

CAVES



AUSTRALIAN
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The Journal of the Australian Speleological Federation Inc.

AUSTRALIA



**CEGWA EXPLORES THE BAXTER CLIFFS
CAVE PHOTOGRAPHY
OBSCURE CAVES**

No. 222 • DECEMBER 2022



Ticket purchasing open

– so make sure to grab your early bird ticket!

<https://asfconference2023.com/>

Conference camping has been confirmed at the beautiful Shelley Beach caravan park; the dunes and beach there are gorgeous and the caravan park owners are friendly and helpful. If you want to jump in and book a campsite, make sure to mention you are coming to the ASF caving conference and they will put you in our allocated area.

There are also a limited number of powered sites available.

Merchandise, photo competition and speaker abstracts will be up soon; keep a lookout for updates on our Facebook page and website.

In the meanwhile, it has been great to see so many people at the online talk series.

We have one this month and then possibly a sixth (TBC) before the series ends.

Thanks to all of you who have been attending and participating in the discussions, and of course thanks to our stellar speakers.

We are really looking forward to seeing all of you in person next year and we'll keep you updated as planning progresses.

I know I said it already, but: *Don't forget to get your early bird tickets!*

Have a question?

Contact event organisers at registration@asfconference2023.com

COMING EVENTS

WITH travel restrictions generally lifted, attendance at international speleological events is possible again. Information on UIS-sanctioned events can be viewed at <http://tinyurl.com/y7rgb8ah>

Don't forget that the International Year of Caves and Karst has been extended to this year — 2022. You can find more information about what's going on and what you can do to help the cause at <http://iyck2021.org/>



CAVES AUSTRALIA

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Cover: *Genghis Khan*. Photo: *Garry K Smith*

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Editor and Production Manager Needed

The positions of Production Manager and Editor are now vacant. Please contact Alan Jackson if you're interested in either or both of the roles and we'll discuss what's involved.

— Alan Jackson: alan.jackson@lmrs.com.au

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EDITORIAL

THIS IS the end of the line for me as editor and production manager of *Caves Australia*. I'd better do my thank-yous.

A general thanks to all the contributors, editors, proof-readers and advertisers I've worked with.

I'd like to single out Susan White for being canny enough to trap me in this role in the first place when I was silly enough to complain about the irregularity of *Caves Australia* at the time. I've always appreciated Susan's blunt feedback and advice and the fact that it is coupled with thick enough skin to tolerate my equally blunt style — lots of disagreements over the years but not an ounce of resentment. Thanks for all your criticism and support, Susan.

Greg Middleton also needs a shout out for being a long-term positive contributor to my *Caves Australia* tenure. Greg, who is 76-going-on-130 at times, never ceases to make me laugh when going through his proof-reading comments.

He has been an encyclopedia of how to 'write proper' from way back in my ancient past when I was STC's *Speleo Spiel* editor. Like Susan, Greg is a champion at amicably agreeing to disagree.

And then there's Fred Baker on the layout front. Fred has done layout for every issue I've worked on. While his professionalism and skills have obviously been essential, his wit and sarcasm are what has kept me going while being bombarded by the demands of needy contributors and proofreaders.

I spent a lot of time despising ASF in my early caving days, which mostly stemmed from what I saw as a disconnect between those running the show and the general membership. I eventually took the advice of several caving friends that if you can't beat them, join them and try to improve things from the inside.

I'm not sure I can take any credit but I have certainly observed much positive change in the way ASF communicates with its members over the last decade and that trajectory looks to continue under the current regime.

The future of *Caves Australia* now hangs in the balance, with no one yet putting their hand up to take on its production. We need to ask ourselves if *Caves Australia* in its current format is what is wanted and/or needed. Is *The Cricket*, or some similar format, the future of regular ASF publications?

Fred is made of sterner stuff than I and is ready with all the systems in place to continue the status quo should someone stick their hand up.

Hell, I'm even happy to help out in a transitional role if that's what it takes. Imagine the ego-stroking and gloating I'll be able to do if *Caves Australia* falls over totally without me; ask yourself what you can do to prevent me from achieving that satisfaction. — Alan Jackson

President's Report



BRAN EVANS

WITH the December issue of *Caves Australia*, the year is coming to an end. This issue also marks another ending, as it is likely to be the last produced under the helm of our production manager and editor Alan Jackson.

With his amazing organisational skill and attention to detail, he has efficiently managed the publications over the past 15 years.

Alan first stepped into the role of production and advertising manager in 2008 to bring out issue #173 after a few years of sporadic publication.

Under his guidance *Caves Australia* came out like clockwork with four issues a year, working with Brooke Grant and then Ian Curtis as Editors.

Alan took a break in early 2015 then came back with a bang in 2018 with the first colour photo on the cover of the digital version of #203.

In true Alan style, he also stepped it up a notch taking on the roles of both production manager and editor, along with the indispensable team of proofreaders, including most recently Susan White, Greg Middleton and Ian Curtis.

Over the past few years Alan has significantly reduced production costs and especially postage, with most members opting to receive digital copies of *Caves Australia*.

This year has seen further scaling back of printed copies, migrating to a subscription basis and minimising the number of printed journal exchanges with other organisations.

During Alan's tenure *Caves Australia* has also become fully open access, reaching a broader audience to promote caving to the wider community and to prospective new members via the ASF website.

The ASF gives a very warm and sincere thank you to Alan Jackson for all the time and energy he has spent to bring us 48(!) editions of *Caves Australia*, regularly, without fail.

We wish him all the best with future projects, as for now he has other mountains to climb.

The ASF is seeking a replacement in the role(s) of production manager and editor. *Caves Australia* is a valuable publication for the ASF and a means of communicating the exciting things you and your club are doing to the wider caving community.

If you're interested in getting involved with *Caves Australia*, please get in contact with us at the ASF Executive asf.cave.info@gmail.com.

For now I wish you all a safe and enjoyable summer holidays and I look forward to seeing you in the next edition in 2023.

— Sarah Gilbert



Mardabilla Plains — Eyelight Cavern. Photo: Paul Hosie

Exploration of the Baxter Cliffs

Paul Hosie
CEGWA

A PROJECT 17 years in the dreaming finally became a reality in April 2021 as we found ourselves flying above the water 150 m away from the face of the Baxter Cliffs.

The mouths of dozens of giant cave openings we saw had us awestruck and exhilarated by the possibilities on offer.

Back in 2004, I had co-ordinated a six week, 30-person expedition to the Nullarbor. We achieved a lot of exploration and had a lot of fun in the process which was subsequently reported in *Caves Australia*.

One of our teammates, Allan Sharpe, had flown in a Cessna light aircraft along the cliffs from Esperance to land at Madura airstrip and join us for the expedition. He reported seeing many big holes in the cliffs during his flight.

I committed at that point to one day properly explore the Baxter Cliffs for caving and cave diving potential.

After several failed attempts over the intervening years to conduct the survey with light aircraft, a real opportunity presented itself in late 2020.

Confined within our state borders during COVID travel restrictions, fellow CEGWA founder and now famous Australian cave diver Craig Challen expressed an interest in taking on the task of surveying the Baxter Cliffs using his Robinson 44 helicopter.

As it turned out, this was exactly the right tool to undertake the survey as it gave us the resolution we needed to clearly identify and locate cave entrances in the cliff-face as small as just a couple of metres in diameter.

We planned to conduct the survey at Easter 2021 and made our preparations, making video camera mounts and refining



the setup and our communication procedures during test flights near Perth.

Kim Halliday used a DSLR to capture high resolution imagery of individual cave features while GPS tracks and waypoints were recorded in synch with the video capture. We ended up taking the door off the helo to capture the highest quality imagery we could.

Easter 2021 soon arrived and a small crew of three CEGWA members served as

ground support crew for our pilot and his whirlybird.

The weather was favourable as we did our first survey flight of the western end of the cliffs from the start near the enormous Bilbunya Dunes through to Toolinna Cove, approximately 50 km.

It was unforgettably breathtaking and spectacular with the ocean clear and calm. The layers in the limestone cliffs were colourful and mesmerisingly beautiful.

Craig skilfully flew the helo as slowly as he practicably could, less than 200 m from the cliff-face and well below the cliff-top. This enabled us to video capture the cliff face at the highest possible resolution for future analysis and reference.

The result was some 50 obvious cave features recorded in this first effort. All the data and video footage was assiduously saved and backed up at camp that night.

Having cut our teeth, proving that the setup and process was working, we then completed the survey of the remaining 120 km of cliff face from Toolinna Cove through to Twilight Cove at the Eastern



Baxter Cliffs crew, September 2021

PAUL HOSIE



end of the cliffs.

From this survey we recorded another 96 blindingly obvious cave features. A remarkable thing happened as we were flying back to camp that day. As we flew over the land a big black cave entrance in a doline appeared in the ground directly in front of us.

Craig circled the feature and landed 150 m away in a small rocky clearing where he shut down the engine. Of course we had no caving gear with us, so we gingerly explored the daylight zone of the vast entrance chamber and saw that it continued down into the depths of darkness at the furthest point. This was our first experience of exploration helicaving — and we liked it.

Back at camp that night, a check of previously documented karst features revealed that this was in all likelihood a new discovery.

The next day all four of us returned to the feature with caving gear and explored a wonderful cave system with a single 10 m wide, 3-5 m high passage over its 150 m length.

The main passages lay approximately 20 m below the surface and it is decorated with massive old black calcite columns and flowstone as well as active formation. The floor in some sections is a mass of bone material.

Craig named the cave Robinson Cave after his beloved red helicopter with which we made the discovery. Since this time we have discovered several dozen similar cave and karst features in the area which we continue to systematically explore and survey.

Shifting base camp 100 km west to the Israelite Plains, we hooked up with CEGWA's Esperance cohort, comprising Paul Pratt and Allan Sharpe, who brought a highly valued 44 gallon drum of AvGas with them.

Joining them were Doug Creighton, Allan Hoggart and Graham Maitland from Condingup, who have been successfully exploring and documenting caves in Mardabilla Plains for a number of years together.

The aim from this point was to conduct helicaving activities in the Mardabilla Plains area, following the seminal work presented by Paul Devine at the 2007 ASF Conference in Mount Gambier.

CEGWA is committed to exploring and documenting the thousands of karst features in the Mardabilla Plains identified by Paul Devine. We have visited and documented approximately 2,000 of his features in the far Western Nullarbor over the past 10 years.

At this stage, exploration helicaving was our new favourite hobby, consisting of flying one or two small crews out into a

Elijah Martin on rope at Feature #200A





Kim Halliday and Elijah Martin in the Eye of Horus Cave

remote part of the bush, landing and then walking a 10-20 km loop while investigating karst features and exploring caves along the way.

The key to success in helicaving is getting back to camp before sunset as Craig is unable to fly at night. We cut it close to the mark on a couple occasions but the caves we discovered and explored were worth risking a night in the bush.

Over 100 features were visited and documented over five days of helicaving in April 2021, many of them being diverse and fascinating cave systems. Of all the cave exploration activities I have been involved in over the past 25 years, this was by far the most thrilling, enjoyable and rewarding experience.

Once we were back home from this trip, the hard work began: compiling the collected data and analysing the cliff survey video footage. This took over 100 hours and resulted in 400 potential karst feature locations comprising 640 individual entrances.

These were all then painstakingly categorised and prioritised by Kim Halliday

and me for future investigation. At this time we became aware of another team's interest in and commitment to exploring the Baxter Cliffs, so we reached out to them and offered to collaborate and share data, an offer that still remains.

Planning immediately began for our first cliff jumping trip in September 2021. Christie and I had abseiled 60 m and had a swim in Toolinna Cove 10 years earlier, so we had some idea of what we were in for — hard work and fun.

It was about this time that we had a fortuitous hook-up through one of our members who was working at an industrial roping training centre. We established a strong rapport with the roping instructors and they were fascinated by our project, offering us their skills, experience, equipment and facilities to upskill us in double rope techniques.

From this we embarked on our pathway of applying full industrial roping techniques to the Baxter Cliff work, involving twin ropes, rigging for rescue and use of both the Arachnipod TEMS as well as edge

rollers. Since this time CEGWA has purchased its own Arachnipod TEMS, which is a fantastic capability for future use.

During September 2021 we focused on exploring cliff features and helicaving in the western and central sections of the Baxter Cliffs. We were able to have two ground teams and one helo team working cliff features concurrently, so it was fabulously productive as well as fun.

Many valuable lessons were learnt on our techniques, including the value of using drones to accurately locate the cliff top drop point for a targeted feature. We only stuffed that up a couple of times as it was very frustrating finding yourself hanging on a rope at the base of an 80-90 m high cliff with no cave in sight.

Another interesting incident saw the author accused of being a hardcore swinger, which was difficult to deny at the time (just don't tell Christie, please).

The standout discovery of this trip was the Eye of Horus Cave, a mid-cliff feature identified as #202 on our list and named before we even got there. A 50 m abseil



Main Passage in Eye of Horus Cave

PAUL HOSIE



Eye of Horus lower cave speleothems

over edge rollers and a landing on a narrow ledge at the cave's entrance saw CEGWA members Gerard Caporn and Eli Martin explore a large, fabulously decorated phreatic trunk passage for more than 400 m.

The next day Kim Halliday and Craig Challen extended the cave through a further 300 m of rocky, walking-sized passages and several sections of unique and spectacular decoration; 600 m of passage was surveyed that day by an exultant team of explorers who then had to be ferried 50 km back to camp in the helicopter.

Apart from the 15 cliff features we abseiled into, including the Eye of Horus, another 15 karst features were identified, visited and explored inland from the cliff top.

Among those we visited and explored were the massive Seal Egg Cave and the extensive labyrinth of Shield Cave where a calcite shield formation was seen, as well as a beautiful female Tartarus spider which

was photographed on her roof funnel web. Of note, most of the hundreds of new caves we have explored and documented in the far Western Nullarbor have populations of Tartarus spiders in them.

The single most exciting discovery at this time was a feature we explored in the cliffs which had several lakes containing speleothems in a short underwater passage. Both stalactites and stalagmites were observed below the water — this is unique on the Nullarbor as far as we know.

The degree of difficulty to safely access this feature is very high as the cliff face bulges out directly above the feature. Once a position to drop straight down is achieved, it is directly into water so a grappling hook has to be deployed to pull yourself into the cliff face, keeping your feet dry.

As the skill base and technical roping experience within CEGWA has grown since then, we are now ready for a return trip with dive gear to document and survey this



PAUL HOSIE

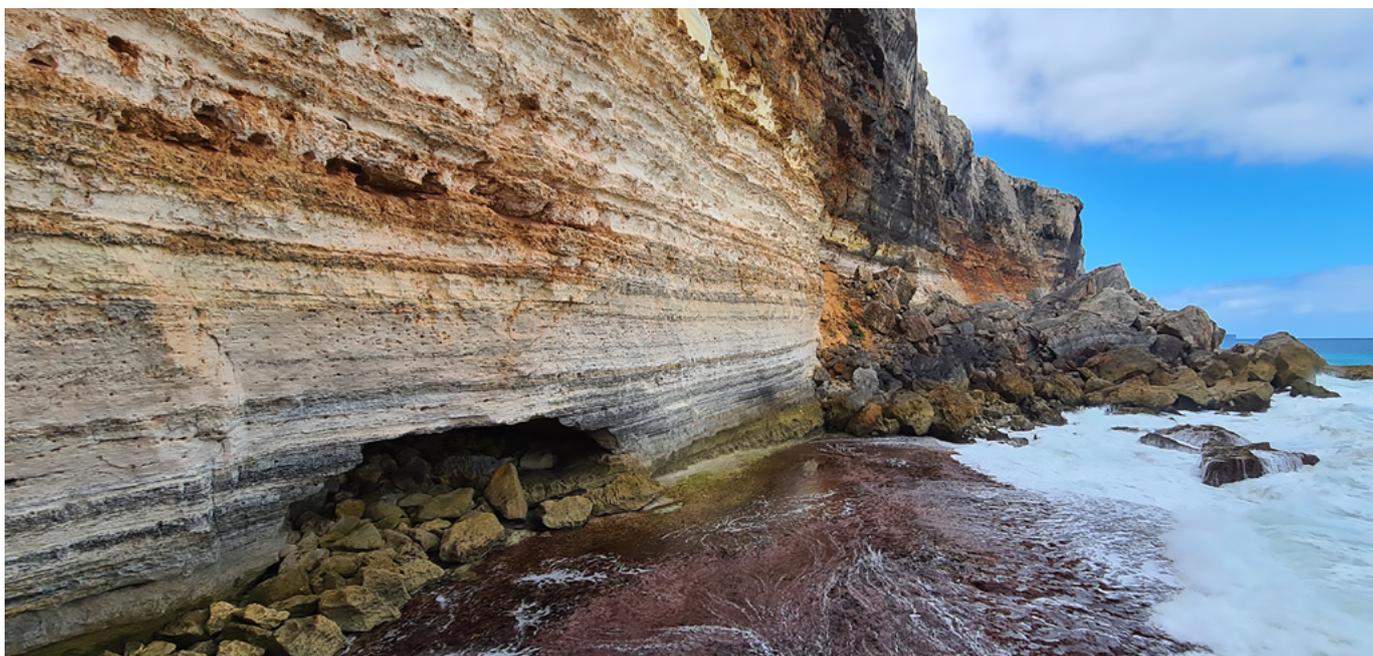
One metre long gypsum stalactite in Chandelier Cave

cave and determine its full underwater extent.

We learned a lot about the different types of features in the cliff face during the September 2021 trip. As a result of this, I repeated the video analysis and feature identification, location and prioritisation for the entire Baxter Cliffs, often going frame by frame to do so.

After another painstaking but far more efficient 100-plus hours of doing this, the result was 540 potential karst feature locations comprising 974 individual en-

PAUL HOSIE



Feature #78 - Dolphin Cavern





Christie Hosie and boys in Raven Cave

trances. No time to waste — plenty of work to do.

Our next trip was at Easter 2022, where we focussed our efforts on the central and eastern sections of the cliffs. We started employing more sophisticated techniques, such as re-anchoring on the rockface and accessing widely overhung entrances which involved advanced application of the grappling hook and associated ropework.

On this trip we were able to investigate and abseil down to nine cliff features, most of which were caverns. The standout discovery was of Chandelier Cave, first entered by Eli Martin after a very difficult cliff face access requiring two people on rope for mid-cliff edge safety management and re-anchoring above the massive cave mouth. Eli excavated a small hole at the edge of the rockpile where he could feel air blowing out. The restriction soon opened into a

large, phreatic, heavily-decorated passage.

Magnificent gypsum formations were encountered 70 m into the cave, including a cluster of jagged gypsum columns 2 m high. It also included a spectacular gypsum stalactite ‘chandelier’ 1 m in length after which the cave is named.

Among the additional 20 new features discovered inland during this trip, several significant discoveries were made, including Raven, Staghorn and Glossowary Caves.

Raven Cave is notable for its huge chamber and passage, the roof of which is completely covered with thousands of calcite straws and stalactites. The columns found in this cave are also the largest we have seen so far. Many of these features will be returned to in 2023 for further exploration and surveying.

Our most recent trip was in August 2022, when we focussed on the eastern end

of the cliffs close to Twilight Cove and back along the cliffs 30 km to the West. Nine cliff features were visited and explored, seven of them being caves.

An additional 20 new inland features were recorded, among them the impressive Three Sentinels Cave explored by Doug Creighton with approximately 300 m of large, beautifully-decorated passage. Another was Millipede Cave with its beautiful 20 m deep, 5 m diameter solution tube entrance shaft.

The standout discovery of the August 2022 trip was Sealions Jacuzzi Cave, explored by Alex Aberle-Leeming and Craig Challen with over 500 m of passages, 360 m surveyed.

The small, unassuming entrance to this cave lies 70 m below the cliff top and a grappling hook was used to pull ourselves into the entrance ledge.



Sealion at end of Sealions Jacuzzi Cave



PAUL HOSIE

Kim Halliday abseils into the Eye of Horus

This cave is fabulously decorated at its furthest reaches with calcite, halite, gypsum and semi-transparent selenite formations including the divine 40 cm long Eagle's Wing.

The cave is also notable for the two sealion skeletons, one located 100 m into the cave and another fully intact skeleton

at the furthest point, 360 m from the entrance. Given that the cave entrance is in the cliff face approximately 10-15 m above the current sea level, it is interesting to consider how long ago these animals perished and what drove them to navigate so far into the pitch blackness of the cave.

There is still much fun to be had explor-

ing and documenting the many hundreds of karst features we have identified and accurately located in the Baxter Cliffs. It is a terrific project for our multi-skilled and talented team of CEGWA enthusiasts to be involved in.

We look forward to sharing more of our discoveries as time goes on.



PAUL HOSIE

Another cave in the bush (left to right) Kim Halliday, James Jooste, Craig Challen, Alan Sharpe, Paul Pratt.



Cave Photography: Challenges and Tips

Garry K. Smith
NHVSS

A NON-CAVER or someone new to caving generally does not appreciate the difficulty of taking photos in the subterranean world.

I have been asked as a guest speaker to talk about caves and caving at various community group functions over the years and typically hear comments from members of the non-caver audience, that the caves had good lighting.

Obviously, these people are relating their comments to well-lit commercial tourist caves. They don't realise that we only have head torches for lighting and that the photographs were taken in completely dark caves, lit for less than a hundredth of a second by electronic flash units.

It is only when I talk about some of the underground conditions that they begin to grasp the difficulties in taking cave photos.

'A picture is worth a thousand words' and a cave photo is no exception. Collectively, they are a record of a trip, places visited, people involved and are a snapshot of what is in the caves.

Capturing a moment in time of an underground scene can be challenging due to the harsh environment.

A photographer is faced with many hazards, including: dust, high humidity, mud, water, confined space, foul air and slippery and unstable surfaces. The photographer must also consider many other aspects including the subject matter, appropriate lighting and framing the subject, as well as including an object or someone for scale (Wools-Cobb 2003a-b, Smith 2009).

There are far too many aspects of photography to cover here, so only a brief overview of the most prominent points are summarised in this article.

Certainly, a caver can take happy-snap photos with a point and shoot compact camera using only light from the camera's inbuilt flash, but the images from this type of photography can be very flat and lifeless.

To achieve a more in-depth photo with plenty of contrast, a cave photographer needs to become more dedicated to the art



Fig 1. Macro lens setting used to capture close up of straw tip. Note stalagmite reflection in drop.

of flash illumination in order to capture that 'wow' factor image. Some excellent reading on this subject are the two books by Chris Howes (1989 and 1997).

When planning a photographic trip it is important to make sure that all members of the party know in advance that the aim of the trip is photography. Dedicated photography trips can yield the best results by far.

I must confess that my perception of digital camera technology before 1999 had me sticking to traditional film cameras. However, that all changed when affordable

5 megapixel cameras came on the scene.

The advances in digital cameras had far surpassed the capability and image resolution of film cameras. I quickly became a convert and I haven't looked back, so this article only considers digital photography.

There are four broad classifications of digital camera: compact, prosumer (or bridge), DSLR and phone camera.

Compact digital cameras are also known as 'point and shoot' or 'consumer cameras', and prosumer cameras are sometimes called 'bridge digital'.

For information about the distinguishing features of cameras in each category and a more in-depth discussion of the pros and cons of these camera types, refer to the ASF Conference paper by the author (Smith 2009).

The quality and technology in phone cameras has been jumping ahead in leaps and bounds over recent years, and they are not covered in the 2009 paper. Even with today's high-tech phone cameras, the greatest drawback is the difficulty of synchronisation and setting exposure levels to match stand alone slave flashes.

If photos are taken just with a torch for lighting, then exposure may not be an issue; however, electronic noise in low light can be a detrimental aspect of a phone camera.

CHOOSING THE RIGHT CAMERA AND LENS

This is a very broad subject and the requirements can vary considerably from one photographer to another. Here are a few simple things to consider when looking for the right digital camera.

- A camera that can be operated in full 'manual' mode will give more flexibility to override settings and thus allow for more creative photography.
- A camera with low light sensitivity will generally produce better images in a dark cave.
- A zoom lens that covers a 'field of view' from 28 mm to 200 mm or more is preferable for taking wide angle shots



Fig 2. Flash and camera tested with trial image.

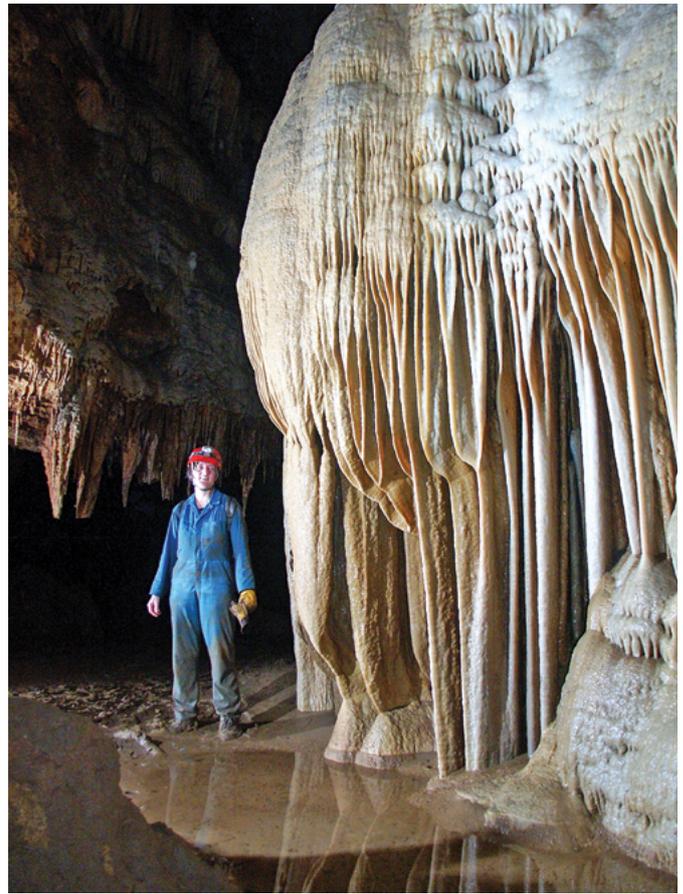


Fig 3. Model moves into position to provide scale of speleothem

in small chambers, through to zooming into those further away objects. Avoid changing DSLR lenses while underground, as dust or moisture can get onto the image sensor (CCD or CMOS) and cause problems, so maybe consider a camera with a non-detachable zoom lens. DSLR detachable lenses can act as an air pump, sucking dust particles and moisture into the camera. This effect is far less likely with a Prosumer non-detachable zoom lens.

The macro focus distance of a lens may be important if considering close up photography of cave invertebrates or crystals (Fig. 1).

There must be the option to turn off the camera's double flash related to 'red eye reduction' or additional multiple flash firing that may be used by the camera to determine white balance or exposure settings. The double or triple flash firing may interfere with the synchronisation of slave flashes.

These flashes from the camera's inbuilt flash may be so close together (just hundredths of a second apart) that they are difficult to detect with the human eye.

Firing the camera flash at a black low-reflectivity surface (e.g. matt black paper) close to the camera and only looking at the black surface is a visual method of determining if there is more than one flash firing during the taking of a photo.

CHOOSING FLASH AND SLAVE EQUIPMENT

Many digital cameras have a small in-built or pop-up flash that is typically inadequate for photography in caves. Therefore additional slave flashes, set off by either the camera flash or a slave trigger, can make a huge difference to the amount of light and lighting effect in a photo.

Flash slave triggers such as the Firefly2 and 3 are set off by a pulse of infrared (IR) or visible light, thus remotely firing the electronic flash to which they are attached. This occurs when the camera's small inbuilt flash is set off when taking the photo.

If the digital camera is using a very rapid series of pre-flashes to perform various functions, the Firefly probably won't synchronise with the timing of taking the photo. A method of checking synchronisation is explained later.

The Firefly slave triggers are very sensitive and will work on electronic flashes up to 500 metres away from the camera and even around corners — there are no connection cables required.

However, if a Firefly is in close proximity (several metres) and direct line of sight with the LCD screen at the back of the camera, the flickering screen (the flickering is not visible to the eye) will set off the slave flash unit.

A bright LED torch with its high fre-

quency flickering on a low setting may also set them off when at close range. It can also be annoying when the photographer's slave flashes are firing randomly as other people take photos in the cave.

To get around this problem, radio frequency slave (RFS) units are a blessing, as they can be set to only fire from the photographer's slave trigger. Typically, RFS units need their trigger to be attached to a camera's hot shoe.

Many cameras are made without a hot shoe connection, so be conscious of this when deciding which camera to purchase.

One disadvantage of an RFS unit is the limitation of distance from the camera and often the need to be in the line of sight to operate. The old saying 'You get what you pay for' applies here, so it is worth initially forking out extra cash for the higher quality RFS to get better range and reliability.

Some advanced slave flashes and trigger units feature a switch on the back that allows the user to select between several triggering modes used by different digital camera types and models.

It is worth investing in at least one or more good quality slave triggers to put on electronic flashes. A 'non dedicated' flash has a single contact on the square section of the plastic moulding that comes into contact with the camera's hot shoe. 'Dedicated' electronic flashes with multiple contacts on





Fig 4. Image illuminated with flash at side of photographer.

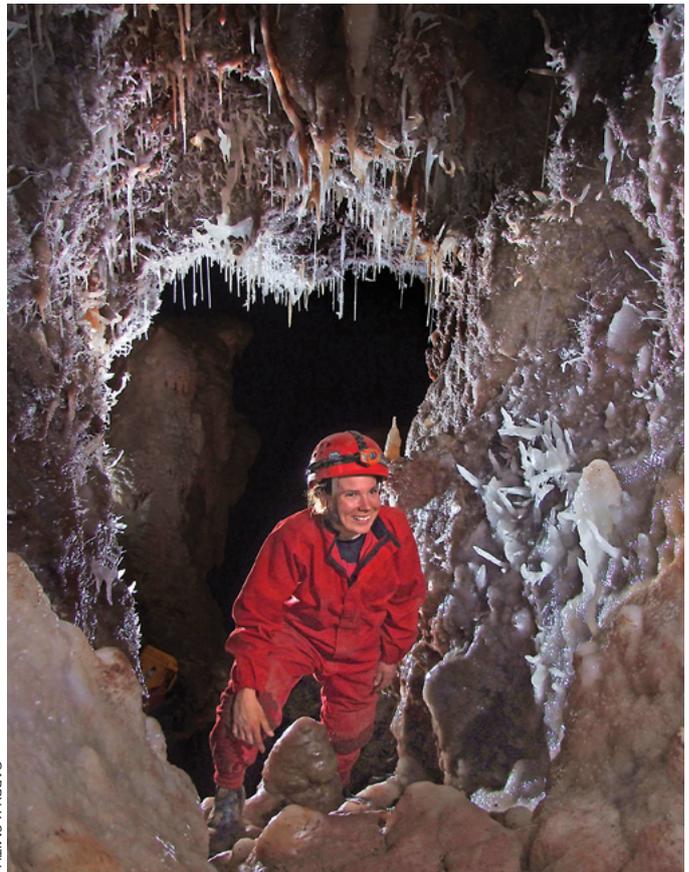


Fig 5. The same scene with reduced flash intensity at front and addition of strong back lighting. Tessa Baker in Barralong Cave.

CARRY K SMITH

CARRY K SMITH

the hot shoe may not work with the Firefly triggers. A second-hand flash purchased from a pawnbroker or cash converter is probably the cheapest way to get started, but check that it is compatible with your slave trigger and will synchronise with your camera before purchasing.

It is worth paying a little more to get an electronic flash with a couple of intensity settings and the smart technology of an in-built light sensor which can cut off the flash when the subject is exposed correctly.

PRE-CHECKING CAMERA EQUIPMENT

One of the biggest mistakes is to lug all the camera gear into a cave only to find that the batteries are flat or something has been left behind.

To mitigate this issue, check that all equipment is working before leaving home by setting up mock photos in a dark bedroom or at night in the back yard.

Make sure slave flashes are firing in sync with the camera flash and that the correct exposure can be achieved with camera in full manual mode. Many compact digital cameras will not allow the photographer to turn off the automatic double flash setting.

An easy test is to take a photo of the slave flash units set up on the other side of a dark room. If the photo shows the flashes firing with bright lights, then the camera

and slaves are in sync. This is explained in more depth in Smith (2009).

When purchasing camera equipment, try to stick to equipment that uses the same size/type of battery, e.g. rechargeable AA. This will reduce the number of spare batteries required and help to reduce weight.

Bear in mind that rechargeable NiMH batteries will hold their charge for a long time when not in use. I have personally found Panasonic Eneloop rechargeable batteries (AA and AAA) to be superior to most on the market. A good battery tester is worth having at hand. Remember to check for some small batteries hidden in the slave triggers.

MODELS AND HELPERS

Cooperative cave models with plenty of patience can make the difference between a good and a bad photo. It can be frustrating for a model waiting around while the photographer is experimenting with lighting and camera aperture settings, so try to get set up before asking a model to move into position. Make sure that none of the cave models have reflectors on their clothes, or if they do, cover them up. Reflective strips on clothes will cause over-exposed patches or underexposure of the whole image.

The model's pose (body language) and position in the framed image is important. In most circumstances, using the thirds

rule (the person or subject one-third in from the side) can make a big difference to the final image. Where the model is looking is also important.

Cave photographers don't have a particularly good reputation with other cavers because of the time it takes to set up and snap the desired photo. Hence it is a good idea, while the rest of the party is exploring possible leads in the vicinity, that the photographer should take the opportunity to size up the photo subject, get the gear ready with flashes in place and camera position determined.

It can be very helpful to have someone holding a flash at an angle and height which otherwise could not be achieved. Snap a few test shots to check lighting without a cave model in the picture.

When all is set, ask the model to step into the picture and take the shot (Figs. 2 and 3). Groups of photographers can work together to simultaneously capture the image from different positions. Refer to Smith (2009) for more in-depth discussion of each aspect mentioned in this article.

LIGHTING THE SUBJECT

Despite having superb subject material to photograph, bad lighting can severely diminish the visual impact (wow factor) of a photo. Some good rules of thumb are:

■ Expose the subject well.



GARRY K SMITH

Fig 6. Two bright flashes behind models (pointing toward camera) and two weak flashes illuminating front of cavers, are used to capture this image. Katerina Fulton and Penny Sze, Gloucester Caves, NSW.

- Have a few dark areas in the photo to provide contrast and add depth to the subject.
- Side lighting will provide some degree of contrast/shadow to the subject.
- Back lighting, in conjunction with soft front lighting, can greatly enhance the photo by giving the subject an aura (Figs. 4 and 5) and provide reflections from pools of water (Fig 6). Avoid excessive flare from a slave flash pointing back toward the camera.
- A torch beam can produce a spot of illumination that can be either detrimental or an advantage to the composition and subject of a photograph (Fig. 7).
- Generally avoid prominent harsh shadows in the field of view.
- Experiment with flash lighting the subject from different angles and intensities. Moving a flash unit a small distance or changing the angle can make all the difference between a mediocre photo and a fantastic photo. An unlit background can often make the difference (Figs. 8 and 9).
- When photographing large chambers, the light output from flashes, sensitivity of slave trigger units and their placement can be crucial (Fig. 10).
- Enhancing a digital photo in a computer program such as Photoshop can make a good photo slightly better, but it can't make a bad photo look good. Therefore, the photographer must capture an image

which is well composed and with good lighting while in the cave.

GENERAL TIPS

Always have the camera set on the highest resolution to take a photo, even test shots. It is often impossible to re-create that perfect photo with a person's expression or lighting effect, however it is easy to delete an unwanted dud image.

Include an object or person for scale. Without a scale the object of interest may be perceived to be much larger or smaller than the actual size (Fig. 11).

It is good practice for the photographer to shine their headlamp directly at the model to focus the camera as this also reduces the chance of the model having 'red eye' as a result of dilated pupils. This is not very pleasant for the model looking straight at a bright light, but it works.

Once the camera is focused, the photographer must continue holding a finger on the button to maintain focus, turn their headlamp off or point it away from the camera field of view and take photo. Generally speaking, keep headlamp beams out of photos.

- Taking photos with the camera set on manual mode will provide the most flexibility with creativity.

- Set the camera's ISO (sensitivity to light number) at a level that has very little electronic noise – refer to the camera manufacturer's recommendation.

- Adjust the aperture on the camera to get the correct exposure to suit the highest available electronic flash output or other light source. Using smaller aperture (high f-stop number) settings will produce images with the greatest 'depth of field' or in-focus range.

- Experiment with the illusion of size, with subjects close and at distance using slave flashes and a small aperture (Figs. 12 and 13).

- Carry camera gear in a good quality protective case that is dust and waterproof, and shock resistant. A favourite with many photographers is the Pelican case.

- Try to reduce the camera gear required underground to the bare minimum to reduce bulk and weight without compromising on quality of images that can be achieved. For example, is a tripod really necessary? I would suggest that it isn't needed most of the time.

CONCLUSION

Cavers who just want to take happy snap photos using torch lighting can achieve reasonable results with a phone camera, but in low light situations the results can be very





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Fig 7. In CC4 Church Creek, a torch beam was used to highlight Dragon Rock and its handler. Despite several attempts at using slave flashes, the narrower beam of a head torch proved the most affective. Tubes to narrow the flash beam are another option.



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Fig 8. Tasmanian cave spider well lit, but the illuminated wall behind detracts from the subject



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Fig 9. Flash moved further behind spider so wall is not illuminated. Spider is now the focus of the viewers attention.

grainy with electronic noise.

To get good quality images, a cave photographer will get the best results by using a prosumer or DSLR camera in conjunction with slave-triggered electronic flashes.

In many respects modern high-end prosumer digital cameras are better suited to photography in cave environments than

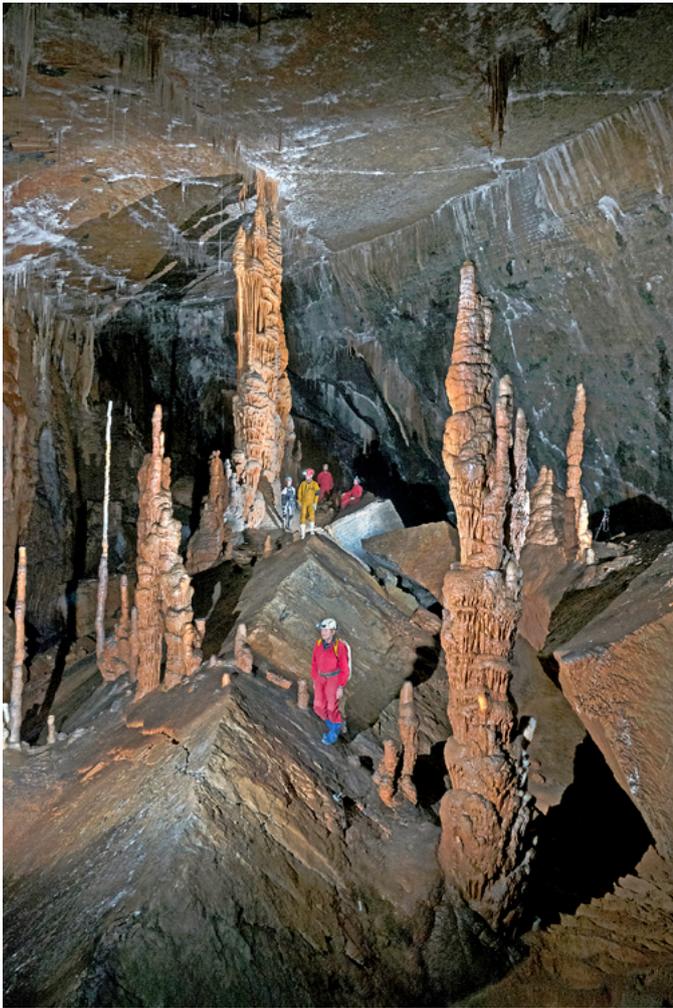
DSLR cameras. This is because prosumer cameras with non-detachable lenses have fewer issues and cope better with cave environments varying between high humidity and dust.

Framing of the subject, lighting, model's body language and facial expression can make the difference between a poor and a

great image. Include something or someone for scale.

Protect camera and flash gear in a strong water and dustproof case to take underground. Above all, photographers must know intimately how all their camera equipment works and check the operation of everything before going underground.





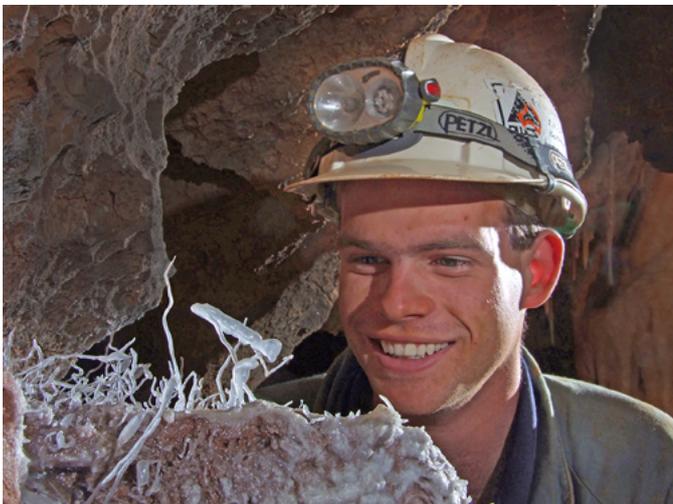
GARRY K SMITH

Fig 10. The Ridgeway in Kubla Khan, Tasmania, lit with five flashes.



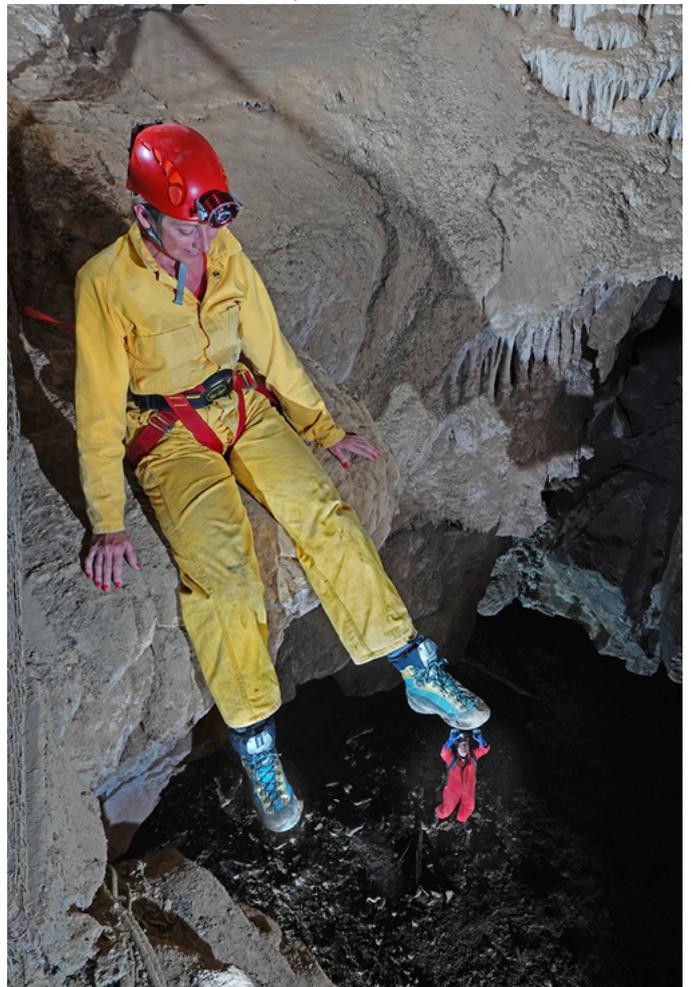
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Fig 12. Experimenting with the illusion of size. Deb Hunter squashes Jess Bertels in Potters Way (BAA108) Bullita, NT.



GARRY K SMITH

Fig 11. To provide scale and orientation, Chris Turner models next to unusual heligmites in Barralong Cave, Jenolan, NSW.



GARRY K SMITH

Fig 13. Marcia Kaye stepping on David Stuckey in Arch Cave, Abercrombie, NSW.

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Obscure non-carbonate caves around Newcastle, NSW

Garry K. Smith
NHVSS

THE NEAREST limestone karst areas to Newcastle are more than two hours' drive away.

Despite this, there are plenty of caves in non-carbonate rocks close to Newcastle. My definition of a cave is 'any cavity large enough for humans to enter which extends beyond daylight', so rock shelters and overhangs are not considered here.

I hope this article will inspire cavers around Australia to look beyond their local karst areas to find and document non-carbonate caves.

Exploration can be exciting, as these caves often contain features and biota of scientific interest. There are also many questions that relate to these caves. For example, how did they form and what invertebrates are found within?

There are many sea caves along the coastline south of Newcastle in the Munmorah State Recreation Park (Smith 2022). Each of these sea caves contains features of interest.

An example is the Pink Cave, so named because of the vivid bubble gum-coloured calcite coating on the rocks (Fig. 1).

Another is Ghosties No. 2 South, which is formed in sandstone and conglomerate rock, yet contains calcite flowstone. A caver just has to be inquisitive and seek answers as to why the rocks are coloured pink or why calcite speleothems occur in non-carbonate caves and this can lead to a whole new field of learning.

Less well-known are the boulder caves scattered around the nearby Watagan Mountain Range to the west of Newcastle. These include some good examples of boulder (talus) caves at Gap Creek (Smith 2013, 2019).

The largest is Bangalow Rock Pile Cave (I6E-68), with more than 60 m of passage (Fig. 2). To the inquisitive caver, questions arise as to how these caves occurred and what troglobitic fauna live in them.

Then there are the large fissure (mass movement) caves at Pilchers Mountain, which are among some of the best examples



Fig. 1. Pink Cave has a bright bubble gum pink calcite layer, coating rocks. It is created by coralline algae.

in Australia (Smith 2007) (Figs. 3 & 4). There are 14 known caves with the deepest being 46 m. What is the process that formed these caves and why has an isolated

pocket of subtropical rainforest grown in the chasms where the caves occur?

Other types of non-carbonate caves are piping caves, of which there are two known



GARRY K SMITH



Fig. 2. The entrance to Bangalow Rock Pile Cave (16E-68) in the Watagan Mountains

examples in the outer suburbs of Newcastle. Formed in quartz sandstone and conglomerate rock, these caves are relatively uncommon compared to other types of caves. Crokers Creek piping cave was detailed in Smith (2021) (Fig. 5).

However, there are many small fissure and stream erosion caves in sandstone and conglomerate rock, which are less well known.

Despite being created in non-carbonate rock, some even contain reasonable

examples of calcite speleothems.

SMALL FISSURE CAVES

Mt Sugarloaf is part of a sandstone/conglomerate mountain range to the west of Newcastle. Various parts of the range are

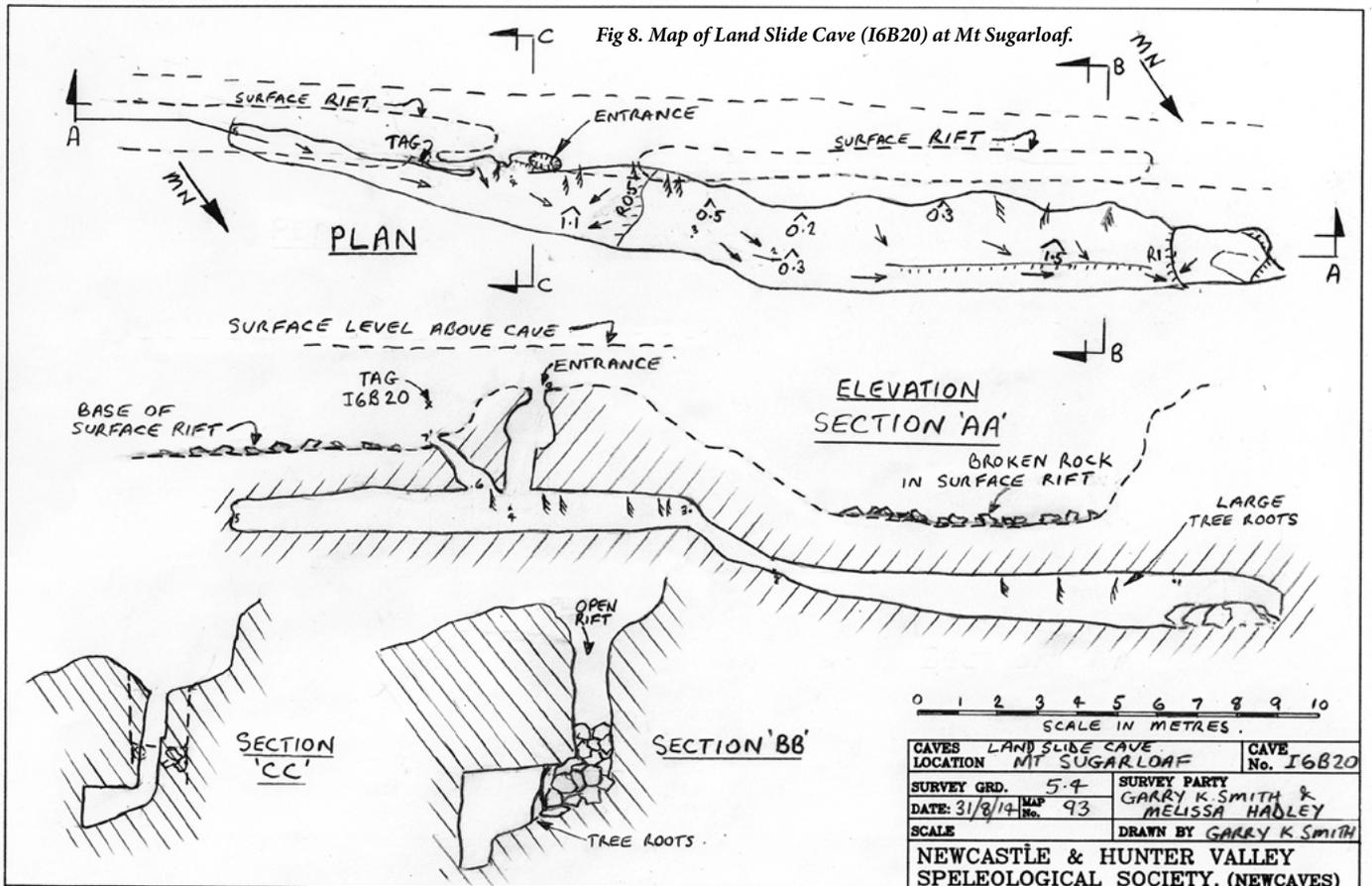




Fig 3. The Main Gorge at Pilchers Mountain, which has resulted from mass movement.



Fig 4. Murray Dalton in Bat Cave (I6B-15), one of the two significant fissure caves beneath the Main Gorge at Pilchers Mountain

under the administration of NSW National Parks, while other areas are managed by Forestry.

On the highest peak (412 m ASL) there is an amazing tourist lookout with a 360° view, and a little further down the mountain are three huge communication towers and a large day use picnic area.

But what tourists don't realise is that further along the mountain range there are a number of fissure caves created by the mass movement of sandstone blocks.

At the top of the ridge the slippage of the large blocks has created a small gorge, but beneath there are two reasonable-sized caves (Fig. 6).

Landslide Cave (I6B20) has a survey length of 31 m and maximum depth of 6 m. The main chamber measures 27 m long x 2.5 m wide x 2.3 m high (Figs. 7 & 8). The cave is generally dry and dusty, but after substantial rain becomes quite damp. There are a number of tree roots in the main chamber.

Nearby in the same slip line as I6B20 is Fault Cave (I6B-2). It has a survey length of approximately 45 m, maximum width of 3 m and depth of 14 m. Both caves are known to often shelter several horseshoe bats.

Another located on the side of the mountain range below the two previously

described caves is Old Lady Cave (I6B-1), so named because of the great number of granny's cloak moths found inside.

This cave was formed by a section of the cliff line breaking free and the base of the large slab slipping away from the break point. It has three entrances, one of which opens to a 2 m vertical drop. The floor of the cave is near horizontal over its survey length of 23 metres and the maximum passage width is 2 m. While not a particularly

large cave, the sheer numbers of moths of ten found inside is quite amazing.

I discovered these caves by accident in the late 1970s while wandering around the bush. Fortunately, they are in obscure locations well away from tourist trails, so are rarely visited.

The search for information and answers can lead down some interesting paths. Such was the case of finding many granny's cloak moths (*Speiredonia spectans*) resting in a lo-



Fig 5. Garry Smith in Crokers Creek Piping Cave (CQ-48).

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TAMBAIYVNI DURNEY

GARRY K SMITH



Fig 6. NHVSS and SUSS members in the small gorge above the fissure caves at Mt Sugarloaf.

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Fig 7. Melissa Hadley in Landslide Cave (16B20) at Mt Sugarloaf.

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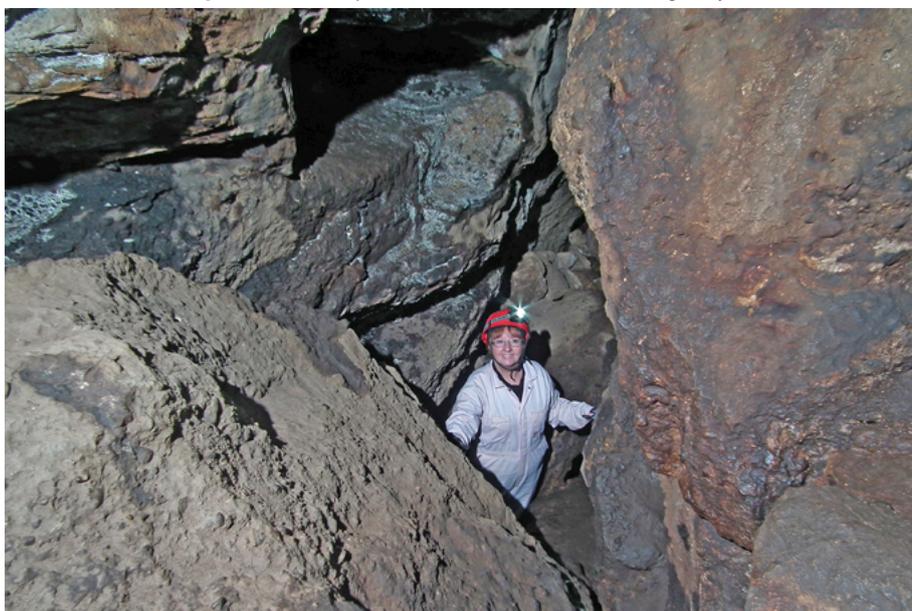


Fig 9. Sonia Taylor-Smith in Tickhole Tunnel Cave (16B-19).

cal cave within several metres of predatory bats.

This observation led to a search for information on the subject and the summary article about how the moths coexist with their predators. (Smith 2021b).

Cavers should keep their ears open as word of mouth can unexpectedly lead to locating caves hidden in residential backyards.

One such example is a fissure cave located under a small cliff in the back yard of a house in Cardiff Heights, a suburb of Newcastle. I first visited this cave in 1971 after a few enquiries revealed its exact location and led to a subsequent exploration trip.

Now called Tickhole Tunnel Cave, (16B-19), it has a survey length of 40 m (Fig 9). The cave was created by a section of ≈ 6 m high cliff breaking free, slipping several metres and splitting into larger boulders. Because the cave is the cavity between large boulders, its passage shape is rather irregular (Fig. 10).

The damp environment in the cave provides ideal conditions for fauna such as leaf-tailed gecko lizards and cave crickets (Smith 2003).

STREAM EROSION CAVE

A good example of a stream erosion cave is Jewboy Cave (16B-3) located near Seahampton to the west of Newcastle.

This cave has been created at the base of a waterfall by preferential erosion of a soft fine-grained sandstone layer (Smith 2015).

It begins at the base of a waterfall as an overhang and transitions into a cave of reasonable extent with an average ceiling height of just over 1 m and chamber width of 10 m.

The survey length is 57 m. At the back of the cave is a tight second entrance.

Besides flowstone, there are a number of calcite stalactites and columns up to 0.7 m high (Fig. 11). It is uncommon to find such a quantity of calcite speleothems occurring in a cave formed in non-carbonate host rock.

But even small non-karst caves can lead to some interesting history if cavers want to delve into it.

The Jewboy Cave was named after the Jewboy Gang who allegedly used it as a hideout while on the run from the law (Smith 1994).

This notorious group of seven outlaws was led by escaped convict Edward 'Jewboy' Davis. The gang robbed property owners in a wide area through the Hunter Valley in 1839-40.

During a holdup one of the gang members shot and killed store clerk at Thomas



Fig. 10. Map of Tickhole Tunnel Cave (16B-19) at Cardiff Heights, Newcastle (NSW)

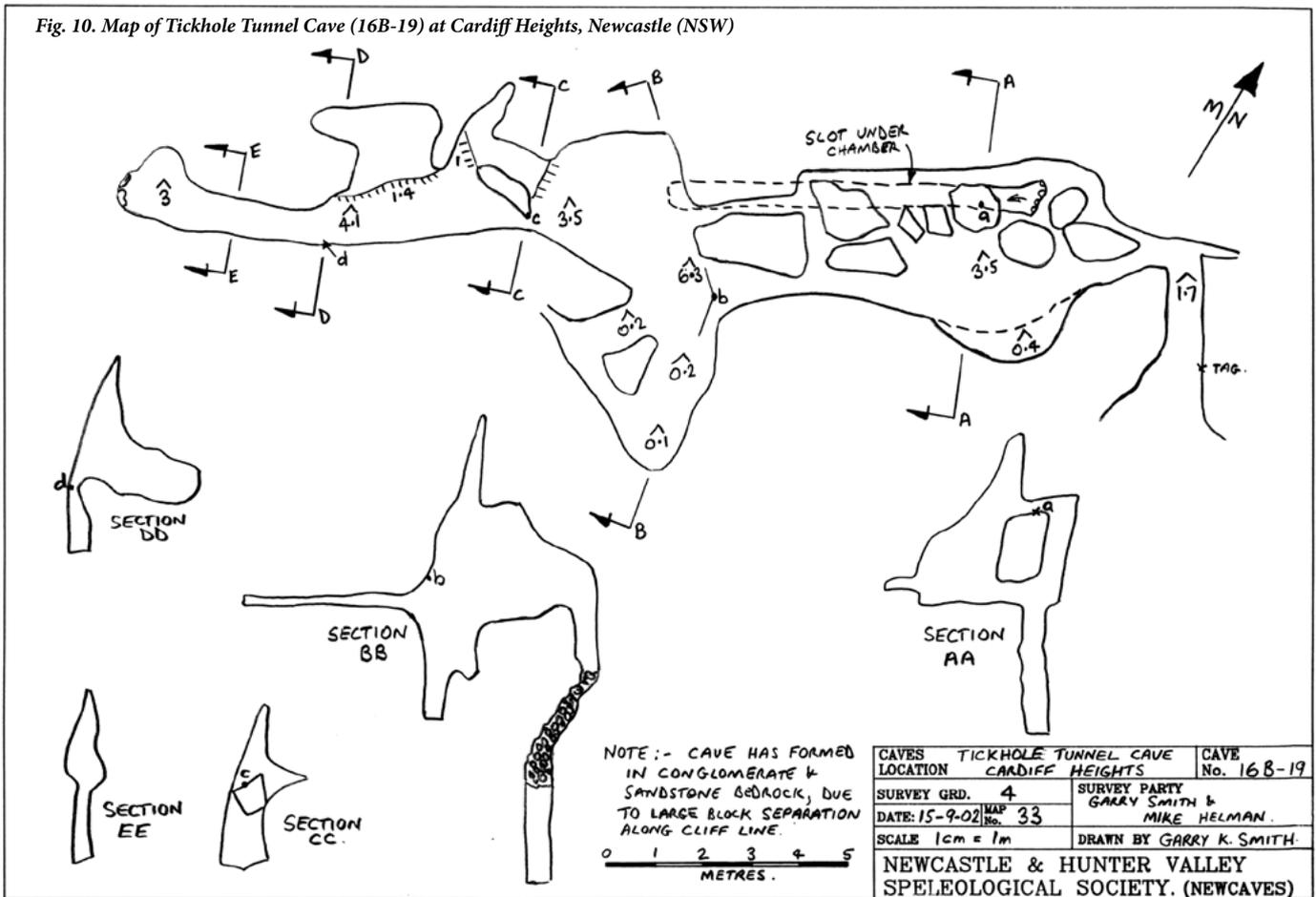


Fig 11. Jewboy Cave (16B-3) at Stockrington (NSW) is formed in quartz sandstone and conglomerate bedrock; however, it contains calcite columns.

Dangar's store in Scone before the gang was tracked down and six were captured in December 1840.

After their trial in Sydney they met their fate at the gallows in March 1841 (Bergman 1966).

Other smaller stream erosion caves occur in the Newcastle region.

I hope this article will inspire cavers to look more closely around their local area for obscure caves that are often overlooked in the quest to find caves in karst areas. Take notice and ask questions when talking to locals, as conversations can lead to some surprising caves located in suburban back yards and local bushland.

Besides surveying, it can prove quite rewarding when investigating the geology, fauna and associated history of these non-karst local caves.

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GARRY K SMITH

Book reviews

Abercrombie Caves

MSS

METROPOLITAN Speleological Society would like to introduce a new book to showcase Abercrombie Caves.

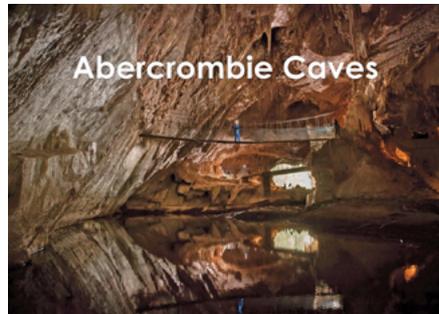
The new book is so comprehensive that it has been four years in the making and we think it has been worth the wait.

Over the past 115 years, at least five publications have sought to cover Abercrombie Caves, but none covered all the various facets of the area.

To address this shortcoming, Metropolitan Speleological Society (MSS) has put together the definitive book on the caving area affectionately called 'Abers'.

This wonderful book highlights not only the abundance of opportunities for some genuine exploration and adventure, but also its beautiful natural environment, abundant wildlife and fascinating historic relics.

For the history buffs, Abercrombie Caves' rich tapestry is documented in this publication along with chapters on the Wiradjuri connection to Abercrombie Caves, early European exploration, impacts of the gold rush and the development of the area for tourists. For caving enthusiasts,



chapters about cave formation, mineralogy, geology and the challenges of managing karst areas discuss these subjects.

MSS has included basic cave descriptions in the publication, together with a selection of cave maps to illustrate the style of caves typical in the area.

The most striking feature at Abers, the enormous arch (reputed to be the largest in the southern hemisphere), the side caves in the arch and the smaller horizontal caves in the nearby bluffs, are all included.

Beth Little, our project co-ordinator and the driving force behind the book said: 'We've tried to cover all aspects of the area that would interest visitors, both tourists and cavers, from the links to First Nations,

history, flora and fauna, geology and mineralogy and the caves themselves. All with gorgeous images creating a beautiful coffee table-style book.' And we think she did us proud.

Long-time ASF member Garry Smith, after reviewing *Abercrombie Caves*, has recommended this book with glowing remarks, 'With contributions from 11 authors and over 190 photographs, graphics and cave maps, this first-class reference book will certainly be the bible of Abercrombie Caves for many years to come.'

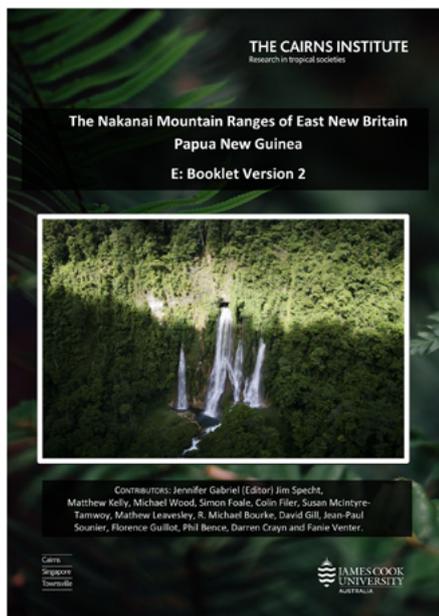
ASF members who order the book will also receive a stand-alone detailed map of the Abercrombie Arch Cave (exclusively available with ASF member orders only).

The book will have a soft release in early December 2022 and MSS is now taking pre-orders — just in time for Christmas. *Abercrombie Caves* will retail for \$45 plus postage and handling; the first 40 orders from cavers will receive a free copy of Philippine caving book *Samar Island Caving Adventures*.

So go to <http://www.mssadventure.org.au/home/AbercrombieBook> and order your copy today.

Nakanai Range, New Britain, Papua New Guinea: a significant karst region

R. Michael Bourke



A BOOK on aspects of the Nakanai Range in Papua New Guinea has recently been published, containing a significant amount of information on caves and karst.

This is a major karst area on the island of New Britain, with numerous deep and long caves, some of the largest dolines in the world (requiring an abseil of up to 300-400 m to enter the dark zone of some caves) and some extremely large underground rivers.

The first dedicated speleological expedition to Papua New Guinea went to Ora Cave in the Nakanai Mountains in 1972-73. The party consisted of six Australian cavers, four men and two women, led by myself. Five of us were members of the University of Queensland Speleological Society and one a former member of the Cave Explora-

tion Group of South Australia. Two of us were based on New Britain and the others were Brisbane-based.

The next speleo expedition to the Nakanai Range was a reconnaissance trip by six French cavers in 1978 (with myself as the local guide). In the decades since then, there have been other many other expeditions to this area, with speleos from France doing most of the exploration.

Since the Australian and French expeditions in the 1970s, there have been fifteen French (or French-International) expeditions, a Swiss one (in which one caver drowned underground), three British expeditions, a Japanese one and a French-Japanese one.

There are many significant caves in the Nakanai Range, some of which have huge rivers in them. The deepest is Muruk (Tok



2023 AUSTRALIAN CAVE ANIMAL OF THE YEAR

Pisin for cassowary), which is 1178 m deep and contains 17 km of surveyed passage. In 2007, the Nakanai Mountains were nominated to the PNG World Heritage Tentative List, within the serial site known as 'The Sublime Karsts of PNG'. The late Ebery Hamilton-Smith and others were involved with this nomination.

The book is published online by James Cook University. It was edited by Jennifer Gabriel, with contributions from 14 others, including a number of speleologists: Jean-Paul Sounier and Florence Guillot (French),

Dave Gill (British) and myself (Australian). Other contributors include biologists, archaeologists and anthropologists.

Contents include an introduction to the Nakanai Mountains; then sections on the karst and caves, including a short history of caving and information on the megadolines; history of European activity in the region from the naming on Nova-Britannia (New Britain) by William Dampier in 1700 to the late 1940s; archaeology of the pre-colonial period; unique fauna and flora; and justification for listing by UNESCO

as a World Heritage Area. The book is attractively produced and contains a number of images of the caves, underground rivers and giant dolines. It is available online, with the citation and URL as:

Gabriel, J., Specht, J., Kelly, M., Wood, M., Foale, S., Filer, C., McIntyre-Tamwoy, S., Leavesley, M., Bourke, R. M., Gill, D., Sounier, J-P., Guillot, F., Bence, P., Crayn, D. and Venter, F. (2022). *The Nakanai Ranges of East New Britain, Papua New Guinea*, Version 2. James Cook University, Cairns. <https://tinyurl.com/2rmzba4p>



Peace and Joy at Christmas – with the compliments of a slimy maggot

Announcing our 2023 Australian Cave Animal of the Year

Cathie Plowman

NC

GLOW-WORMS are wondrous creatures that truly bring peace and joy to those lucky enough to spend time with them.

Australia has eight species of glow-worms in the genus *Arachnocampa* and collectively these are our 2023 Cave Animal of the Year. There is a ninth species in the genus, *Arachnocampa luminosa* which is endemic to New Zealand.

Inspired by the long-running German Cave Animal of the Year program (now in its fifteenth year), 2023 will be the fifth year of the Australian Cave Animal of the Year program. We commenced with a ten-year plan with the current promotional products (bookmarks, poster, sticker and mug).

While we've made a start on increasing awareness of cave animals amongst cave visitors, it's time to start thinking about how we can build on these efforts. It would be good to have some more people involved to take our ideas forward. You don't need to commit lots of time, and this would be a great opportunity to learn more about cave animals and contribute to their conservation. Want to be part of the Cave Animal of the Year team? I'd love to hear from you at hello@caveanimaloftheyear.org.au

Our 2023 Cave Animal products will



be available from December. Thanks to our wonderful production team for their efforts, especially to illustrator Sam Lyne and graphic designer Kelly Eijdenberg/poco people. The intricacies of glow-worm threads and light has provided lots of challenges to everyone involved this year: from Sam and Kelly doing the illustration and design in Hobart, to the printers of book-

POSITION VACANT

The Cave Animal of the Year program needs someone who can put some time into our Facebook and website efforts. Could this be you? Contact Cathie at hello@caveanimaloftheyear.org.au

marks and posters (also in Hobart), the people who produce the mugs (working out of Sydney and Brisbane) and caver Nivaldo Colzato from Brazil who prints the stickers for us. Thanks to everyone concerned.

As usual, the stickers and bookmarks come free of charge, posters are also free of charge and available for display in public areas (sorry, not private offices or houses as the aim of the game is to increase public awareness). Payments to cover the cost of postage is desirable. Mugs are \$12.00 plus postage. Supplies always run out, so don't delay on ordering at hello@caveanimaloftheyear.org.au

Australian glow-worms occur at various locations in Queensland, New South Wales, Victoria and Tasmania. Not everyone can readily see them, but if you have a chance, give yourself a summer treat by taking the time out to see them. Be enthralled and uplifted by the glowing, insect-catching larvae of tiny flies. If you can't see them, grab yourself a bookmark or sticker to stay connected with them.

Thanks to the Karst Conservation Fund for support of the Cave Animal of The Year program.

For some glow-worm information go to www.caveanimaloftheyear.org.au



A BIG thank you for your support over the year. Have a happy festive season from the team at Aspiring.

Looking forward to seeing you in April at the ASF conference!



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