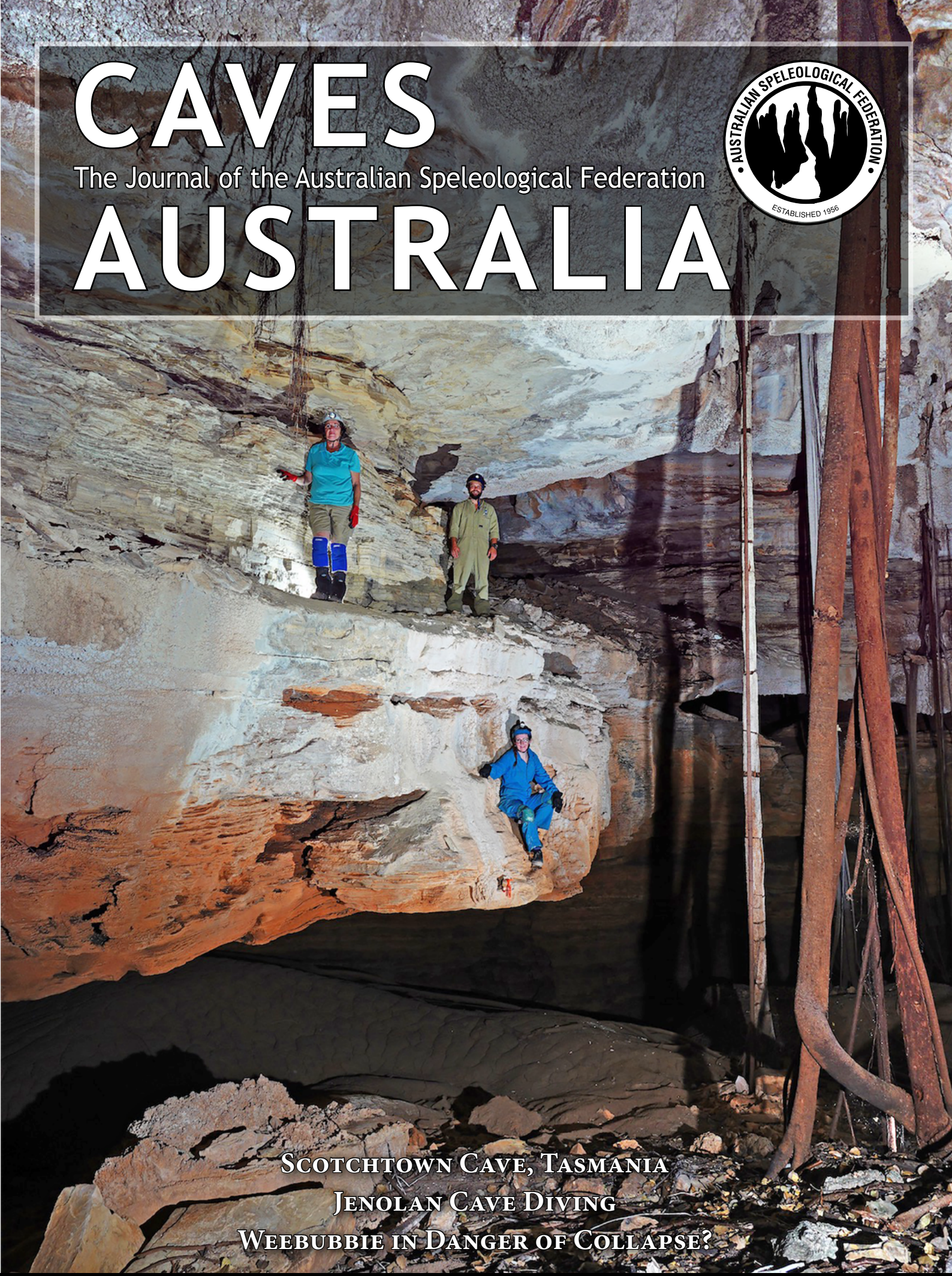
CAVES AUSTRALIA

The Journal of the Australian Speleological Federation



Scotchtown Cave, Tasmania

Jenolan Cave Diving

Weebubbie in Danger of Collapse?

No. 206 • DECEMBER 2018

COMING EVENTS

This list covers events of interest to anyone seriously interested in caves and karst. The list is just that: if you want further information the contact details for each event are included in the list for you to contact directly. The relevant websites and details of other international and regional events may be listed on the UIS/IUS website www.uis-speleo.org/ or on the ASF website http://www.caves.org.au. For international events, the Chair of International Commission (Tim Moulds) timothy.moulds@yahoo.com.au may have extra information. A similar calendar is published in *ESpeleo.* This calendar is for known events in 2018 and early 2019.

2018

30 December–4 January 2019

31st Australian Speleological Federation Conference – The Darkness Beneath: Caving Tasmania, Devonport, Tasmania. For more information: https://asfconference2019.com/general-information/ Presentation: https://prezi.com/view/KavyRw5tX1ExvDqCr7aY/

2019 and beyond

1-4 February

XIV National Congress of Speleology, Hermosillo, Sonora, Mexico. for details: http://umae.org/congreso2019/

9-10 March

1st Colloquium on the Caves of Azé, Saône-et-Loire, France. for more information, contact: lionel.barriquand@wanadoo.fr

20-25 May

Hypogea 2019, Dobrich, Bulgaria. The International Congress of Speleology in Artificial Cavities, http://www.hypogea2019.org/

10-14 April

84th Annual Meeting of the Society for American Archaeology (SAA): Albuquerque, New Mexico. As has been the tradition for many years, a cave session is being organised. For information on the SAA and the conference in general visit http://www.saa.org/

9-12 August

National Speleological Congress of Switzerland, Interlaken, Switzerland. https://sinterlaken.ch/en/

11-13 September

ArmConference 2019 Caves as Natural and Cultural Monuments. Yerevan, Armenia. http://armconference2019.com/

7-11 October

National Cave and Karst Management Symposium, Bristol, Virginia, USA http://nckms.org/2019-symposium

23-29 July 2021

18th International Congress of Speleology, Lyon, France, http://uis2021.speleos.fr/

Sinkhole Conference Proceedings: Correction!

If you have downloaded a print quality copy of the Sinkhole Conference proceedings, please open that file and look at the cover of the proceedings (this message does not affect you if you downloaded the web quality version). If it says "NCKRI SYMPOSIUM 7" at the top, then you can stop reading this message. If not, please continue reading.

An early, incorrect version of the proceedings that says "NCKRI SYMPOSIUM 6" was accidentally posted on the Karst Information Portal at http://digital.lib.usf.edu/SFS0064364/00001 and some copies of this draft version were downloaded before this mistake was corrected (although this page still says "Symposium 6," which should be corrected this week).

In addition to the wrong number, which is important in correctly citing the proceedings, the version that is now posted is the final version and includes other small corrections and improvements.

NCKRI apologises for the error.

A very useful international calendar is posted on the Speleogenesis Network website at www.speleogenesis.info/directory/calendar/
Many of the meetings listed above are on it but new ones are posted regularly.

Caves Australia

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ASF

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Cover: Firemans Chamber @ station 18PM46, Dingo Cave, Bullita. Photo by Garry K. Smith

CAVES AUSTRALIA

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WANTED
ARTICLES FOR *CAVES AUSTRALIA!*

Whether caving, cave diving or generally just caving, *Caves Australia* readers are interested in YOUR story. It is only with YOUR contribution that we can produce a quality magazine for all to enjoy. For writing and style guidelines, contact the Editor or Production Manager.

EDITORIAL

NOTHING startling to report from the Editor this issue. I'm sick to death of this issue so writing something pertinent and upbeat is beyond me, I'm afraid. A few sardonic dot points will have to suffice.

- **There's a conference happening. You should go to it (see page 31).**
- **Concerned that hard copy *Caves Australia* is on the chopping block? Turn to page 12 and relax.**
- **Apologies to contributors whose article haven't appeared in this issue. It was full (we ran to 32 pages and still full). I promise you'll make it into the March issue. Yep, that'll be about six months after you submitted your article. What a pity there isn't a way of publishing your articles in an online format more promptly and then publish it officially/formally in printed or PDF form at a later date …**
- **Can authors please check their URLs (links) before they submit articles. It's surprising how many of them don't work (minor typos, often).**
- **Go to the conference in Devonport (see page 31).**
- **Consider standing for the Executive or some other position at the ASF Council Meeting in January. It could change your life (I won't be so bold as to suggest how).**
- **Write an article for *Caves Australia* on your latest adventures or pet project. You'll be surprised what other people are interested in.**
- **Enjoy your Christmas break, if you're getting one. If you are getting one, use it to attend the conference (see page 31).**

President's Report

NOT LONG to go until the 31st ASF conference — The Darkness Beneath: Caving Tasmania: the organising team have a great week planned and I look forward to catching up with the many members attending.

During the conference there will be the usual Council meeting. This is the time for your club to have input to the ASF for the next year, so make sure that your club is sending some reps or appoints a proxy. Please make sure that your rep takes the information back to the club for discussion and action.

The ASF Commissioners and Executive are all volunteers and are doing their best to protect the caves and karst of Australia. If you want to have input please put your hand up.

And speaking of karst conservation — opportunities exist at the conference to make donations to the Karst Fund. Any contributions small or large are always appreciated.

The ASF would also like to offer its condolences to the family and friends of Ann Augusteyn who passed away recently. Ann and her late husband Ken were the owners and operators of Capricorn Caves in Queensland.

Ann's acumen helped make Capricorn Caves a premier tourist operation for many years and one of the best-run show cave operations in Australia. Ann was very much involved with ACKMA as well. Capricorn

Caves were great supporters of the International Congress, donating a cave package which was won and enjoyed by Russian cavers.

Does your club/society/group have a great idea or project to protect caves or karst, or something related, but need some money?

The ASF has grant money available for various projects around Australia. Contact the Grants Commission.

Lastly, with the weather finally starting to clear I hope you are all out there caving and enjoying each other's company. We would love to hear about your most recent adventures. Send them off to the editor of *Caves Australia* — its content is only as good as the photos and pieces submitted by you or your club.

Discovery of Tasmania's first cave

with an assemblage of Pleistocene megafauna and ongoing discoveries to the present

John Wylie
SRCC

A PREVIOUS version of this article was published in *Caves Australia* 195 (Wylie 2013). Additional investigations of historic and subsequent Tasmanian megafaunal finds, along with modern discoveries, have since been reviewed by the author. This is a revised version documenting discoveries to date — Ed.

ABSTRACT

Within the extensive Smithton dolomite deposits of North Western Tasmania a small area of limestone exists at Scotchtown (Calver 1996 p. 5), some 4.8 kilometres south of Smithton. Through quarrying, in March 1942, an infill cave was exposed that provided the first assemblage of Pleistocene megafauna from a cave in Tasmania. The feature became known as Scotchtown Cave (Kiernan 1984).

The reason for Scotchtown Cave recently re-emerging as a site of interest to science was the discovery of the same type of giant kangaroo remains at the Mt Cripps karst between 2000 and 2010, by members of the Savage River Caving Club (SRCC).

INTRODUCTION

The property on which the in-filled cave was found was owned by Ray Ollington at the time. In 1942 the quarry was operated by Mr F. Archer to provide lime for the paper mill at Burnie (Brown 1989; Kiernan 1995, p. 141) as the lime being provided by Fenton's operation at Pulbeena had proved chemically unsuitable for the paper mill's operations (Gulline 1959, p. 28; Pink & Ebdon 1988).

The working of this limestone quarry by Frank Archer on the Lower Scotchtown Road resulted in exposure of a rich deposit of fragmented bones within an infill cave. Fortunately, Mr Archer recognised the likely significance of the bone deposits and ensured that a quantity of the bones were forwarded to the Queen Victoria Museum (QVM) at Launceston for initial identification. The museum greatly appreciated Mr Archer's actions (Anon. 1942a; Scott 1942).

CRAIG REID/QVMAG

Quarry where Scotchtown Cave megafauna deposits were unearthed.

Another first for Tasmania was the discovery within the Scotchtown Cave deposits of bones of *Thylacoleo carnifex,* the 'pouched lion', as *Thylacoleo* was described by Owen in 1876, from remains found in cave deposits on mainland Australia (Anon. 1942a).

Back in 1888 it was noted that no remains of extinct giant marsupials such as *Diprotodon, Nototherium* and *Thylacoleo* had been found in either ossiferous cavern breccias or in the older alluvial beds in Tasmania (Johnston 1888) and the state had to wait until 1942 for *Thylacoleo* to be discovered at Scotchtown.

Fossils (of extant species) have been found in caves and recorded as early as 1792 in the south and in the north of the state (Andrews 1971; Higgins & Petterd 1884).

Since the discovery of the Scotchtown Pleistocene megafauna deposits in 1942, other megafauna deposits have been found in several other locations within the state, these modern/living fossil deposits having been found in the Junee-Florentine, Smithton, and Mole Creek (Higgins & Petterd 1884; Noetling 1911; Scott 1915).

With some excellent megafauna deposits still being found to the present day (Darby 2005; Eberhard 2014), Flowery Gully (Gill 1968; Murray & Goede 1977), Montagu

(Murray & Goede 1977; Murray 1978), and a number of sites in the south of the state (Goede & Voss 1976; Goede 1978; Parker 1978; Cosgrove *et al.* 2010), with further megafauna discoveries being found at Mt Cripps between 2000- 2010 (Gray 2000, 2005, 2010), Mole Creek between 2004 & 2012 (Darby 2005, Bird 2012, Eberhard 2014), and recently once again in the Junee-Florentine in 2014 (Jackson 2014).

PHYSIOGRAPHY

The physiographic features of Tasmania's North West are amazingly diverse, with low coastal plains and large inland swamps, along with a diverse range of mound springs (Rockcliff & Sheldon 2011; Wylie 2012).

Since the 1940s these inland swamps have been drained for agricultural purposes, with some remnant forest left around the fringes, consisting of dense heath plains and tea-tree swamps, like those surrounding the Montagu Caves, described very well by Dave Heap (Heap 1996a, 1996b). To the south, rising from the swamps are a series of coastal hills, with eucalypt being predominant and interspersed with some rainforest species, till it becomes predominantly temperate rainforest with some areas of low scrub, making walking through it difficult at times.

GEOLOGY

There are few remarks prior to 1934 on limestone or dolomite in the area. The first mention of lime being obtained was from shell deposits on Hunter Island in 1827 (Meston 1958 p. 54); then Strzelecki, in 1840, noted the carbonated waters from mineral springs (Stephens 1912).

A newspaper article mentions lime being provided to the Van Diemen's Land Company orchards from the limestone deposits at Scotchtown (Anon. 1917). Fortunately, Craig Reid of QVM had visited the Scotchtown quarry and taken photos of the limekiln in 2004, as the present owner has had the quarry and limekiln backfilled and levelled off.

The isolated dark grey oolitic limestone outcrop at Scotchtown has been described as a member of the Smithton Dolomite of Precambrian and Cambrian age (Noldart 1966; Brown 1989) and is one of three limestone deposits in the Smithton area that all differ considerably (Nye 1931; Gulline 1959). A Government Geologist reported that other cracks and caverns, although small, have been found while accessing the dolomite in the Smithton area (Thomas 1944).

Other literature that has contributed to the greater understanding of the geology of this area started with the first detailed study in 1934 (Nye *et al.* 1934) with other reports following over the years (Edwards 1941; Thomas 1944; Carey & Scott 1952; Hughes 1957; Longman & Mathews 1961; Noldart 1966; Corbett 1982; Sharples 1995), and a very good summary on the history of geological work carried out in the North West by Brown (1989).

Further geological work in recent times on the Scotchtown deposit suggests a middle to upper Ediacarian age (Calver 1996). The same author went into greater detail explaining the geology of the Neoproterozoic Togari Group of the Smithton Synclinorium, originally known as the Smithton Basin of North-West Tasmania (Calver 1998).

The dolomite karst and the small isolated outcrops of oolitic limestone (Longman & Matthews 1961, Calver 1996) in the northwest area have not produced caves of dimensions most speleologists would like, with fewer than 25 caves being documented within the Smithton dolomite basin of some 700 sq.km. Large portions of the dolomite are covered in extensive groundwater swamps and forests (Baillie 1989).

A number of caves in the Smithton area have provided some of the best assemblages of megafauna (Colhoun 1989; Murray & Goede 1977; Kiernan 1988).

THE TASMANIAN MEGAFAUNA

Caves generally are stable environments, and when vertical holes develop, they have may act as natural traps and pitfalls, resulting in animals being trapped and their skeletons then being preserved, leading eventually to greater understanding of megafauna morphology (Pavey 1977; Hope 2004; Webb 2008).

In 1942 Scotchtown Cave became the first cave in Tasmania to provide an assemblage of megafauna, with numerous new species identified by QVM (Gill & Banks 1956).

The distribution of the Tasmanian devil and thylacine in SE Australia in the Quaternary was written up in 1953 (Gill 1953), with three plates showing the upper and lower jaw bones of *Sarcophilus laniarius* (now *harrisii)* and *Thylacinus cynocephalus* (thylacine), which had come from Scotchtown Cave, NW Tasmania. These were the first published photographs of bone material collected from Scotchtown Cave.

Some of the ancient and extant species identified at Scotchtown Cave housed at Queen Victoria Museum (QVM), Launceston & Tasmanian Museum (TM), Hobart(Gill & Banks 1956, Murray & Goede 1977, Turney* et al. *2008, Filmer-Samkey 2008, Squires 2012):

Megalibgwilia sp. *[ramsayi]*. — a large long-beaked echidna. (extinct) (see Figure 1)
Metasthenurus newtonae — short-faced kangaroo. (extinct)
Palorchestes azael — a marsupial similar to a ground-sloth/tapir. (extinct) (see Figure 1)
Zygomaturus trilobus — large wombat-like. (extinct) (see Figure 1)
Thylacoleo carnifex — marsupial lion. (extinct) (see Figure 1)
Simosthenurus occidentalis — size of grey kangaroo. (extinct) (see Figure 1)
Protemnodon cf. *anak* — large wallaby. (extinct) (see Figure 1)
Thylacinus cynocephalus — Tasmanian tiger. (extinct)
Macropus giganteus titan — possibly twice size of eastern grey kangaroo. (extinct)
Dromaius n. diemenensis — Tasmanian emu (extinct)
Sarcophilus harrisii — Tasmanian devil
Macropus rufogriseus — red-necked (Bennett's) wallaby
Thylogale billardierii — red-bellied pademelon
Potorous tridactylus — long-nosed potoroo
Trichosurus vulpecula — common brushtail possum
Vombatus ursinus — common wombat
Mastacomys fuscus — broad-toothed mouse/rat

Figure 1 shows the relative sizes of some species found at Scotchtown Cave together with a human (White & Lampert 1987). More information on these extinct species can be found in Quick *et al.* (1983).

A review of the extinct kangaroo family Sthenurinae (Macropodoidea: Diprotodontia) of southern and eastern Australia required because of the doubling in the number of species in the 30 years since the last review included notes on the

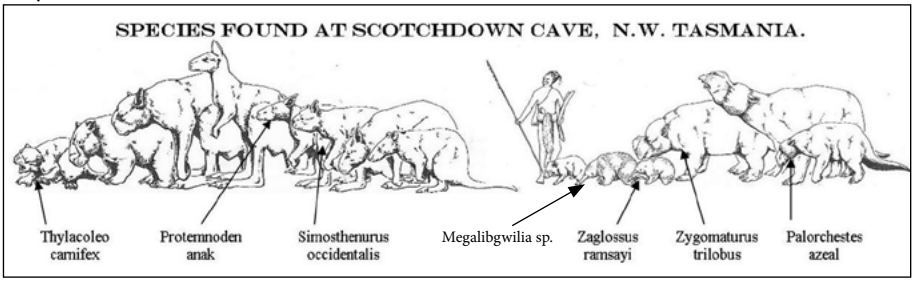


Figure 1 — adapted from White and Lampert 1987

dentary found in Scotchtown Cave housed at QVM Launceston (Prideaux 2004).

The cause of the megafaunal extinction is a contentious field of research, with different views being held over the disappearance of the Tasmanian megafauna. Perhaps it was a result of the arrival of humans using fire and hunting or maybe climate change (Brook & Bowman 2002; Gillespie 2002; Turney *et al.* 2008; Roberts & Jacobs 2008; Diamond 2008). Erosion events may provide clues as to when humans first arrived in Tasmania (McIntosh *et al.* 2009; McIntosh 2010).

QVM has recently sorted the skeletal collections from Scotchtown Cave and Mowbray Swamp, where possible, into family groups (Filmer-Samkey 2008; Turney *et al.* 2008). It is this collection that Craig Reid showed the author on a visit to QVM (Wylie 2013 p. 23). It continues to be referenced internationally.

Archaeologists and palaeontologists may be debating the cause of the megafaunal extinctions for a long time to come, although one scientific review is possibly contributing to closing the gap (Gillespie *et al.* 2012).

SCOTCHTOWN CAVE: SOME HISTORY

The Scotchtown Cave in-fill exposed by quarrying had dimensions estimated at about 7.6 m x 4.5 m (Anon. 1942a). It created great interest, particularly when added to other megafauna not found in a cave, but in Mowbray Swamp in 1910 (Noetling 1911, Gill & Banks 1956) and the surrounding district (Scott 1915; Kiernan 1995, p. 115).

Although Edmund Gill did compare the Tasmanian tiger jaw deposits with other species collected on mainland Australia in 1953 (Gill 1953) and followed with the joint paper in 1956 (Gill & Banks 1956), nothing else has been published in scientific literature specificallyon the collection. There have been some papers written recently on components of the collection housed at QVM (Eberhard 2018; Hume *et al.* 2018).

New megafaunal sites and the various megafauna species found there have been compared with the Scotchtown Cave material, once again highlighting the importance of this collection (Flannery 1980; Smith 1982; Griffiths *et al.* 1991).

CONTINUING DISCOVERIES IN THE NORTH AND SOUTH OF THE STATE

Note: The species lists have been compiled from the reports ofthe authorsreferenced.

Some of the ancient and extant species identified at Loongana housed at QVM (Anon. 1956; Goede pers. comm.).

JOHN WYLIE

Tasmanian Tiger bones found at Loongana by Albert Goede 1956, on display at QVMAG.

Thylacinus cynocephalus — Tasmanian tiger (extinct) (above)
Vombatus ursinus — common wombat
Microchiroptera — bats

Some of the ancient and extant species identified at Montagu, Mowbray Swamp and Pulbeena housed at QVM (Noetling 1911; Gill & Banks 1956; Murray & Goede 1977; Turney* et al. *2008; Vickers-Rich & Hewitt-Rich 1993).

Montagu:

Nototherium tasmanicum — tapir like (extinct)
Megalibgwilia sp. *[ramsayi].* — a large long-beaked echidna. (extinct)
Macropus giganteus titan — possibly twice size of grey kangaroo. (extinct)
Protemnodon cf. *anak* — giant wallaby. (extinct)

ROLAN EBERHARD

Jaw of extinct kangaroo Simosthenurus occidentalis *found at Montagu.*

Simosthenurus occidentalis — size of grey kangaroo. (extinct) (above)
Thylacoleo sp. — marsupial lion. (extinct)
Thylacinus cynocephalus — Tasmanian tiger (extinct)
Zygomaturus? — large wombat-like. (extinct)
Palorchestes sp. — a marsupial similar to a ground-sloth/tapir. (extinct)
Zaglossus — long-beaked echidna
Tachyglossus — short-beaked echidna
Sarcophilus harrisii — Tasmanian devil
Mastacomys fuscus — broad-toothed rat
Vombatus ursinus — common wombat
Potorous tridactylus — long-nosed potoroo
Thylogale billardierii — red-bellied pademelon
Bettongia cuniculus — rat kangaroo
Macropus rufogriseus — red-necked (Bennett's) wallaby
Pseudocheirus peregrinus convolutor — common ringtail possum
Dasyurus maculatus — spotted-tailed quoll
Perameles gunnii — eastern barred bandicoot
Hydromys chrysogaster — water-rat
Aves — birds
Reptilia — snakes, lizards
Pinnipedia neophoca — Australian sealion

Some of the ancient and extant species identified at Mowbray Swamp housed at QVM (Gill & Banks 1956; Murray & Goede 1977; Turney* et al. *2008; Vickers-Rich & Hewitt-Rich 1993).

Mowbray Swamp:

JOHN WYLIE

Jaw of Zygomaturus trilobus

Zygomaturus trilobus — large wombat-like. (extinct) (above)
Palorchestes azael — a marsupial similar to a ground-sloth/tapir. (extinct) (see Figure 1)
Macropus giganteus titan — possibly twice size of red kangaroo. (extinct)
Dromaius n. diemenensis — Tasmanian emu (extinct)

The ancient and extant species identified at Pulbeena/Edith Creek housed at QVM (Murray & Goede 1977; Horton & Murray 1981; Turney* et al. *2008)

Pulbeena/Edith Creek:

Palorchestes azael — a marsupial similar to a ground-sloth/tapir. (extinct).
Thylogale billardierii — red-bellied pademelon
Aves — birds
Macropus/Notamacropus greyi — toolache wallaby (extinct) (below)

JOHN WYLIE

Skull of Toolache wallaby Macropus greyi.

Bones from fossil deposits at Flowery Gully found during the 1950s (Gill 1962), and at Mole Creek (Scott 1915; Darby

2005), stored in the QVM have only recently been sorted by staff.

Some of the ancient and extant species identified at Mole Creek (Higgins & Petterd 1884; Scott 1915; Anon. 1951, Gill & Banks 1956; Andrews 1971; Darby 2005; Eberhard 2014) & Flowery Gully (Gill 1968; Murray & Goede 1977; Filmer-Samkey 2008; Eberhard 2018) housed at QVM.

JOHN WYLIE

Tasmanian emu Dromaius diemenensis.

Dromaius n. diemenensis — Tasmanian emu (extinct) (above)
Thylacinus cynocephalus — Tasmanian tiger (extinct)
Sarcophilus harrisii — Tasmanian devil
Trichosurus vulpecula — common brushtail possum
Pseudocheirus peregrinus convolutor — common ringtail possum
Antechinus swainsonii — dusky antechinus
Ornithorhynchus anatinus — platypus
Macropus tasmaniensis — eastern tasmanian forester or grey kangaroo
Halmaturus/Macropus bennettii — red-necked (Bennett's) wallaby
Macropus/Wallabia rufogriseus — red-necked (Bennett's) wallaby
Halmaturus/Thylogale billardierii — red-bellied pademelon
Potorous apicalis — long-nosed potoroo
Bettongia cuniculus — rat kangaroo (eastern bettong)
Phascolomys — wombat
Trichosurus volpecula — common brushtail possum
Phalangista cookii — possum
Mus pachyrus — mouse/rodent
Mus castaneus — (house?) mouse/rodent
Rattus lutreolus — Australian swamp rat
Vombatus ursinus ? *(humeri)* — common wombat
Isoodon obesulus — southern brown bandicoot
or
Perameles gunnii — eastern barred bandicoot
Microchiroptera — bats

Flowery Gully:

JOHN WYLIE

Lower jaw of Tasmanian Tiger
Thylacinus cynocephalus

Thylacinus cynocephalus — Tasmanian tiger. (extinct) (above)
Macropus tasmaniensis/giganteus — Tasmanian forester or grey kangaroo.
Sarcophilus harrisii — Tasmanian devil
Dasyurus viverrinus — eastern quoll
Dasyurus maculatus — spotted-tailed quoll
Macropus rufogriseus — red-necked (Bennett's) wallaby
Bettongia cuniculus — rat kangaroo
Trichosurus vulpecula — common brushtail possum
Pseudocheirus peregrinus convolutor — common ringtail possum
Cercartetus nanus — eastern pygmy possum
Vombatus ursinus — common wombat
Isoodon obesulus — southern brown bandicoot
Perameles gunnii — eastern barred bandicoot
Antechinus spp. — dusky & little tasmanian marsupial mouse
Sminthopsis — fat tailed dunnart
Mastacomys fuscus — broad tooth rat
Pseudomys higginsi — long-tailed mouse
Pseudomys novaehollandiae — New Holland mouse
Rattus lutreolus — Australian swamp rat
Tachyglossus — short-beaked echidna
Chiroptera ? — bat
Reptilia — lizard

In the Junee-Florentine during the 1970s, members of the Tasmanian Caverneering Club found the remains of a variety of extinct and extant species, with the remains of the Tasmanian emu *(Dromaius novaehollandiae diemenensis)* being found for the first time in the southern part of the state (Parker 1978), These were placed in the collections in the Tasmanian Museum and Art Gallery, Hobart.

Some of the ancient and extant species identified in the Junee-Florentine, Ida Bay, Cracroft and Mt Weld areas are housed at QVM, TMAG & University of Tasmania (UTAS) — (Higgins & Petterd 1884; Andrews 1971, Murray & Goede 1977; Goede & Murray 1979; Savva & Taylor 1986; Clarke 1988; Eberhard 1988; Turney* et al. *2008; Squires 2012).

Junee-Florentine Area: stored at QVM:
Zygomaturus ? — large wombat- ike. (extinct)
Protemnodon sp. — large wallaby. (extinct)
Simosthenurus occidentalis — size of grey kangaroo. (extinct)
Thylacoleo sp. — marsupial lion. (extinct)
Thylogale billardierii — red-bellied pademelon
Macropus rufogriseus — red-necked (Bennett's) wallaby
Sarcophilus harrisii — Tasmanian devil
Dasyurus viverrinus — eastern quoll
Pseudocheirus peregrinus convolutor — common ringtail possum
Vombatus ursinus — common wombat
Mastacomys fuscus — broad tooth rat
Chiroptera — bats

Junee-Florentine Area: stored at TMAG:
Macropus tasmaniensis/giganteus — Tasmanian forester or grey kangaroo
Thylacinus cynocephalus — Tasmanian tiger (extinct)
Dromaius n. diemenensis — Tasmanian emu (extinct)
Ornithorhynchus anatinus — Platypus
Tachyglossus aculeatus — short-beaked echidna
Antechinus swainsonii — dusky antechinus
Sarcophilus harrisii — tasmanian devil
Macropus/Wallabia rufogriseus — red-necked (Bennett's) wallaby
Pseudocheirus peregrines convolutor — common ringtail possum
Rattus lutreolus — Australian swamp rat
Trichosurus vulpecula — common brushtail possum
Dasyurus maculatus — spotted tailed quoll
Cercartetus nanus — eastern pygmy possum
Bettongia cuniculus — eastern bettong
Potorous tridactylus — long-nosed potoroo

Some of the ancient and extant species identified in the Ida Bay, Cracroft, Mt Weld area housed at QVM and UTAS:
Sarcophilus harrisii — Tasmanian devil
Ornithorhynchus anatinus — platypus
Tachyglossus aculeatus — short-beaked echidna
Thylacinus cynocephalus — Tasmanian tiger (extinct)
Dasyurus maculatus — spotted tailed quoll
Dasyurus viverrinus — eastern quoll
Trichosurus vulpecula — common brushtail possum

JOHN WYLIE

Tasmanian Tiger deposits from Cracroft Valley area

Cercartetus nanus — eastern pygmy possum
Potorous tridactylus — long-nosed potoroo
Bettongia gaimardi — eastern bettong
Thylogale billardierii — red-bellied pademelon
Macropus rufogriseus — red-necked (Bennett's) wallaby
Vombatus ursinus — common wombat
Antechinus swainsonii — dusky antechinus
Antechinus minimus — swamp antechinus
Chalinolobus morio — chocolate wattled bat
Eptesicus regulus — southern forest bat (King River eptesicus)
Eptesicus sagittula — large forest bat (large forest eptesicus)
Pseudomys higginsi — long-tailed mouse
Pseudomys novaehollandiae — New Holland mouse
Rattus lutreolus — Australian swamp rat
Rattus norvegicus — brown rat
Rattus rattus — black rat
Menura novaehollandiae — superb lyrebird

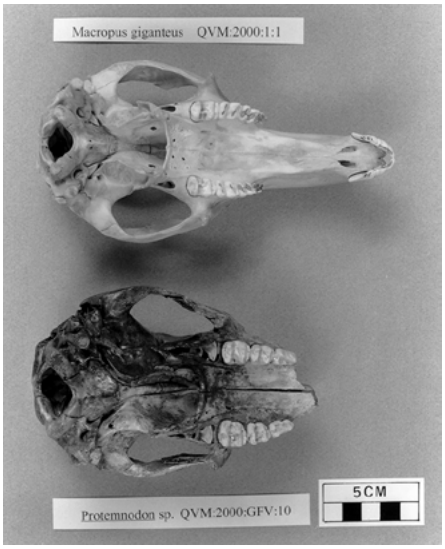
IMPORTANT DISCOVERY

Although bats are not known to roost in caves in Tasmania. Of the eight bat species known to exist in the state, the remains of two species have been discovered in a number of Tasmanian caves (Clarke 1988; Savva & Taylor 1986; Driessen *et al.* 2011)

Between 2000 and 2010 at Mt Cripps members of the Savage River Caving Club discovered a number of megafauna deposits (Gray 2000). A lower mandible of the short-faced kangaroo *Simosthenurus* was found to be larger than other specimens found at Scotchtown, Mowbray and in the Junee-Florentine (Gray 2005).

The almost complete skeleton of *Simosthenurus occidentalis* has been aged at about 45,000 years (Gray 2010).

Some of the ancient and extant species identified in Mt Cripps housed at QVM — (Turney* et al. *2008) and elsewhere (Gray 2000, 2005, 2010):



PAUL DARBY

Comparison of Protemnodon *(from CP213) and* Macropus giganteus *skulls*

Macropus giganteus — Tasmanian forester or grey kangaroo (above)
Simosthenurus occidentalis — size of grey kangaroo. (extinct)
Metasthenurus newtonae — short-faced kangaroo (extinct)
Sarcophilus harrisii — Tasmanian devil
Dasyurus viverrinus — eastern quoll
Dasyurus maculatus — spotted-tailed quoll
Trichosurus vulpecula — common brushtail possum
Macropus rufogriseus — red-necked (Bennett's) wallaby
Protemnodon cf. *anak* — large wallaby (extinct) (above)
Thylogale billardierii — red-bellied pademelon
Potorous tridactylus — Long-nosed potoroo
Pseudocheirus peregrines convolutor — common ringtail possum
Vombatus ursinus — common wombat
Antechinus swainsonii — dusky antechinus
Mastacomys fuscus — broad tooth rat
Pseudomys higginsi — long-tailed mouse
Rattus lutreolus — Australian swamp rat

Discoveries at Mole Creek in 1974 and 2008 yielded further bones of the extinct Tasmanian emu *Dromaius n. diemenensis* (Eberhard 2014; Eberhard 2018). The extinct Tasmanian species differs from two other extinct species which were on King Island and Kangaroo Island and from the existing mainland species *Dromaius novaehollandiae* (Thompson *et al.* 2018).

The latest fossil finds have been in the Junee-Florentine area, in the south of the state (Jackson 2014). Rolan Eberhard of the Department of Primary Industries, Parks, Water and Environment (DPIPWE) has requested that any future discoveries be reported to the Department to ensure the fossil deposits are protected for the future.

Hopefully the recent finds will inspire others to systematically explore and study karst areas, document all they find, like so many in the past (Davey 1977), notify the relevant experts and organise field trips to record these finds.

The megafauna of Scotchtown Cave will always be significant, as it was Tasmania's first Pleistocene megafauna cave site, and continues to be referred to in a broad range of publications, like *Paleobiology* (Megirian *et al.* 2010) and *Quaternary Science Reviews* (Gillispie *et al.* 2012).

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JOHN WYLIE

Tammy Gordon (left) and Margret Murray of Natural Sciences, QVMAG

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This article was further enhanced through the efforts of: Greg Middleton, Alan Jackson, Albert Goede, Cathie Plowman, Jill Bennett, Margaret Turton and Rolan Eberhard of DPIPWE, in tracking down additional contacts, information and photos. I truly appreciate your efforts in making this article possible.

▮ References to this article are on pp. 10-11

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Electronic *Caves Australia*

Dispelling the myths and a how-to guide

Alan Jackson
STC

THERE HAS been much discussion regarding the future of *Caves Australia* distribution over the last few years.

Not surprisingly, some people have grabbed the wrong end of the stick. Here's the truth, the whole truth and nothing but the truth.There is NO plan to make *Caves Australia* exclusively electronic.

All individual members and affiliated clubs (unless the club chooses otherwise) will continue to have the option of receiving *CA* in printed form (i.e. a wad of paper stapled together, wrapped in plastic, delivered by your local postie, which you can touch, hold, smell, eat or light the fire with). Anyone who says otherwise is misinformed or lying.

What is changing (from January 2019) is how you must indicate your preference to receive your hard copy. There is a check box in the ASF Membership Database where individual members can indicate their preference for electronic or hard copy.

Currently, if this check box is left in the default unmarked position (the term '- not set -' appears in the box) then you'll receive a hard copy *CA*. From January 2019 the default unmarked position of '— not set —' will result in that person receiving an electronic copy only.

Why is this changing? We wish to ensure that only those who actually want to receive a hard copy are doing so.

It costs ASF a lot of money, and the environment a few trees and litres of crude oil, to print and post hard copies and there's little point sending hard copies to people who don't actually want to receive it that way (we are an environmental organisation, after all).

There are also a considerable number of copies which get 'returned to sender' as a result of members not updating their address when they move house. Australia Post charges ASF several dollars per return.

We expect the number of returns will be significantly reduced by this change.

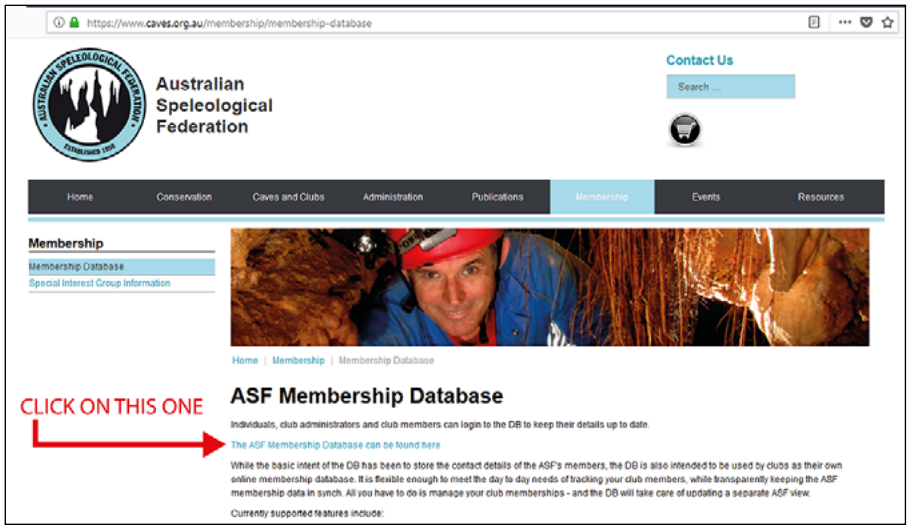
The record of any member whose hard copy is returned will have their preference changed to 'electronic only' by administration.

Here's how to ensure the aforementioned check box is respecting your wishes:

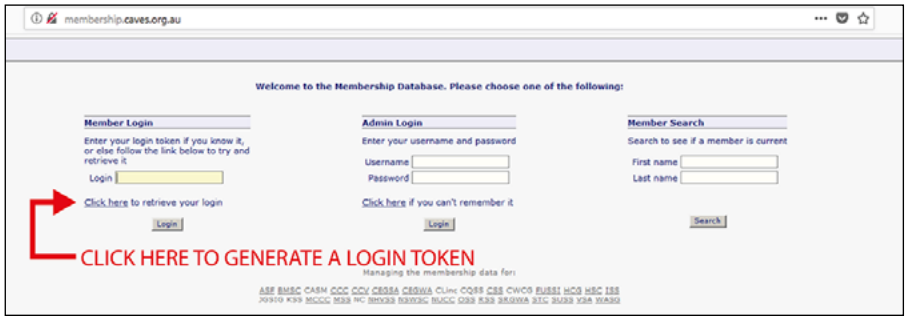
If you have an email address registered on the ASF Membership Database (hint, if you receive ASF 'allcomms' message, *ESpeleo* notifications etc. then your email address is probably registered), then go to:

https://www.caves.org.au/membership/membership-database

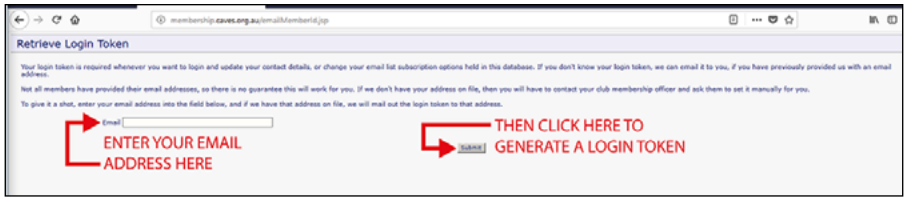
Under the 'ASF Membership Database' heading, click on the blue live link text which says 'The ASF Membership Database can be found here.'



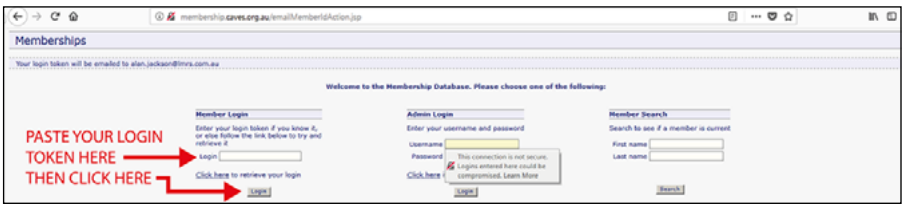
Under the 'Member Login' heading (left of screen), click on the 'Click here' link below.



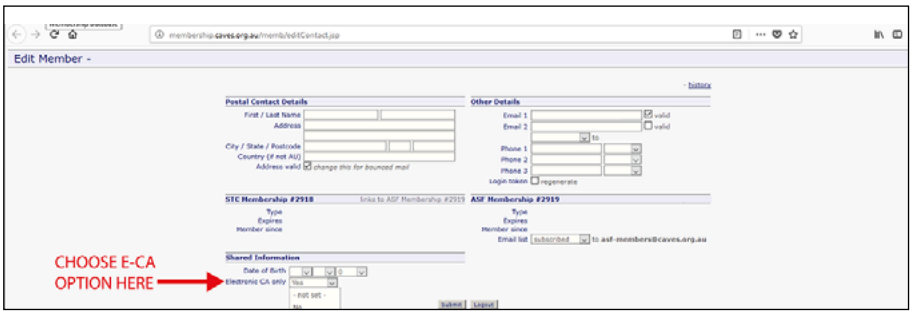
Under the 'Retrieve Login Token' heading, enter your email address in the 'Email' field and then click on the 'Submit' icon. This will generate an email from db-admins@caves.org.au (check your inbox or junk folder). If an 'error' page pops up then you might have multiple entries in the database — choose the one you think is right and hit 'submit' again.



Locate your email from db-admnins@caves.org.au and copy the login token generated then paste it into the now open 'Memberships' page. Alternatively, the link supplied in the email might take you directly to your 'Edit Member' page.



The 'Edit Member — *your name*' page should now be open. It will differ from the screen shot below depending on what club you're a member of and what details and services you've been signed up to in the past, but the framework will be similar. At the bottom left of the page, under 'Shared Information' is the 'Electronic *CA* only' field. Click on the drop down arrow (right hand side of field) and choose one of the three options. If you choose 'Yes' then you'll only receive *CA* electronically (via email notification). If you choose 'No' then you'll receive a hard copy *CA* in the mail. If you choose '- not set -' then your fate will be in the hands of the Gods (which means you'll receive a hard copy *CA* until January 2019 and then you'll receive electronic only from that date forward).



If you don't have an email address registered but you'd like one to be entered into the Membership Database then contact your club's Treasurer or Membership Secretary (DON'T contact the ASF Treasurer, ASF Membership Secretary or ASF General Secretary) and ask them to update it and then you can follow the above instructions.

If you don't have an email address or the concept of using a computer is anathema then politely inform your club's Treasurer or Membership Secretary of your preference (hard or electronic *CA)* and they'll manage it for you.

Become richer through ASF

ASF wants to give you money

Ric Tunney
ASF Grants Commission

SO, THAT'S got your attention. Is this a scam? No. (Trust me.) Have you heard of the ASF Grants Commission? Don't worry about your ignorance, no-one else has heard of it either. But now you have. Heard of it, that is.

ASF Grants Commission wants to give YOU money. Now read the fine print. It's not THAT easy. You'll have to make some effort. Do you have an idea for a project that would further caving (or speleology for the polysyllabic amongst us) in Australia?

Would you like some monetary support for this project? Then get some sort of proposal together and send it in — grants@caves.org.au

To give you an idea of the sorts of projects that have been supported recently:

- Some bolting gear to help cavers dropping the Bunda Cliffs along the Great Australian Bight not to fall into the ocean while they are looking for cave entrances.
- New batteries for drones looking for caves on the Nullarbor.
- Hire of a satphone for a Nullarbor expedition.
- Support for Indonesian and Philippines cavers to attend ASF conference.
- Insert your clever project here.

You'll find some information on the ASF website, but if you're unsure you can always ask.

Don't expect to be buried in money. We expect you and your club to provide most of the money for your project and we'll contribute (maybe) up to (perhaps) $500 towards the cost. And we like to target a specific part of your costs.

ASF Grants Commission has recently been restructured and its members are:
Grant Elliot — HCG, NSW
Paul Osbourne — CCC, Qld
Grace Matts — ex officio as ASF Treasurer
Greg Thomas — WASG, WA
Nicholas White — VSA, Vic
Ric Tunney — STC, Tas, ASF Grants Commissioner

You'll see we have attempted to get a broad geographical spread to get a national view. SA, NT and ACT miss out.

Australia's Largest Cave Systems
in Judbarra-Gregory National Park, NT

Garry K. Smith
NHVSS
J-GKR(SIG)

GARRY K. SMITH

Surface karst near the western end of Berks Backyard — Boab Valley

DEDICATED teams of cavers have been undertaking annual pilgrimages to Bullita for the last 29 years to explore, survey and document the vast cave systems.

The total length of surveyed cave passage reached 300 km in 2017 and the expedition this year has mapped another 10 km or more. This could not have been achieved without the perseverance and hard work put in by the cavers who make up the ASF Judbarra-Gregory Karst Research — Special Interest Group (SIG) and the much-valued close relationship and assistance of Judbarra-Gregory National Parks staff and the Traditional Owners.

The caves are formed in several major karst block areas; Northern, Central, Southern and Spring Creek. Major creeks and rivers bisect the karst to define these boundaries, thus making cave connection of all areas virtually impossible.

Serious exploration of the karst at Bullita began in late 1990 with an Operation Raleigh Caving Expedition led by Storm and Smith from the United Kingdom. Then in 1991, members of the Top End Speleological Society (TESS) and Canberra Speleological Society (CSS) visited the area and continued exploring and mapping for several years. In 2005 the SIG was formed and continues to conduct annual expeditions to this present year. Kershaw (2012) provides an excellent account of the history of the exploration over the years.

A quick count back through records reveals over 100 ASF members and National Parks staff have been involved in the surveying and explorations. This is an amazing achievement given the logistics of the very remote location, harsh conditions of the region and that all participants self-finance to participate.

Despite what has been achieved so far there is still lots to do and discover. Each year extensive new caves and significant extensions to known caves are discovered, adding many kilometres of new passage to the maps. Newly discovered caves, which often appear to be disconnected from the main systems, are constantly being linked up with other caves as connections are discovered.

The annual expeditions of a two week duration are typically held in July, during the Northern Territory's dry season. This period is chosen because in the wet season, vehicle tracks become impassable and many parts of the caves are flooded.

A campsite in the park is used as the

GARRY K. SMITH

Garry K. Smith in Thunderbirds near Station 18PM003 entrance BAA114 Bullita

GARRY K. SMITH

Stromatolite domes in karst near Berks Backyard

GARRY K. SMITH

Deciduous boab trees abound

main base for expeditions and there is sometimes a group of cavers who also set up an 'out-camp' to reduce daily access time to areas of more remote karst. A typical day at the main camp begins around 6.30 am (half an hour before dawn) enjoying breakfast as the first rays of sun peep over the horizon. It is a pleasant 10 to 15 degrees at that time of day. Then the pace picks up as people begin preparing and packing food, water and caving equipment, filling out location logbooks, collecting maps of previously surveyed caves and punching in waypoints and entrance locations into their GPSs. By 8 am we are driving to the starting point for walks to the caves. The walk can be as little as 10 minutes or as long as two hours, depending on the karst area visited.

Most times groups are in the cool of the underground by 10 am as above-ground temperatures often reach over 30°C in the middle of the day. After our day of exploration, surveying and photography in the pleasant cave temperature, we emerge from the underground late afternoon to allow time to walk back to the vehicles around 5.15 pm. After returning to camp the fire for the water heater is lit followed by a rotation of people through the two showers. Dinner is cooked, batteries are recharged then finally there's time to relax and sit around socialising and exchanging stories of new exciting cave discoveries. Clothes washed before going to bed are dry before the sun rises, so one can wear the same caving clothes each day. By 10 pm most people are off to bed.

The karst at Bullita was created by an ancient life form which caused the precipitation of calcium carbonate from saturated seawater to form stromatolites. Today rounded stromatolite domes created over eons by microscopic photosynthetic organisms (cyanobacteria) some 1.6 to 1.0 billion years ago, are visible on the surface where the cap rocks have eroded away. These layered structures, up to 15 metres in diameter, can even be seen on images taken from orbiting satellites. One could say they are the only fossils on earth visible from space. Cyanobacteria were responsible for changing the earth's atmosphere from a carbon dioxide-rich to the present-day oxygen-rich atmosphere and allowed life as we know it to evolve (Smith 2018).

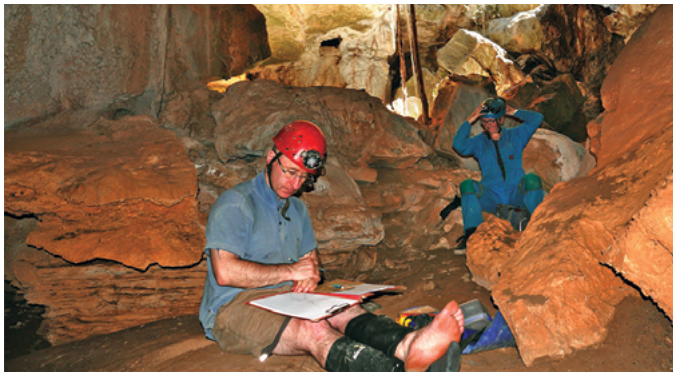
Below ground, the layered Proterozoic dolomitic limestone has been dissolved away to create a myriad of passages. The extensive maze caves have formed in and under the major outcrops of Supplejack

GARRY K. SMITH

Reto Zollinger and Yvonne Ingeme in Dingo Cave at Firemans chamber -Station 18PM064

GARRY K. SMITH

Ian Barnard surveying near the western end of Berks Backyard cave



GARRY K. SMITH

Phil Maynard and Melissa Hadley in Thunderbirds entrance

Dolostone member of the Skull Creek Formation (Martini & Grimes 2012). Often different passage levels connect and separate again in an intertwined three-dimensional maze.

There are some vast caverns so large that even the brightest lights don't illuminate them and one can but marvel at the huge expanse of rock suspended above. Among the largest examples are Mega Chamber 1 (107 m long x 24 m wide x 14 m high), Mega Chamber 2 (103 m long x 15 m wide x 15 m high) and the Giga Chamber (140 m long x 54 m wide x 7.4 m high). The two Mega Chambers were photographed during the 2018 expedition, using five flash units held by cavers spaced at intervals down the chamber and communication with the models via 2-way radios. It took a while to set up the photos and everyone had to stand perfectly still for the 10-second exposure.

Much of the park's caves comprise huge passages, which when exploring can feel like an underground bushwalk, with something new and exciting around every corner. For those who like extra physical challenges, there are still plenty of areas to be found with crawl and squeeze passages. In many places there are multi levels (up to five levels in SOGS Cave) of three dimensional maze.

Giant tree roots penetrate cracks in the limestone and hang down from the ceiling like fireman's poles, but they are in fact the life support for trees above. In places beams of light may penetrate cracks in the 20-30 metres of limstone above and provide a dazzling light display at certain times of day.

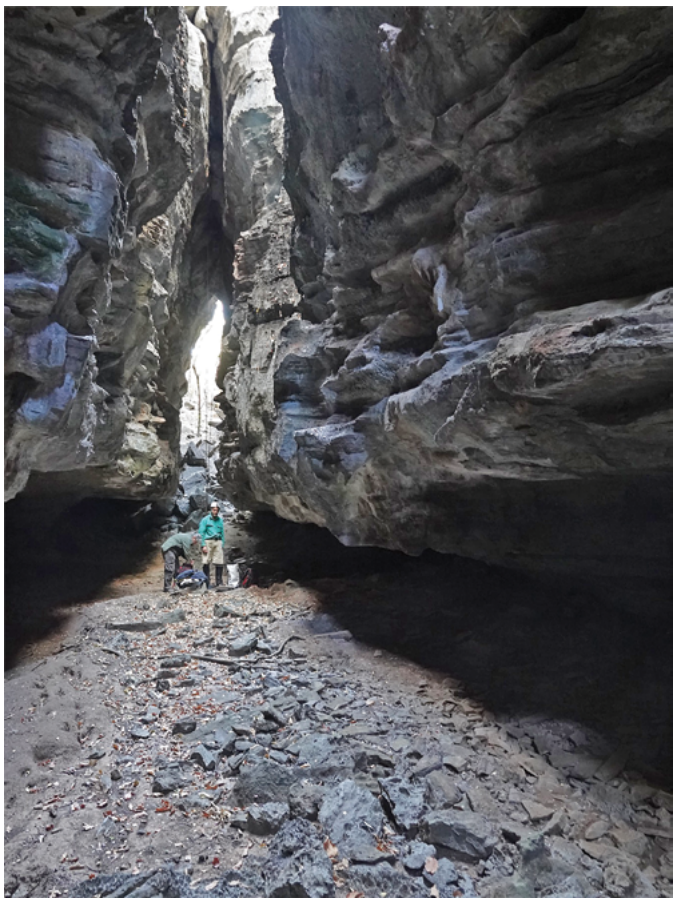
Above ground is stunning with massive deciduous boab trees *(Adansonia gregorii)* scattered across the landscape and huge areas of tower karst, with razor sharp fluting. Straw-coloured cane grass can grow to head height and crackles and snaps as the first person pushes their way through on the walk to a cave entrance.

It doesn't take long before paths are formed through the grass as cavers walk to and from caves each day.

Wild donkeys screech in the distance and flocks of cockatoos squawk as they fly overhead. The flies can sometimes be of irritating proportions during the middle of the day, so hat fly nets are a blessing. Carrying drinking water is absolutely essential in this dry landscape, because even the caves are waterless at this time of year. Despite the harsh conditions, this country has a beauty of its own. Broad expanses

GARRY K. SMITH

Melissa Hadley in Dingo Cave near station AK19



GARRY K. SMITH

Surface grike near station 18MP011

GARRY K. SMITH

Ships Graveyard Chamber, Dingo Cave

GARRY K. SMITH

Melissa Hadley in Scout Cave, Bullita — station 18IB108

of blue sky, straw-coloured grass, leafless boab trees, white flowering gums in bloom and stunning-shaped rocks of the tower karst are a photographer's paradise. Even at night, one only has to glance skyward to see the bright star-filled sky and the Milky Way in all its spectacular glory without the glare from city lights.

So what is the future for new discoveries and continued surveying?

Consensus among those attending the expedition this year, is that much more exploration and surveying is still to be done. There are still promising areas of limestone karst visible on satellite photos, where speleologists are yet to visit.

Existing caves continue to be linked up by new passages, there are hundreds of question marks on the maps where passages lead off and nobody has had time to explore or survey them. Sefton (2017) reported that as of the end of the 2017 expedition the three largest connected cave systems in the park were:

- The Bullita Cave System in the Central karst block at over 123 km of continuous surveyed passage, making it presently the 19th longest in the world http://www.caverbob.com/wlong.htm
- The Prometheus System in the southern karst block, which includes North and South Prometheus, Claymore, Two Fishes, and Atlantis caves, is over 57 km.
- The Dingo System of the northern karst, at approximately 41.5 km.

Once the more than 80 pages of survey data from this year's expedition have been processed these figures will certainly increase. The three cave systems continue to grow in survey length as new passage is discovered and smaller caves are incorporated into bigger systems. Theoretically it is possible that many of the smaller caves with say 5, 10 or more km of surveyed passage will become part of larger caves as more links are discovered.

The Judbarra-Gregory karst covers an area about 30 km long by a maximum width of 1 km, but generally only a few hundred metres wide. It is a substantial area by Australian standards.

All of the achievements to date would not have been possible without the efforts of dedicated members of the Judbarra-Gregory Karst Research SIG and the support of the National Parks staff and indigenous community.

There are SIG members who have participated in 10, 15 and even 20 years of expeditions. Their knowledge and expertise

GARRY K. SMITH

The Giga Chamber — North Dingo System (140L x 54W x 7.4H)

GARRY K. SMITH

Solar Bore campsite, early morning

are pivotal in providing guidance to newcomers who are keen to assist and hopefully willing to take over the reins in the future as senior members are no longer able to participate.

There have been studies on the geology, hydrology, flora and fauna, both above and below ground, but there is still plenty to be done.

To gain a position on an expedition, one must first apply to the SIG committee or be recommended by an existing member of the SIG. Long term survival of this group is ensured only if there is a steady influx of fresh enthusiastic speleologists willing to take on the challenge.

It should be especially noted that all caving in the Judbarra-Gregory National Park requires a special permit from the Parks and Wildlife Commission — NT, and that there is a very real chance of becoming lost in the multi-level maze cave systems without survey maps and guidance by cavers who have past experience at Bullita.

ACKNOWLEDGEMENTS

Expedition members are indebted to the Park staff and the traditional owners of the Judbarra-Gregory National Park for their continued support and encouragement of our activities within the park.

Thank you to Mark Sefton for checking the accuracy of this article and Andrew Baker for checking the readability.

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Exploring Ice Pick Lake, Jenolan

Deborah Johnston
SUSS

THE APTLY named 'Mammoth Cave' sprawls across a significant chunk of the Jenolan limestone in the NSW Blue Mountains, boasting over 10 km of mapped passage, with exploration leads remaining.

The cave has an underwater level with various entrances spread far and wide across the cave. The use of chemical markers showed that they are all connected but the exact path and connection point of each is still unknown. This means that cave divers are required to explore these submerged passages.

One such dive in Mammoth Cave is called Ice Pick Lake, an impressive permanent subterranean lake that can be reached via around an hour of semi-sporty dry caving.

It earned this name in the 1960s when Sydney Speleological Society (SSS) cavers swam across the 8 m deep lake, and used ice picks to scale a slippery 6 m mud climb on the other side. Unfortunately that climb ended after a short distance with no prospects.

In Easter 1980, Ian Lewis travelled from Adelaide to Jenolan and completed the first cave dive in Ice Pick Lake, with a single backmounted cylinder (standard equipment for divers at the time) and described finding a small opening that lead to around 70 m of passage down to a depth of -17 m. The passage continued, but his air supply did not, so he was forced to turn back. Local cavers spent the next decade exploring other dives at Jenolan, but for one reason or another they did not return to Ice Pick Lake.

By 1993, management decided that having untrained cavers diving in caves didn't seem like such a great idea. The Sydney University Speleological Society (SUSS) obtained a grant and brought legendary British diver Rob Palmer to Australia to impart wisdom and certifications. This prompted some renewed interest in Jenolan diving exploration.

In 1996, local cave diving legend Mervyn 'Nipper' Maher attempted to find the reported passage heading off from the lake. He had no luck in the main pool (hindered by poor visibility), and instead dived the revolting tight upstream sump around 30 m distance and -3-5 m depth through fairly low, silty passage. Disappointed, it was decided that Ian's tale of clear open passage and depth were wild exaggerations *(SUSS Bull* 36 (4): 23).

KENNETH ANDERSON

Mammoth Cave on the way to Ice Pick Lake

In 2003, cave diver Rod OBrien was being shown the various dives of Jenolan. When he saw Ice Pick he simply had to dive it and returned soon after with two small

GREG RYAN

Entering Ice Pick Lake

sidemounted steel cylinders. With clear visibility he was able to find the inconspicuous hole in the side wall of the lake that Ian Lewis had first discovered. It is not in an intuitive location in terms of direction, explaining why it had been easily missed on other dives.

Rod was able to match the distance Ian Lewis had achieved before running out of guideline. He returned on subsequent trips and extended the passage around 200 m, reaching an air chamber at the end with holes in the roof out of reach. Eleven years passed until SUSS divers assembled together in 2014 to resume the project.

Over the years we had all heard horror stories about how difficult it was to get equipment to and from the lake through the dry cave.

For our first trip, we took nothing but our lunch so we could explore all possible routes before selecting the most efficient 'path of least resistance'. This meant we were able to get to the water much faster and with noticeably less fatigue than attempts by other parties. This would be important as we would need to rely on the donated assistance of dry cavers to help transport equipment without their regretting every moment of their trip.

The trip to the lake with six bags of dive equipment for two divers meanders through sporty but fun dry cave with a series of climbs and squeezes along the way. It is challenging enough to keep seasoned cavers interested, but safe enough for fit and motivated beginners. This takes around an hour or two each way depending on the group.

Upon reaching the lake, there's a convenient large flat bank for gearing up. Once ready, the diver crawls carefully to the edge of the bank across a tarp, before gliding into the water (attempting to minimise the amount of mud following after you which can ruin the visibility).

These entrances are typically rated out of 10 by the dry caving team for style and grace. Scores achieved ranged from a glorious 9.5 (by Alex Boulton, who is described as 'a dream to watch' by swooning onlookers), to a -4 (diver's name hidden to preserve what's left of his reputation after that monstrosity).

Once entering the water, you follow the mud bank down a steep descent before going through a hole in the side wall just big enough for a person with two small sidemounted cylinders. This quickly opens up into a surprisingly large tall and thin rift passage with beautifully curved walls.

Initial dives were conducted to check and repair the old orange braided polypropylene diveline, which was found to be in mostly excellent condition. One diver learned the 'when in doubt, chuck it out' rule the hard way.

DEBORAH JOHNSTON

Caving to Ice Pick Lake

He had decided that one section of the thin orange lifeline didn't need replacing, only to have it snap in half as he passed it. It was a shocking sight for each of the two divers that trip, with one staring at the now floppy end of the string in his hand, and the other emerging in a rush back towards him from a billowing silt cloud.

The windy nature of the passage means that the guideline must be carefully followed to avoid unceremonious smacks in the face by protruding rocks, or awkward attempts to swim through spaces far too narrow for humans.

The majority of the dive involves following narrow keyhole sections along the rift that disappears into the darkness both above and below the diver.

Silt has accumulated in every scallop. Exhaled bubbles extend high up the rift above you, unleashing this silt which tumbles down in clouds of yellow and orange. Swimming ahead of this falling silt gives you almost perfect visibility, but the return is often so murky that you cannot see your hand in front of your face.

Luckily, the dive is shallow enough that decompression obligations are not a concern. On each of these early dives we took care on the way in to preserve visibility for the exit, but upon exiting we tried to stir things up as much as possible behind us as we made our way out. The reasoning behind this was to eventually dislodge all the silt from above which would settle to the floor, creating great visibility for future divers.

In one section the diver is forced to turn on an uncomfortable sideways angle and slide themselves through a sloped crack before continuing ahead along rift passage. This section was a total blackout after the first diver and never cleared in time for

the return journey, earning the name 'that bastard bit'.

Eventually, the passage goes almost straight up into a small air chamber. There are two holes in the ceiling, and a 2+ m high mud pile that peeks up out of the water. A passage continues off from this air chamber, but it's much smaller and descends rapidly down to -16 m. It levels out at the bottom for a short distance before reaching the base of what seems to be a narrow rift. Settled on the floor is almost 1 m of soft silt.

By lying on your side with one arm ahead you can wiggle about a body length into the rift before it becomes tighter. Your shoulder sinks well into the soft bottom which then starts coming up over your face. Personally, this is the point where I reached maximum 'nope' factor and turned back. It probably is possible to push through here into ongoing passage, but as it stands that is the furthest point of underwater exploration.

Attentions were then focused on the tantalising holes in the roof of the air chamber. We tried free-climbing up there via a variety of bridging attempts and even a human ladder that would make Cirque du Soleil proud.

Then we acquired a fancy slingshot with wrist brace. This ate up multiple trips as the goal (to get up to the roof hole) seemed so close and achievable. The slingshot worked well at getting a lead sinker and fishing line through a large thread just beneath the roof hole, but it always stuck on the mud on the other side, never falling down low enough to be reached. The angle meant that it wasn't possible to attack from the other side. Eventually, we had to admit defeat and give up on these attempts.

There was a very tight side rift branching off from the main passage not far from the air chamber, but it was initially discounted as being impossibly tight and horrible. After becoming more familiar with the cave over time, it seemed less scary, and after a few false starts (aka chickening out) I eventually found a way through at the end of a survey trip.

It's a very narrow and tall vertical rift where the diver needs to move up and down in the water as they move through to stay in spaces wide enough to fit through. Thankfully this suffering is short and it opens into a medium-sized chamber. The diver crosses the chamber and ascends a mud slope on the other side before reaching a second air chamber.

When water levels were high, Alex Boulton and Adam Hooper bravely decided to chimney the walls of the rift above this second air chamber, and were able to fix a handline around a solid chockstone that is firmly wedged in a formation choke up high. The price of this heroic endeavour was a torn drysuit which made for a painfully uncomfortable return journey through the 14 degree water.

DEBORAH JOHNSTON

Lugging gear to the lake

I returned on a later trip and was horrified to see that the water level had dropped significantly (the thought of landing in water feels more comforting than a bed of mud and stone).

The chimney up was awkward and I found it harder than the guys had described, so I was thankful for the grippy material of my thick wetsuit. At the top of the chimney, you can shuffle along the rift carefully in either direction. One direction had a thick false floor of stones and mud that you could teeter across (all the while thinking about the drop underneath). Just around the corner this ended in a rockpile choke that would be suicide to disturb.

Heading in the other direction (towards the 'main drag' of the cave) the rift continues a short distance before reaching a mud choke. This could be dug, but thanks to a voice connection being made with Greg Ryan in the main air chamber, we know that this isn't necessary.

Looking up, the rift passage continues at least 12 m straight up. The smooth limestone walls have large sections coated in formation and water sprinkles down like a rain shower. The potential for this climb seems enormous. If this were in the dry section of Mammoth Cave, any keen climber would chimney up the walls to explore what is at the top. Because this is at the wrong end of a difficult dive, it would require bolting for safety.

Looking at a plan view of the cave, this passage is heading well and truly into the unknown, deep in the mountain. The water will eventually connect back in with Lower River or Slug Lake (two other significant dives in Mammoth Cave) but the path, distance, depth, and size are all unknown.

ACKNOWLEDGMENTS

These repeat visits to the lake over a period of 18-months required the assistance of a massive number of people from time to time, including lead divers Alex Boulton and Adam Hooper (who each spent 18-months of hard work exploring here and assisting with trip logistics), and support divers Andreas Klocker, Sandy Varin, Rick Grundy, Greg Ryan, Rod Obrien, and Philip Maynard.

Dry cavers who assisted include Al Warild, Brenda Carr, Brian Hedden, David Stephen-Miles, Dean Coleman, Felix and Balthazar Ossig-Bonanno, Flora Lin, Geoff McDonald, Grant Stewart, Ian Wild, Jenny Joule, John Wooden, Joshua Barker, Justin Wilkinson, Jyah Stachan, Katie Keophilaphet, Katie Lillyman, Kenneth Anderson, Kevin 'Bob' Prescilla, Louise Johnston, Luke Weatherstone, Maddie Eve, Natalie Brennan, Phillip Eddey, Rowena Larkin, Steve and Annalise Contos, Stevan Ellis, Steve Kennedy, Susanne Parkinson, Tatiana and Patrick Prokofyeva, Tina Wilmore, Tord Meisterplass and a handful of others I have definitely missed for which I am sincerely sorry.

Australian Cave Diving – New South Wales

New Cave Diving Book Review

Ian D Lewis
CEGSA, CDAA

THE high-profile focus of cave diving in Australia is at Mount Gambier and on the Nullarbor Plain. Cave diving first started in Mount Gambier in 1961 and on the Nullarbor in 1972.

The CDAA formed in 1975 but the 5,000 CDAA members over four decades may not realise that Australian cave diving began in the eastern States 20 years before and only seven years after World War II ended. In 1952, brave, energetic, innovative and well-organised divers in Sydney were drawn to the popular underground Imperial River featured in the famous Jenolan Caves in the Blue Mountains of New South Wales, three hours from Sydney.

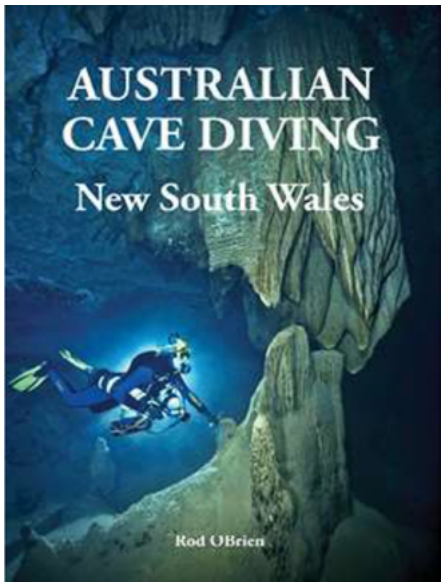
We all know that limestone is the main rock in which caves form. Most of the world's limestone formed on sea floors which have become exposed as landscapes after being uplifted.

Where the limestone is flat and full of fossils, groundwater has dissolved our horizontal tunnels, sinkholes and massive passages — fantastic cave diver territory in Mount Gambier, the Nullarbor, Florida, the Bahamas and the Yucatan in Mexico. However, when limestone gets squashed, squeezed and hoisted into mountain chains, it becomes much harder and riddled with fractures.

Caves formed in marble, dolomite and hardened limestones are carved by streamways through the fractures which bring gravels, sands and muds through the systems. Most of the world's cave diving in Britain, Europe, Russia, North America and New Zealand is in these conditions.

Here in Australia, these conditions are found in cave systems throughout the hills and mountains of the Great Dividing Range of eastern Australia and Tasmania. Rod's book is about the extensive diving in these conditions throughout the NSW section of the Great Divide.

It's all about a 'parallel world' to the



COVER IMAGE: NEIL VINCENT

world of large white-rock sinkholes and huge clear passageways. New South Wales cave divers have much tougher and muddier current conditions to traverse and dive compared to the clearwater sinkholes and caves of South and Western Australia. That's why they made the excellent and appropriate decision to undertake UK sump diver training with Rob Palmer in 1993 and 1995 rather than try to adapt the CDAA system which is better designed for sinkhole and stillwater territory.

Rod is one of Australia's leading cave divers and has poured all his experience and knowledge into a simply huge effort over the last seven years to produce this book about the beginnings of cave diving in Australia.

Underwater exploration started in the famous Jenolan Caves where the two underground river systems flow from the north and the south into the multi-level-cave tourist complex, forming a series of sumps and concealing hidden chambers within the mountainsides.

A combination of cave explorers and cave divers have been trying to reveal secrets of the Jenolan Limestone for seven decades now and Rod documents in full all those explorations, through the development of gear improvement and cave diving techniques. On page 45 he lists a number of important 'firsts' in cave diving in this country that occurred at Jenolan.

Rod is a specialist in several areas — working for years as a commercial diver, a wreck diving specialist, helping discover advanced caves like the Olwolgin and Burnabbie systems on the Nullarbor and receiving an 'Award of Distinction for Cave Exploration' from the Australian Speleological Federation (ASF).

His diving life has been an adventure in itself and there is another book to be written about all that someday.

I am quite comfortable to say that Rod's experience in cave diving efforts and achievements stand alongside those of Ron Allum who figures prominently in NSW cave diving history and the contribution of both of them to Australian cave diving has been outstanding. They have shared much of their NSW work with prominent Sydney University Speleological Society (SUSS) cave divers Keir Vaughan-Taylor, Simon McCartney and Greg Ryan, to whom Rod also gives well-deserved credit.

This is a very well-written, readable book with an attractive, professional layout, clear subheadings, lots of excellent color photographs of beautiful places and tough exploration and many good yarns and reports about the efforts of more than 100 cave divers in NSW caves over time.

Rod is generous and thorough about crediting and attributing the achievements of others with many trip descriptions and personnel, and has listed all cave divers who've helped in NSW at the back of the book with thorough references and a detailed index, features essential to any quality book.

His crediting of assistance lists many prominent members of the ASF fraternity

in SUSS, SSS and CDAA who have all contributed to the book but it is Rod himself who has pulled all this information together expertly.

Rod covers the changes in techniques used for NSW cave diving and has included a special chapter on foul air detection and management, as NSW mountain caves have vegetation and soil inwash from stream systems that can decay and trap CO_2 in airbells and pockets — not a problem in any SA or WA cave diving except for the Tommy Graham's Inner Sanctum Chamber.

But it is his detailed coverage of Australia's cave diving pioneers commencing in 1952 in Jenolan with a series of well-publicised Sydney newspaper articles that is an outstanding contribution to our sport and our science.

Rod has obtained many excellent black-and-white photographs of those who were tackling this tricky exploration.

This is real national cave diving history and excellent for all cavers and cave divers in this country to learn about and acknowledge their resourceful and courageous pioneering when divelights were motorcycle batteries in sealed World War II ammo boxes.

Rod describes all sorts of early equipment and modifications in a sequence so we can really appreciate how our forebears were able to innovate in their drive to discover underwater caves.

He backs this with a simply great montage of photos of these divers and on-site support parties on pages 116-121. The leader of the original Jenolan cave dives was Dr Denis Burke, who I met and caved with years later when he and his caving family moved to South Australia and joined CEGSA. His prominent Jenolan cave diving partner was the late Ben Nurse, who notably led the SSS (Sydney Speleological Society) for many decades.

Rod provides full coverage of NSW caves with a great chapter and photos on the beautiful Wellington cave diving and photos and the exploration of drowned caves at Burrinjuck Dam involving a combination of CDAA members working alongside NSW cave diving specialists.

The book then covers Cooleman Plains and Yarrangobilly cave dives in the Snowy Mountains (where there's also interesting low-visibility freshwater diving on the drowned towns in Lakes Jindabyne and Adaminaby), sumps at the base of the vertical shafts of the Bungonia Gorge caves, even the pool at the bottom of Big Hole near Wyanbene, a 100 m drop to water — three times the drop to water in Hells Hole at Mt Gambier.

ALAN PRYKE

Author Rod OBrien

I love maps from the early days when we mapped the sinkholes to help in dive planning at Mt Gambier. Rod's book contains many maps of all styles, some from trip reports and sketches, but it also has several excellent detailed long sections of the complex Jenolan system showing tourist caves, other dry caves up the mountainside and the underwater sections and their connections (pages 48, 78-9, 98-9, 124-5) which show their relationship and complexity. Some maps contain eye-catching and witty names of various chambers and extensions — part of the speleological culture around the world.

One sketch of a tight passage on page 65 shows the challenge of grovel diving — spot the diver! On a personal level, thanks Rod for including the Ice Pick Lake dive map and discovery — quite a relief, as nobody believed me for 20 years.

The Mammoth Cave Slug Lake dive is NSW's greatest challenge — it's now 96 m deep (text page 66) and opening out below the chamber sketched on Rod's map on p. 65.

In a geological paper I gave there a couple of years ago, I estimated that the near-vertical limestone plunges several kilometres deep at Jenolan and this 96 m underwater chamber is the top of a large deep 'reservoir' of groundwater in the limestone band feeding the northern river system.

Rod OBrien and Ron Allum have both done this epic dive. Cave divers in NSW require good fitness, tough equipment, tough discipline, trust, reliability and close cooperation.

We from SA and WA calmwater experiences have much to admire about them. Rod's book is a brilliant effort and deserves success and great respect. Its collection of history and activity underpins nearly 70 years of cave diving in this nation. Outstanding!

How to order

Cave Diving in Australia: New South Wales by Rod OBrien — 288 pages full colour paperback, with 51 maps and 254 photographs including 58 historical photographs from the 1950s.
$60 + $18 postage and handling for 1 or 2 books within Australia (overseas postage on request).

To order: email Rod OBrien at constructiondiver@bigpond.com including your name, address and quantity. Payment by PayPal to constructiondiver@bigpond.com, or by direct debit to Comdiv Pty Ltd, BSB 032-514, A/C No. 214125. Please ID your EFT payment with your name.

Weebubbie Cave

Nullarbor Plain – Western Australia
In danger of collapse?

Norman Poulter OAM
Northern Caverneers Inc.
Speleological Research Group Western Australia Inc.

WEEBUBBIE CAVE (6N-2) is located some 12 km north-west of the present-day 'township' of Eucla on the Hampton Tableland of the vast, arid Nullarbor Plain, a short distance west of the South Australian border.

The ruins of the Eucla telegraph station, only 20 km south of the cave, are situated close to the beachfront on the Roe Plains. This was once an important communications centre of the inter-colonial telegraph line, the only station between Israelite Bay (180 km east of Esperance) in Western Australia and Fowlers Bay in South Australia (885 km) to be serviced by a jetty enabling supplies to be delivered by sea.

Weebubbie Cave has probably been known to Aboriginal Australians for thousands of years. They mined flint from the cave walls for use as stone tools and to trade. The cave is a registered archeological site as was indicated by a small plaque placed near the cave entrance, seen by the author in early 1972, but long since disappeared.

The cave was not 'discovered' by European Australians until two employees, Clayer and Junken of the South Australian Telegraph Department, chanced upon it in early 1900 (Poulter 1987). They were no doubt impressed by the sheer size of the collapse doline but, more importantly, the volume of water the cave contained. The pair then lodged an application for an 80,000 acre (32,375 hectare) grazing lease encompassing the cave.

While granting the pair a 40,000 acre (16,187 ha) lease on 2nd August of the same year, the Surveyor-General also placed a temporary reserve of 5,000 acres (2,023 ha) around the cave. Clayer and Junken then sought compensation for 'finding' the water resource in an otherwise waterless environment only to lose access to it. The government favoured granting a reward

NORMAN POULTER OAM

Looking into the doline in September 2017 with the entry rockslope on the left. Entry into the actual cave is obscured by vegetation.

provided a government-appointed inspector submitted a favourable report as to the water quality, suggesting the pair nominate a suitable sum. The government's friendly attitude changed when the pair applied for a £500 reward — a huge sum in those days —and despite much telegraphic prodding from the pair, the government failed to dispatch an inspector to sample the water.

However, during March 1901, John Muir, Inspector of Engineering Surveys PWD, was examining the country between Kalgoorlie and Eucla in relation to either constructing a future transcontinental railroad direct to Eucla and thence to Tarcoola in South Australia or, sending a spur line down to Eucla from a more northerly east-west route.

The reasoning behind such an idea would have been to carry supplies for the railroad construction using the already existing Eucla jetty. On meeting Muir, Clayer and Junken persuaded him to inspect the cave's water and forward his opinion to his superiors. Muir's October 1901 report, accompanied by three interior photographs of the cave, concluded the lake to be a 'small underground reservoir' due to the 'impervious character' of the surrounding strata and that the estimated 3 million gallons was of highly mineralised water not suitable for stock.

On the strength of this report, the government refused a reward to Clayer and Junken, despite their protests that Muir's observations were no more than casual and that he was not qualified to pass judgment on the water quality. The government, however, was unmoved and shortly afterward Clayer and Junken left the area.

Attitudes change with time and in December 1927 a proposal was made to give the reserve permanent status and lease it in order to raise money from the resource. On 4th January 1928 Water Reserve #19713 was duly leased to J. D. and O. D. Jones for grazing purposes at 10 shillings a year, subject to the public having free access to the water.

The lease was cancelled in 1930 due to non-payment of fees. Subsequent attempts to re-lease the cave's water resource appear to have been short-lived.

There was a minor panic during 1964

when it was discovered that Weebubbie was not in the reserve that had been thrown around it in 1901. The cave was quite some distance outside the boundary, an error that was rectified later in the year.

Prior to 1964, the cave had been periodically known as Weebobby. There is also a reference that it was referred to not only as Weebubby, but Weebobby Pool (File #5431/00 p. 52) and reputed to mean 'Place of Hidden Feet' in the dialect of the traditional Mirning Aboriginal language (T. Hadland pers comm 2018).

The name Weebubbie did not appear in correspondence until 1967 when F. E. B. Gurney sought permission to use the cave's resource to water stock on his nearby Moonpina Station.

The name Weebubbie is apparently derived from the Jirkla-Mirning Aboriginal words *wipa* (ant) and *kapi* (water) meaning 'trails of ants leading to the cave's water at night' (Reardon 1996). Formal approval of the name Weebubbie was granted in April 1968 following representation from David Lowry, then of the WA Geological Survey.

There is no record of Gurney taking up the water lease from Weebubbie. Initially, water was extracted by a pipeline laid from the cave's minor lake out through the entrance of the cave.

A small but heavy Lister diesel pump unit was located at the edge of the lake, providing the power. Prior to 1972, a hole was drilled through the ceiling of the main lake allowing easier access to the water using an electric pump to supply water to the nearby Eucla Roadhouse, the pipework appearing in many published works (Deacon 1985, 1986, Morrison 1981). The ceiling pipework was removed prior to 1985, although some lengths had fallen through into the lake.

Weebubbie had been used as an ad hoc tourist attraction during the 1960s and into the early 1970s. In addition to the Eucla Roadhouse exploitation, it is possible that the cave's water resources were utilized during the sealing of the Western Australian section of the Eyre Highway in the early 1960s.

All these activities resulted in a considerable amount of rubbish being dumped in the cave, including a lot on the bottom of the main lake.

This took the form of the already mentioned steel and PVC pipework and the Lister diesel powered pump as well as oil drums, timber, light fittings, wire and insulators as well as tourist-generated litter both in the cave and the entrance doline. A few 'dead' tyres had been thrown into the doline for good measure.

Systematic exploratory cave diving did not occur until 1971-72 when Ian Lewis conducted the first Cave Exploration Group South Australia (CEGSA) Nullarbor cave diving expedition. At Weebubbie Cave, in addition to discovering the mysterious underwater growths and extensions, extensive side passages leading off from the entrance doline were discovered (Lewis 1972). The waters of Weebubbie Cave, in addition to other caves containing ultra-slow moving water of the Nullarbor, are world renowned as being of the utmost clarity, rivalled only by South Australia's famed Piccaninnie Ponds.

During the Christmas period of 1985-86 and again in 1989-90, the Speleological Research Group Western Australia (SRGWA) organized multi-society expeditions to remove the several tonnes of rubbish from the cave (Poulter 1987, 1990). Since the cleanups, very little tourist-generated rubbish has been noted — this could be partly attributed to the cave falling off the 'tourist radar'.

SOME NOTES ON RESERVE #19713

Following the European discovery of Weebubbie by Clayer and Junken in 1900, the Surveyor-General placed a temporary 5,000 acre (2,023 ha) reserve around the cave. A permanent reserve was established in 1928, a partial description of which follows:

The legal area of Reserve #19713 is 1,035.9952 ha (2,560 acres) whose purpose is 'Landscape and Aboriginal Culture and Heritage Protection and Conservation of Fauna'. It is a Class 'C' reserve and the responsible agency is now the Department of Regional Development and Lands (Landgate). The date of the last change was April 20, 2011. The 'Additional Reserve Information' lists the reserve as 'Comprises of Lot 300 on DP69595 limited in depth to 20 metres (L566764),' (L. McDonough pers comm 2018).

Quite apart from the size of the reserve being seemingly whittled down by almost half over the years, what about the depth? 20 m? The depth of 20 m doesn't even 'protect' the bottom of the doline, let alone the cultural, heritage and conservation of fauna values inside the cave.

Due to the fact that Weebubbie Cave is home to colonies of swallows living in the entrance zone and bats congregating at the far end of the main lake and elsewhere, guaranteeing a constant input of surface energy, there is a naturally diverse fauna regime also present. Hamilton-Smith (1967) listed the following species from Weebubbie:

Araneae indent., *Spinturnix* sp., — bat parasite,
Acarina indet. — bat parasite, *Polyzosteria pubescens Tepper* (accidental),
Rhaphidophoridae sp., *Psyllipsocus ramburi* Selys-longchamp,
Speotarus sp., *Brises acuticornis Pascoe,*
Lathridiidae sp. *Chalinolobus morio* (Gray)

Since that publication, four more troglobites have been discovered from the cave:
Possibly 1971 — *Janusia muiri* (spider) — most likely the first discovery of this species.
1981 — Isopod (undescribed) Robert Poulter
1982 — Cockroach (undescribed) Norman Poulter
1985 — Beetle *Speozuphium poulteri* (Moore 1995)

THE LEAD-UP TO THE WEEBUBBIE COLLAPSE

The cavernous coastline of the lower South-West of Western Australia between Capes Naturaliste and Leeuwin (as well as further north) is made up of what is commonly known as Coastal or Dune Limestone. Rich in silica, it can be quite porous and extremely friable. At Gracetown, a small coastal village just north of Margaret River, there is a popular surfing beach with adjacent limestone cliffs.

Amongst the cliff-line was an overhanging ledge (approx. 6 m long and 2-3 m deep (C. Paice, local resident pers comm 2018)) that provided beachgoers with a convenient, elevated all-weather shelter and sandy viewing point that ultimately became a safety concern to some residents and land managers alike. Unconfirmed reports suggested that 'remedial actions' may have been undertaken at various times, and may have unknowingly partially destabilised the ledge.

During a high school surfing event, held in inclement weather[1] on September 27, 1996, while numerous people were sheltering underneath, the ledge suddenly collapsed, killing nine people, four of them children. It was ironic that an event organiser, whose wife was earlier imploring him to call off the event, was among those killed[2] (De Poloni & Woods 2016). There were other minor injuries. The effect on the

1. There is no Bureau of Meteorology weather station at Gracetown, but a short distance away and slightly inland, there is a recording station at Cowaramup (#9636 est. 1926) where 150 mm of rain had been recorded between September 1-23, 1996.
2 . In the hours leading up to and including the time of the collapse, 35 mm of rain had been recorded at the Cowaramup station. It may have been a more severe event at Gracetown.

regional communities was to be devastating and long lasting.

THE COLLAPSE AT WEEBUBBIE CAVE — 9 OCTOBER 1996

Twelve days later, a roof collapse occurred just beyond the weather line of Weebubbie Cave. A party of cave divers from South Australia was in the cave at the time — though nowhere near the collapse site. A power cable and a 6 mm copper airline passing from the surface were buried under the collapse. A group of Girl Guides led by a WA caver had visited the cave the previous evening between 7:30 and 9:30 pm, camping overnight, leaving the area the morning of the collapse.

At the time of the collapse, Weebubbie Cave was under the jurisdiction of the Department of Land Administration (DOLA) who readily admitted to being administrators, not managers.

No doubt influenced by the Gracetown tragedy, DOLA immediately closed access to the cave and sought advice from the Department of Mines as to what other action should be undertaken.

The cave was promptly visited by Ian Misich (geotechnical engineer, Mining Operations Division) of the Department of Mines. He submitted a short report accompanied by several photographs. On the strength of the Misich report, DOLA now permanently closed the cave, had the uppermost ladders removed and commissioned five large signs to be erected in strategic locations advising the general public that the cave was closed. There was no distinction between untrained members of the public and experienced speleologists or cave divers.

The closure signs were apparently installed during early December, 1996, one unfortunately within view of the Eyre Highway acting as an attractant and another adjacent to the nearby microwave tower, which served as the beginning of the rough track leading to the cave. Two signs were placed at the cave itself, one adjacent to the doline access point, with the other in the camping area. The fifth sign was erected at a track junction of the Eucla-Reid road.

At the time of the collapse, SRGWA was already preparing for an expedition to the Nullarbor and in early December began negotiations with DOLA to gain access to the cave in order to ascertain for itself the severity of the collapse and potential for further rockfalls.

This was prompted in part by conflicting media reports immediately after the October collapse.

Those reports inferred that several thousand tonnes of rock were involved. The

OLAF THEDEN

The warning sign installed at the entry point to the doline (circa 1996?), prior to its removal.

NORMAN POULTER OAM

The warning sign (September 2017) where it was originally 'planted' in the campsite back in 1996.

Albany-based regional manager of the Department of Conservation and Land Management (CALM), the Western Australian equivalent of a National Parks Authority, supported the SRGWA application. CALM manages the Nullarbor's Nuytsland Nature Reserve, which contains numerous caves, several of which are highly significant and embody lakes. CALM also administered access to other Nullarbor sites of interest to cave divers who were accredited by the Cave Divers Association of Australia (CDAA). Given the WA Government's enthusiasm for expensive departmental amalgamations, CALM has since been merged into the Department of Biodiversity Conservation and Attractions, Parks and Wildlife Service.

In what could only be described as an eleventh-hour event, this author signed an indemnity form with DOLA at 11:15 am on Christmas Eve 1996, 45 minutes before the traditional knock-off time for the Christmas-New Year holiday break on behalf of the ASF Inc. that enabled all members of ASF (cavers and cave divers) who subscribe to the ASF's insurance policy to have access to Weebubbie Cave and all other caves on DOLA territory throughout Western Australia.

SRGWA visited the cave during 28th-29th December, 1996 (Poulter 1997a). Initial inspection revealed that, contrary to some media reports, the collapse occurred inside the cave beyond the weather line and that the amount of rock involved proved to be significantly less than they implied. For a rockfall that was less than three months old, the newly fallen rock was remarkably stable.

Over the next two days, members conducted a survey of the rockfall area, the conclusion being that the collapse involved the natural weathering of a roof-step through salt wedging or the drying out of clay interbeds. This weathering process is common throughout the Nullarbor as the caves continue to evolve.

The survey also found that approximately 97 m^3 of rock was involved in the collapse, creating another roof step, of which Weebubbie has several.

As indicated in diagrams submitted in the SRGWA report to DOLA (Poulter 1997b), the rockfall took place approximately 4-5 m from the inner lip of

the entrance cliffline and extended along the ceiling for 13.5 m varying in thickness from 0.4 — 0.6 m with occasional spurs up to 1 m. The width of the collapse was determined to be 18 m, approximately 80% of the passage width.

The entrance rockpile at the region of the collapse sloped at 27° and rubble from the fall occupied about 20 m of the downslope area indicating very little rolled downslope (approximately 7 m). The vertical distance that the rock fell varied from approximately 4 m near the entrance to about 11 m at its furthest point. For such a 'young' rockfall, only two or three rocks were found to move when trodden on or leant against. The determination was that the entire 97 m^3 'step' fell more or less as one piece, breaking up on impact.

Laboratory tests in Perth later revealed that the density of the fallen limestone was much less than that of pure limestone. Pure limestone weighs 3,140kg/m^3 while the rockfall sample indicated a weight of 2,066kg/m^3. This placed the estimated weight of the Weebubbie rockfall at about 200 metric tonnes, considerably less than the 2,000 metric tonnes bandied about in the media.

SRGWA's report to DOLA was confident that the entire rock strata fell during the October collapse and that further rockfalls were unlikely in the immediate future although as stresses built up or were relieved in other bedding planes as a result of that fall, minor falls could occur from those strata.

2017 AND BEYOND?

In company with a Tasmanian neighbour, this author camped at Weebubbie Cave on the evening and morning of 11th-12th September 2017 — almost 21 years after the rockfall. Although I wasn't looking out for them as we drove in from Eucla, in the darkness, I did not notice the two signs that had been placed near the Eyre Highway or the old microwave tower. I didn't see any indication of the sign at the Reid Junction the next day as we departed.

The closure sign placed right near the cave entry point disappeared a long time ago. The remaining sign at the camping area looks quite sad, having fallen off one of its support posts, with the other quite rusted at ground level.

I would speculate that the removal of the short wooden 'bush ladder' at the very surface and the long fixed steel ladder further down has acted as a suitable deterrent, preventing most casual visitors from attempting to venture into the cave.

WHAT HAS HAPPENED WITH WEEBUBBIE CAVE DURING THE INTERVENING YEARS?

Have there been further rockfalls? None that I have heard or read about! It would be interesting to find out if speleological activity in the cave has declined since the rockfall.

Responsibility has apparently been transferred from DOLA to Landgate.

It was refreshing to note that I only recovered very little litter from the camping area — and, from the surface, none was visible in the doline.

So… is Weebubbie any more dangerous today than it was prior to the 1996 rockfall?

I don't think so

Is Weebubbie in danger of collapse?

I think not — at least not yet.

ACCESS NOTES

Applications in writing or email for permission to visit or dive at least 4 weeks in advance of trip to:

Ms Shannon Alford
Department of Planning, Lands & Heritage
PO Box 1143, West Perth WA 6872
Phone: (08) 6552 4661
Fax: (08) 6552 4417
Email Shannon.Alford@dplh.wa.gov.au

A site indemnity form must be filled out for each visit to the site. Forms can be downloaded from the website.

Diving permission acknowledged by official letter from landowner.

ACKNOWLEDGMENTS

In relation to my earlier articles on this subject over the last 22 years, I wish to thank the following people for supplying additional information or corrections to this updated version.

Some information from earlier articles and reports has not been included.

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Tony Culberg OAM
Brian Combley

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The International Union of Speleology

Yesterday, today, and the next four years

Dr. George Veni
UIS President

The International Union of Speleology (properly abbreviated 'UIS') is essentially the United Nations (UN) of all interests related to caves.

Like the UN, the UIS is comprised of member countries which currently total 53. As the newly elected President of the UIS, this is my first of a series of annual articles to keep cavers in the member countries informed about the UIS, its plans and programs and how we can all work together to raise the level of speleology internationally.

First, the basics. The UIS member countries assign delegates to represent them at the General Assembly meetings where the business of the UIS occurs. In most countries, there is only one national speleological organisation and it selects the delegate. In countries with multiple national organizations, those organizations collaborate and select the delegate. In either case, the delegates represent all cave interests in their countries and not an organization.

The General Assembly meets every four years at the International Congress of Speleology, which is hosted by a member country. Each General Assembly makes decisions to set the general course of the UIS for the next four years. One of those decisions is to elect a new Bureau, which conducts the daily business of the UIS and brings forward new programs and actions to better achieve the UIS' goals to promote fellowship between people in all countries who are interested in caves, karst and related features and terrains, to develop and promote all aspects of speleology (scientific, technical, cultural, sporting, social and economic) and to advance the protection and management of the world's speleological and karst heritage in ways conducive to sustainable development in all locations where caves or speleological activities occur (UIS Statutes).

Each Bureau member must be from a different country and each does different jobs for the UIS. The jobs of the officers (President, Secretary General, two Vice Presidents, and Treasurer) are defined in the Internal Regulations. The remaining Bureau members, seven Adjunct Secretaries, are given the flexibility to take responsibility for jobs that fit their skills and interests, or to meet special needs of the UIS at the time.

The current Bureau, which was elected at the International Congress in Australia in July 2017, is:
Dr George Veni, President (USA)
Dr Fadi Nader, Secretary General (Lebanon)
Zdeněk Motyčka, Vice President of Administration (Czech Republic)
Efrain Mercado, Vice President of Operations (Puerto Rico)
Dr Nadja Zupan Hajna, Treasurer (Slovenia),
and Adjunct Secretaries:
Bernard Chirol (France)
Nivaldo Colzato (Brazil)
Dr Mladen Garašic (Croatia)
Satoshi Goto (Japan)
Gyula Hegedus (Hungary)
Dr Tim Moulds (Australia), and
Bärbel Vogel (Germany).

You are welcome to contact us at any time. You'll find our contact information, that of your national delegate, all of our guiding documents, plus much more on the UIS website: www.uis-speleo.org

Now let's answer the question most people have. What does the UIS do for me?

Have you ever been to an International Congress of Speleology? My first was in 1981 and it truly changed my life. It showed me all of the possibilities speleology offered from the recreational to the scientific. The UIS congress connected me to cavers around the world, opportunities for expeditions and to my future professors. Most importantly, it generated an excitement in me for all things speleological that still happily pushes me forward even today. And this is not just my story. Many other cavers have enjoyed similar experiences. The next International Congress of Speleology will be held in Lyon, France, in 2021. Look for information about it on the UIS website in the coming months.

The best way for cavers to get involved with and benefit from the UIS is to join one or more of its commissions. Commissions are specialty groups that focus on a particular speleological topic. There are commissions dedicated to recreational caving, such as the Cave Rescue and Techniques and Materials commissions. Other commissions are highly scientific, such as Cave Biology and Karst Hydrology and Speleogenesis. Most commissions bring recreational cavers and scientists together, such as Pseudokarst and Volcanic Caves. The UIS has 22 commissions covering nearly all aspects of speleology. To get involved, just find the commissions on the UIS website, www.uis-speleo.org and contact the officers to join. There is no cost and active, excited, participants are most welcome. The Bureau provides the commissions up to 2,000 euros each year upon request to help them meet their goals.

When you visit the UIS website, look around — you will find a lot of resources, opportunities, and information. The links to the commission's websites will connect you with a lot of specialized news and information. The Karst Information Portal is a UIS project, in partnership with other organizations, and is a free on-line library of all things related to caves. If your club's newsletter is not currently posted on the Portal, consider posting it to share your

UIS Bureau: UIS Bureau for 2017-2012, left to right: Efrain Mercado, Gyula Hegedus, Mladen Garašic, Zdeněk Motyčka, Satoshi Goto, George Veni, Nadja Zupan Hajna, Bärbel Vogel, Fadi Nader, Bernard Chirol, Nivaldo Colzato, Tim Moulds. Main photo courtesy of Mladen Garašic.

results with the rest of the speleological world. The UIS' International Journal of Speleology is among the world's most important outlets for scientific information on caves. Order a copy of Fifty Years of the UIS, 1965-2015, written by UIS past-President José Ayrton Labegalini, to learn the history of the UIS and much about modern speleology. Read the new issues of the UIS Bulletin to learn details about what the UIS is doing now and to get ideas on how you can be involved.

One very important aspect of the UIS is that speleology is a subject where sport and technical specialists rely on each other. Sport cavers find, explore and map caves. Their efforts make research possible for the scientists. The scientific results prove that caves have value and need to be managed properly. Educators teach the public and politicians about the importance of caves, which leads to the protection of caves and karst areas allowing more exploration—and thus the cycle repeats and grows.

The UIS has sponsored and partially funded expeditions and conferences, organized training and research programs and provided assistance to show caves and governments to assure the best cave and karst management possible. During the International Congress in Australia last year, the UIS renewed its important Memorandum of Understanding with the International Show Caves Association. Since Australia, the Bureau has begun to develop other major scientific and political partnerships. In November 2017, the UIS was accepted as a United Nations Non-Governmental Organization (NGO).

All of us on the UIS Bureau would rather go caving, but we are building these partnerships to make speleology better for everyone. These relationships create funding opportunities to support research, management, and education. Typically, less funding is available for exploration, which is why the UIS Bureau is now looking specifically at ways to raise money from other sources to support more expeditions and projects. Recently, the UIS helped secure funding from the European Union for a cave exploration, mapping and research project in Cyprus. All aspects of speleology are important and connected, and the UIS does not neglect any of them.

By now you may wonder about UIS' plans for the future. In 2015, during the UIS' 50th Anniversary Celebration, then-President Kyung Sik Woo made the declaration that the UIS will work to have UNESCO (United Nations Educational, Scientific, and Cultural Organization) declare 2021 as the International Year of Caves and Karst. International years are major opportunities to educate the public worldwide about important topics, gain public and governmental support, and increase funds and opportunities for exploration, research, management or whatever else is needed.

Since 2015, the UIS Bureau has worked hard on the International Year. So far we have official letters of support from four countries (Belgium, Croatia, Hungary, and Slovenia), eight international organizations, and 21 national organizations in 12 countries. Despite this progress, we need a country to make our proposal to UNESCO. Only UNESCO member countries can make proposals, not outside organizations. Several countries have considered submitting the proposal for us, but there are politics beyond what we do that also affect such decisions, so we are still waiting and developing new strategies to find support. For example, we may send the proposal to the UN instead of UNESCO. If you might have connections to ask your country for formal support or to propose the International Year of Caves and Karst, please let me know. The next UNESCO General Assembly meets in late 2019 and we hope to have a country to make the proposal then.

If our efforts on the International Year succeed, we will need all of the UIS member countries to organize events and activities in their countries to support speleology. If we do not succeed, it is even more important that we hold those activities in 2021 to prove the importance of caves and karst terrains to the general public and governments. Please begin to think about what events your organisations can develop. It would be excellent to have UNESCO or UN support, but if we don't have their support we can still have an international year on our own. I will report later with ideas and specific requests so we can be prepared in either case.

As you think about what UIS can do for you, I encourage you to think about what you can do for the UIS. UIS is an organization of volunteers. When it succeeds, we all benefit. But that success is because speleologists worked together to make it possible. Of course I invite you to work directly with the UIS, but you also support the UIS when you help your local, regional and national organizations. Together we can do much more than we can do alone.

I am constantly impressed at how cavers step forward to help with speleological training, cave protection, publications, research and even organising excellent international congresses such as we enjoyed last year in Sydney. And as a group, I find cavers the most adaptable and creative at solving problems. With your support, I have no doubt that the next four years will be the best yet for speleology, and thus the best to date for the UIS. If you have any ideas for the UIS or want to reach me with questions or to offer assistance, please feel free to contact me at gveni@nckri.org. I look forward to working with you and seeing the UIS and speleology grow.

ACRC News
September 2018

Brian Evans
Australian Cave Rescue Commission

IN MAY, a new ACRC coordinator was appointed. (Well, I failed to say 'No' when asked.)

So what is the ACRC?

The Australian Cave Rescue Commission is a body directed by the Australian Speleological Federation to support the Federation's aims with respect to cave rescue preparedness.

Its aims are:

- To facilitate the provision of cave rescue training to cavers; and
- To improve the exchange of information and training related to cave rescue

By...

- facilitating the provision of skills and equipment for cave rescues Australia wide;
- providing a national communications framework for cave rescue organisations;
- encouraging an ethos of minimal impact for cave rescue training and rescues;
- facilitating the establishment of cave rescue organisations in states where such organisations do not exist;
- organising national cave rescue workshops at the Biennial ASF Conferences;
- spreading self-rescue knowledge, skills and attitudes amongst cavers;
- enhancing the first aid skills of cavers
- establishing relations with overseas cave rescue organisations in nearby countries; and
- where cave rescue organisations don't exist, establishing relations with relevant organisations to enable the delivery of assistance and provide education of government bodies and management authorities about cave rescue.

Please remember that each Australian State has its own emergency management arrangements and the ACRC has no statutory responsibilities in any cave rescue incident. ASF makes money available to affiliated clubs each year to further those aims. Requests for these grants have been scarce in recent years but the money is available, and it's one of my jobs to encourage clubs to receive those grants.

WHO AM I?

I'm Brian Evans, current member of ISS and the NSW Cave Rescue Squad.

I started caving in time for the 1982 PNG expedition, then took a holiday from it for nearly 40 years and resumed in '05 or thereabouts after a mate convinced me to attend the Tasmanian ASF conference. (Thanks. Bunty). Since then I have managed to cave in every state except Victoria. I got involved in the NSW Cave Rescue Squad because, like most cavers, I understand (and value) that caving involves risk.

Most cavers also recognise that rescue from a cave environment is typically very difficult and beyond the training and resources of most emergency services. We feel a responsibility to support our colleagues in caving.

… AND WHAT'S HAPPENING REGARDING RESCUE?

There are many individuals and groups around the country that give generously of their time, expertise and resources to help cavers (and others in caves) in trouble, and to prepare for any cave incident. They are still out there doing it, and I hope to keep *CA* readers informed of their efforts, from time to time.

THAM LUANG NANG NON

Now I wasn't expecting anything like this when I took on the job!

A huge thanks is due to each of the many cavers who stepped up to try to educate media and the public about our chosen activity, its hazards, rewards and how we visit them safely so often. In all of my interviews, I found the media genuinely interested in understanding (but I didn't do TV or commercial radio). I was in regular correspondence with Al Warild, Andreas Klocker, Deb Johnston, Deb Hunter and Janine McKinnon as well as the CDAA and a great deal of media.

I think we did an excellent job and expect that there will be an increased interest in caving and new memberships in clubs.

THE ASF CONFERENCE

There's quite a lot of practical and other sessions at the upcoming conference for those interested in rescue, whether it's sharing what is happening in other regions around the country, hearing about recent rescues or learning self-rescue techniques to help get your own caving party out of trouble on its own.

I strongly recommend going to the conference, and doubly so if you have an interest in rescue.

GRANT REQUESTS

Please contact me if you would like support in preparing for potential cave rescues (or preventing them). The ASF web page has more information or, if you email me on acrc@caves.org.au I'll send further information and help you to address the requirements.

PROMOTING COLLABORATION

I have details for many of those interested in cave rescue around the country, but definitely not all.

I would appreciate meeting more, and if you are interested, and I don't know you, or don't know that you are interested, I'd appreciate an email to acrc@caves.org.au.

I have been surveying those I know in preparation for a conference presentation and have responses from most caving regions but would appreciate diversity and the widest geographic coverage I can get so if you feel you know about cave rescue preparedness in your area and have not seen the survey, again, please contact me on acrc@caves.org.au as soon as you see this. I may be able to incorporate your responses into the presentation for conference, and in any case, I'd be interested and able to keep you in touch with what the ACRC is doing.

BRIGHT IDEAS?

Various rescue folks about the country have been talking with me about how we can develop an effective database of people who could help with cave rescue.

There are obviously a number of issues in this apart from contact details:

- How can the person calling out volunteers know what the volunteer is capable of?
- How can the database be maintained so that is up to date?
- How can we develop a shared vocabulary of competencies and techniques so that people know what they can really do?

If you have some thoughts on how we could address these problems, I'll be discussing it at the conference, and would appreciate input.

Thanks — may all we cavers keep safe, but may we be well prepared when we do need to respond to an accident in a cave.

Devonport conference

Latest news

30th December 2018 — 4th January 2019

THE 31st ASF Conference in Tasmania is fast shaping up to be the largest biennial ASF event we've seen for many years, with over 110 attendees registered including children, partners and day registrants — and there is still space. If you haven't registered get in quick as campground bookings close on 10th December.

Day registrations are only $50 and cover everything on that particular day, with Tuesday being the best value if you prefer a whole day of presentations. An updated program is posted on our conference website www.asfconference2019.com

Cavers' Dinner RSVPs also close on 10th December and it promises to be a fitting finale with the Flintstones theme. It's unlikely NC's costumes will be outdone. Prizes will be on offer for the best Flintstones themed costumes, so come prepared with your op shop frocks.

Brian Evans has had a pleasing number of entries to the photo competition and entries have now closed.

We are fortunate to have enlisted some generous commercial sponsors to donate valuable items to be auctioned or raffled at the conference.

The major prize in our Karst Conservation Fund raffle will be a $500 gift voucher to spend online at wildernesswear.com.au — that could be a complete bushwalking outfit or polar fleece jumpers for the whole family.

There will be caving bags from Aspiring, Petzl headlamps, Smitten beanies, Mole Creek accommodation and an award winning Pennicott Wilderness Journeys tour, as well as essential caving items such as karabiners and tapes up for grabs.

Speleosports, the Prusik Challenge and the Trivia Night will add to the fun social atmosphere of the conference and some great prizes can be won, so make a point of joining in. A Silent Auction will run during the conference and winners will be announced at the Cavers Dinner, so remember to bring your wallet.

Pre-conference trips filled up extremely fast before the early bird period ended and organisers struggled to find places on permit trips and local guides for everyone who showed interest.

Post conference trips will be equally popular, so please be flexible and sign up early during the conference. Mt Cripps has a waiting list. Southern trips are by expressions of interest.

Multiple mid-week excursions are organised and can be signed up for on Monday afternoon once you've seen the weather forecast and heard a bit more about them. Bring a wetsuit if you are keen on swimming at the beach, canyoning, or any of the wetter caves such as Gunns Plains, Croesus, Lynds or Kubla Khan as you will enjoy it more if you keep warm.

If you're interested in cave rescue techniques, the ACRC is organising a practice day at a disused quarry in Mole Creek on Sunday 6 January and all are welcome.

BYO personal SRT kit and helmet, and local clubs will provide the other equipment. Bring your own water bottle and lunch box for the mid-week excursions and all caving trips.

Don't miss this conference. Register now online or register on the day, but sort out your transport and accommodation ASAP.

Timetable

Arrival on Sunday 30 December
12:00 Campground opens, and closes 12 noon Saturday 5 January
17:00 Registration opens, volunteer helper sign up sheets available, KCF raffle launches
18:00 Welcome BBQ at the school canteen, bar open – no BYO alcohol
20:00 Post-conference caving briefing – sign ups start Monday morning.

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