber. He stopped to point out pieces of fossil bone breccia lining the path, marking the presence of a collapsed cave chamber that had exposed a fossilised cave floor. Further along the path we climbed up a set of old timber stairs to reach the entrance to Colosseum Chamber where we were relieved to feel the cool air of the cave. Inside was a unique fossil deposit found in 2002 by Scott and Noel Sands (Central Queensland Speleological Society). Scott and his team had excavated the site over several years, working in co-operation with Ann Augusteyn, owner and operator of Capricorn Caves. This year Dr Julien Louys, Dr Gilbert Price and their team from the University of Queensland (UQ) continued the excavation into a deeper section. A series of lights shone down on a deep pit surrounded by string-lines that indicated past excavations. The UQ team were loading buckets with fossil sediment, to be carried down to base camp for wet sieving and fossil sorting.

As I walked over the floor of the chamber I realised I was walking on an entire fossil deposit some two metres deep. How were there so many bones preserved? Scott pointed to the spot where he had first seen an owl roosting in the cave at the time he



A suspension bridge through dry rainforest offers a fun way back to the main entrance of Cathedral Cave, one of the popular visitor attractions at Capricorn Caves. Photo Rochelle Lawrence

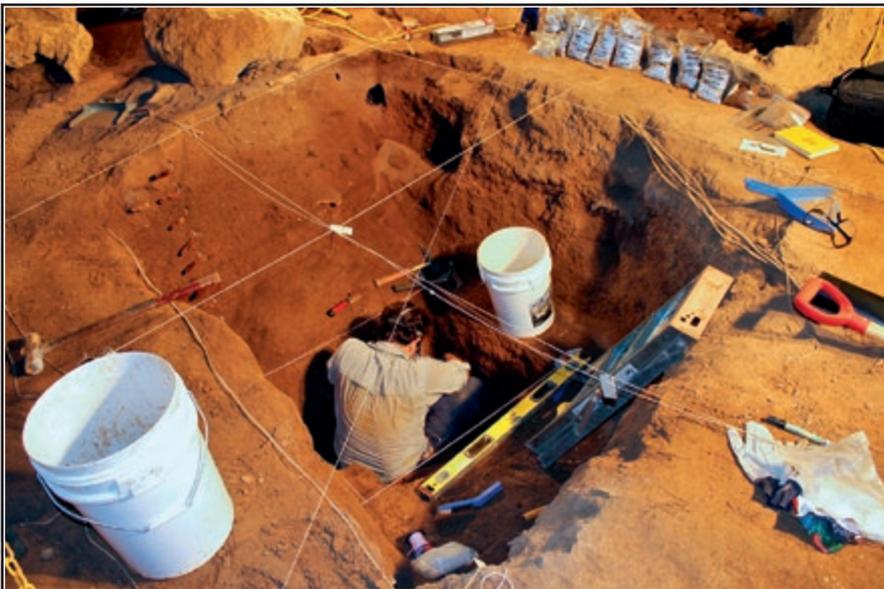
and Noel found the deposit. Pellets containing the bones of animals that had been eaten and regurgitated by owls had been found on the cave floor. These pellets had become incorporated into the silt and clay of the cave floor over thousands of years, making Colosseum Chamber one of the largest and most concentrated owl roost deposits found anywhere in Australia. Among a suite of species still found in the region today the layers also contain the remains of the extinct Capricorn rabbit rat (*Conilurus capricornensis*), which was first found at Capricorn Caves and recently described by Jonathan Cramb and Scott.

We continued through a dark passageway, going deeper into the cave system. The flap of large wings overhead revealed the presence of a lone ghost bat (*Macroderma gigas*) that had taken residence in the cave. Although the ghost bat has survived for over 500,000 years in the region, it is now in dramatic decline. With only our torches to guide us, we moved around overhanging stalactites and ducked under low ceilings. I felt a cool breeze being pushed through the passage – a sign that there was another entrance to the cave further on. Upon reaching the entrance we climbed the rocky stairs out of the cave and found ourselves on the other side



*Dr Julien Louys digs down through layers of sediment in Colosseum Chamber in 2012 (below left). Fossils in these sediments represent bones of small animals that have been eaten and regurgitated by owls roosting in the cave over thousands of years, similar to this modern owl pellet containing undigested material (top left). The deposits of Colosseum Chamber vary in age from several thousand years old to recent and have produced bones of many small animals that still exist in the region today. One exception, the now-extinct Capricorn rabbit rat (*Conilurus capricornensis*), is known from bones, including this maxilla (below), found in Colosseum Chamber.*

Photos Rochelle Lawrence



of the karst. Here, a path meanders through dry rainforest and semi-evergreen vine thicket. This remnant forest is a relic of a much wetter past, having adapted to a drier climate by developing small waxy-coated leaves for moisture conservation. The limestone rock has provided a protective habitat for this now-endangered type of rainforest.

The ancient rainforests of northern Queensland were the reason we were here, continuing our search for a connection between the faunas of Capricorn Caves and the ancient rainforest faunas of Mount Etna. Hearing a rustle in the undergrowth, we caught a glimpse of an echidna just

before it curled up into a protective ball. For a dry rainforest, the area still holds a diverse array of species. We came to a huge fig tree at the entrance of Belfrey Chamber. Figs are great cave indicators as they send their massive roots down through limestone crevices into the underground water table and fertile deposits of bat guano on the cave floor. Searching the chambers, I felt the occasional flicker from a little bent-wing bat (*Miniopterus australis*) as it whisked past me. We found a few nice fossilised bones eroding from the damp brown sediment of the cave floors but it was still not what we were really looking for.

I spotted a small fern (*Tectaria devexa*), growing in a thin pocket of soil on the wall near one of the main entrances. The survival of this endangered fern is yet another reminder of the heavily forested past of the caves. The Caves district is the only known site in Australia to preserve this fern. We continued along a timber ramp and past a suspension bridge – like something you would envisage from an Indiana Jones movie. In front of us a surprised rock-wallaby bounded over the limestone karst before disappearing in an overhang near the cave entrance. Climbing yet another set of stairs we walked over a false floor



Scott's 15 year search to find a replacement for the lost arid-adapted fossil fauna – destroyed by mining at Mount Etna – finally paid off with a visit to nearby Capricorn Caves with Rochelle Lawrence in 2012. Their discovery of a new rainforest fauna in Harp Chamber (inset), was soon surpassed when, crawling under a false floor next to the stairwell (above right), they discovered thousands of bones sticking out of the roof (above left). These fossils represent the missing arid-adapted fauna and will help complete a fossil record spanning over 500,000 years.

Photos Rochelle Lawrence

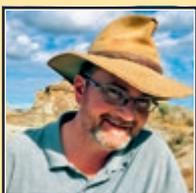
before stepping down into a small cavern called Harp Chamber. Lights from a previous public tour of the cave illuminated the chamber's famous formation, reminiscent of a harp. Scott's attention was drawn to the red terra rossa clay on the chamber floor. This was identical to the sediment he had found at Mount Etna that preserved the rainforest fauna. We both started to poke around in the sediment, pulling out tiny bones and fragments but nothing really identifiable. It wasn't until I found a small tooth that Scott got really excited. It was a tooth belonging to a bandicoot that had lived in the ancient rainforests. We had discovered a new deposit linking Capricorn Caves to Mount Etna.

With renewed excitement we continued to investigate the chamber to find the extent of the fossil deposit. I heard a call from Scott, who had

disappeared under the false floor over which we had just walked. Clambering under it, I was amazed when I shone my head torch on to the ceiling. Scott had just found an entire cave floor deposit that had cemented thousands upon thousands of bones and teeth into rock over millennia. Dazzled by the number of bones, it didn't take us long to find an identifiable species. It was a tooth from a pig-footed bandicoot, a recently extinct species of arid-adapted bandicoot that once thrived in central Australia. Scott couldn't believe what he was seeing. Twelve years prior he had been confronted by the loss of one of the most significant fossil sites at Mount Etna due to mining. Today we had found its replacement. For the first time at Capricorn Caves we had found evidence for the faunal

succession from the oldest rainforest fauna (~500,000–280,000 years old) through to an arid fauna (~200,000 years old) and finally to a modern fauna at Colosseum Chamber (~50,000 years old-present).

With the connection between the fossil faunas of Mount Etna and Capricorn Caves now established, we have started to unravel the secrets of faunal evolution in central eastern Queensland over hundreds of thousands of years. The development of new tours at Capricorn Caves will focus on these amazing new fossil deposits, where visitors will discover the direct evidence of our past. It is right there, just under their feet.



The Authors

Dr Scott Hocknull is Senior Curator of Geosciences at the Queensland Museum and holds a number of honorary positions in organisations throughout Queensland. Rochelle Lawrence is Capricorn Caves' Palaeontologist and a Research Assistant in Geosciences at the Queensland Museum. Their combined research focuses on understanding palaeoecological transitions throughout the Mesozoic and Cenozoic. Scott uses new 3D



technology to capture and interpret geo-heritage digitally and scientifically for a wider audience. Rochelle has a specific interest in microfauna representing a variety of palaeo-ecologies from tropical rainforest to arid-zone springs.

Australian Age of Dinosaurs, Dr Scott Hocknull and Rochelle Lawrence wish to acknowledge Central Queensland Speleological Society, Queensland Museum, Noel Sands, Capricorn Caves, the Augusteyn family and Warwick Willmott for their assistance with this story.

ACKMA CONFERENCE 6-11 MAY 2018 MARGARET RIVER, WESTERN AUSTRALIA

Mark Delane
Conference Convener



*Lake Cave, Margaret River
Photo: Courtesy AMRTA*

It's hard to believe that only a few months ago we were in New Zealand, enjoying the hospitality and beautiful scenery in Ta Anau, but now we have to start to look forward to the 2018 conference in Margaret River, Western Australia.

Planning and organisation started in the flights home and since then and we are pleased to be able to provide you all with the following update!

Conference Committee:

As many of you know the task of organising a conference is no small feat, but we are blessed with a load of experience with this committee, consisting of 2 ACKMA fellows and 2 Life members, and me!

- Robyn McBeath
- Peter Bell
- Andy Spate
- Rauleigh Webb
- Mark Delane

Conference Date and Location

The 2018 ACKMA conference will be held in Margaret River, Western Australia, with the welcome gathering on Sunday 6th May and the final dinner on Friday 11th May 2018.

Located in the South West of Western Australia, the Margaret River Region is home to over 150 cave and karst formations, nestled in the spine of the Leeuwin-Naturaliste Ridge.

The Margaret River Busselton Tourism Association (MRBTA), is a not for profit, membership based organisation that manages 4 cave and 2 lighthouse precincts, 4 visitors centers and the ground handling at the Busselton- Margaret River regional airport, and destination marketing for the region.

MRBTA, is proud to host the 2018 ACKMA conference, with the support and assistance of a number of key operators within the region.

Conference Theme

The conference committee is pleased to announce that the theme of the 2018 conference is Hydrology Management, with a working title of "Water to Wine".

Water was a fundamental element in the formation of the karst landscape in the region, the flourishing new wine industry, with other land uses now capitalizes on this water; with what impacts and implications? We are keen to share, explore and discuss the management of water in all aspects above and below ground in cave and karst landscapes.

Pre- and Post-Field trips

Both the pre- and post- conference field trip are yet to be confirmed, and will be subject to interest:

The Pre-conference field trip is purposed to head north of Perth, taking in Yanchep, Eneabba, Cervantes, Nambung and Beekeepers Nature Reserves, ending in Margaret River

The Post-conference field trip is purposed to head south, from Margaret River, taking in Black Point, Pemberton, Mt Chudulup, Albany, Porongurups, Stirling Ranges, ending in Perth.

More info on both field trips will be issued once details are confirmed.

Conference Papers

A call for conference papers will be made in the coming months, Andy Spate will co-ordinate and manage all conference papers.

Conference Program

The conference will run with the same format each day; with papers being presented in the morning including morning tea, then grabbing pre-packed lunch, and afternoon snacks prior to boarding buses for afternoon field trips. Below is a sample day:

8.30 – 9.00 am	gathering for morning papers
9.00 – 10.30 am	presentation of papers
10.30 – 11.00 am	morning tea
11.00 – 12.30 pm	presentation of papers
12.30 – 1.00 pm	collect lunch and board buses
1.00 – 5.00 pm	field trip

Conference Venue

The primary venue for the 2018 conference venue for the presentation of the papers is the Margaret River TAFE which is centrally located within the town of Margaret River and is centrally located to the accommodation, food and beverages and key services.

Field Trip Locations

The itinerary of field trip locations is currently being compiled and will include a range of caves and karst formations, other key attractions and places of interest in an effort to provide a broader cross section of management and conservation. MRBTA is working with Department of Parks and Wildlife to host one day of field trips also. The field trip itinerary will be published in the December journal.

Accommodation

We have sourced a number of accommodation options that are located in close proximity to the town center and also cover a

good cross section of budgets. Venue details and booking options will be published in the December journal.

Conference Catering

In an effort to accommodate all and to keep the overall conference cost as low as possible, the purposed format for catering at the conference will be as below, please note information will be provided for local shopping centers, cafes and restaurants.

Breakfast at own cost

Morning Tea

- Provided at conference venue
- Self-serve tea and coffee, with assorted muffins, biscuits and fruit

Lunch and Afternoon Tea

- All pre-packed for taking on field trips - assorted rolls, bottle of water, fruit, cake/cookie etc and cheese and cracker style pack

Dinner

- Casual BBQ dinner of Sunday of arrival
- Catered dinner Monday, Wednesday and Final Dinner Friday
- Tuesday and Thursday dinner at own cost, we are speaking to local suppliers to source discounts or offers from venues in town to offer to ACKMA

Conference Transport

Buses will be supplied for field trips each day, which will depart and return to the conference venue.

Buses will be supplied to and from scheduled dinner venues on Monday, Wednesday and Friday evenings if required.

A support vehicle and driver will be available if required.

Bus Transfer to and From Perth

This will be as an optional extra, subject to numbers.

We have 3 options to get to Margaret River and then back to Perth

- Set departure time on Sunday early afternoon for a dedicated ACKMA bus one way down to Margaret River and the same on the return Saturday mid- morning – Costs per person, departure and arrival times to be confirmed
- Those outside these times we can offer either to book a seat on either Southwest Coaches or TransWA, both with set departure times and routes, both via airport - Costs per person, departure and arrival times to be confirmed

Conference Registration Form and Costs

The conference registration form will be issued in December, we are currently finalising the details of the conference including the registrations fee; all efforts are being made to minimise costs and to be in line with past conferences fees.

Early Bird List

We would welcome any early bird expressions, if you are keen to attend the 2018 ACKMA Conference in Margaret River, if you are indeed interested please send an email to:

<mailto:conferenceregistrations@ackma.org?subject=EarlyBird>
Conference Expressions of Interest

