

CEGSA NEWS

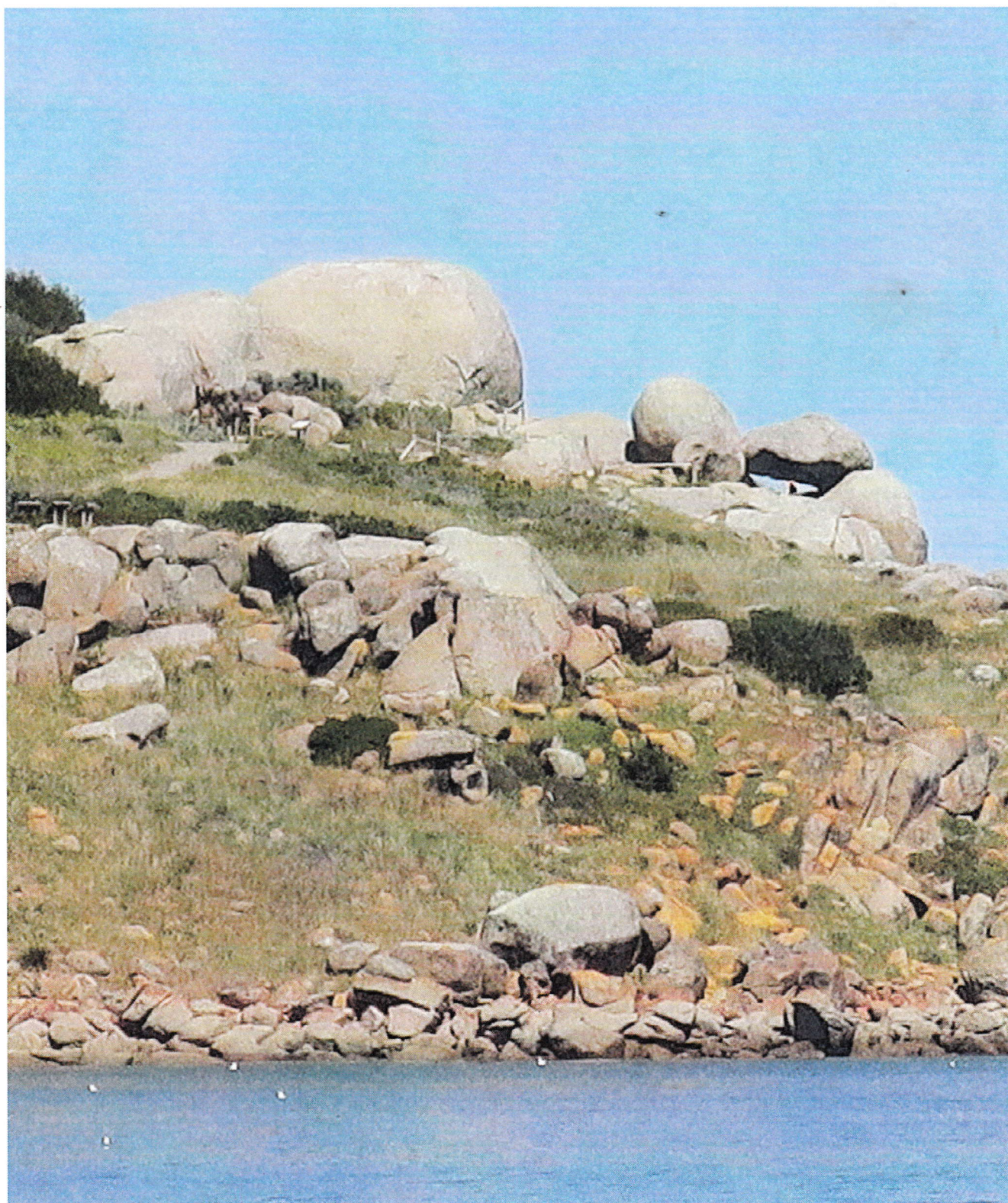


Newsletter of the Cave Exploration Group (South Australia) Inc.

Volume 63 Number 1

Issue 249

FEBRUARY 2018



CAVE EXPLORATION GROUP (SOUTH AUSTRALIA) Inc.

PO Box 144, Rundle Mall, South Australia, 5000.

<http://www.cegsa.org.au>

Meetings held on the fourth Wednesday of each month, except December, at 7.30 PM usually in the Royal Society of South Australia meeting room, Natural Science Building, South Australian Museum.

2018 Committee

President	Ian Lewis	(W) 08-8463-7649 (M) 0427 284 051 (E) Ian.Lewis2@sa.gov.au
Secretary	Matt Smith	(M) 0419 830 575 (E) matt@speleorovers.org
Public Officer / Library & Records/ OzKarst admin / Membership.	Graham Pilkington	(H) 8258 8877 (W) 8258 8877 (E) p-c-h@bigpond.net.au
Treasurer	Mark Corbett	(M) 0439 042 707 (E) macorbett@gmail.com
Committee	Ken Smith	(W) 8375 1946 (M) 0407 603 118 (E) kendiver@gmail.com
Committee	Steve Milner	(H) 8370 6570 (M) 0402 884 121
Committee	Neville Skinner	(H) 8296-4142 (M) 0411-295-766 (W) 8186-9256 (E) 23nesk01@adam.com.au
Museum Representative	Neville Pledge	C/- SA Museum

Other Office Bearers

Publications	Athol Jackson	(H) 8337 8759 (E) atholjax@adam.com.au
Webmasters	Matt Smith	As Above
Quartermaster / Key & GPS Holder	Paul Harper	(H) 8297 8878 (W) 8222 5615 (E) paul.harper@health.sa.gov.au
Search & Rescue Co-ordinator	Harry Harris	(H) 8431 5395 (W) 8273 5666 (E) divedoc@adam.com.au
Safety Officer	Matt Smith	As Above
Science Officer	Ian Lewis	As Above
Training	Matt Smith	As Above
Website Trip Log	All Trip Coordinators	See list p14

Area Coordinators

Eyre Peninsula, Murray Mallee, Gawler Ranges, Torrens, Pitjandjara lands, NW of SA	Records Officer	As Above
Upper & Lower S E(dry), Glenelg River	Kevin Mott	(H) 8723 1461 (W) 8735 1131 (E) jkmott@internode.on.net
Lower South East (wet), Narinna (wet)	Peter Horne	(H) 8295 6031 (E) ppuddles@yahoo.com.au
Adelaide & Kangaroo Is.	Grant Gartrell	(H) 8556 9100 (E) farm@blueberrypatch.com.au
Nullarbor Plain (SA & WA), Yorke Peninsula	Graham Pilkington	As Above
Flinders	Eddie Rubessa	(H) 8336 4775

Representatives

ASF	Graham Pilkington	As Above
SA Speleological Council	Ian Lewis	As Above
Kanawinka Geopark Liaison	Ian Lewis	As Above
CDAALiaison	Ian Lewis	As Above
SA Scout Liaison	Ian Lewis	As Above

Cover Photograph: Umbrella Rock Arch, Granite Island, Victor Harbor, SA.

Photo: Ross Ellis.

CONTENTS**Volume 63 Number 1****Issue 249****FEBRUARY 2018****CONTENTS**

	AUTHOR	PAGE
Committee and Office Bearers		1
Contents		2
Presidents Spot	Ian Lewis	3
2017 Awards		3

TRIP REPORTS

A Visit to Umbrell Rock Arch, Granite Island, Victor Harbor, South Australia.	Ross Ellis	4
35WXKRM18	Kevin Mott	12
Past Trips (from November General Meeting)		12
Past Trips (from January General Meeting)		12

TECHNICAL AND OTHER ARTICLES

Membership Fees	Graham Pilkington	13
Approved CEGSA Trip Leaders	Committee	14
Annual General Meeting Report	Athol Jackson	14
Koonalda Cave, Nullarbor Plain, South Australia – Issues in Optical and Radiometric Dating of Deep Karst Caves.	Keryn Walshe	15
Naracoorte Caves Newsletter		24
Drones Head Underground	Syed Naeem Ahmed	26
No GPS, No Pilot, No Problem (New Scientist)	Sandrine Ceurstemont	28
Notice of Motion	Graham Pilkington	28
FUSSI Program - March to July 2018		29
Calendar of Events	Committee	30

QUARTERMASTERS NOTE.

High usage equipment will now be stored at the quartermaster's residence. Please make arrangements with the QM well in advance of required date for equipment. The QM can be contacted at the telephone numbers on the previous page.

NEWSLETTER MATERIAL

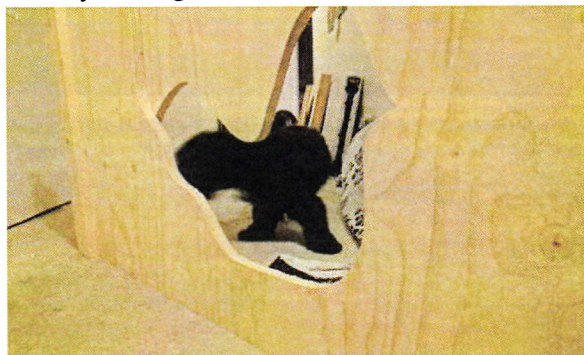
The deadline for copy or background material for Volume 63 Number 2 (Issue 250) must reach the Editor by Monday **14th MAY 2018**. Material not meeting this deadline may be retained for possible use in a following issue. The preferred method is via E-MAIL to atholjax@adam.com.au as an attachment or on a memory stick or CD, in Word *.doc(x) or *.rtf files. Of course other forms of communication will still be gratefully accepted. Photographs are preferred to be in colour as separate files and note in the article where to be inserted. (*.jpg format under 500Kb unless for the cover).

The views expressed in this publication are those of individual authors and not necessarily those of the Cave Exploration Group (South Australia) Inc., its Committee or the Editor.



PRESIDENTS SPOT

I have written so many submissions this year already for Nullarbor caves, Naracoorte caves, Cave Diving, Volcanic lava flow protection issues, our Annual report etc etc that I'm totally written off today. Tomorrow I'm off to the Nullarbor for some cliff filming with Steve Milner and the 'COAST' TV documentary series - a chance to actually see real live limestone and cave entrances instead of bloody writing about them. PHEW!

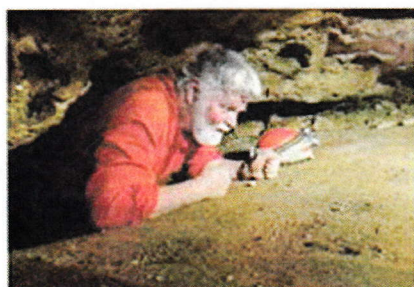


Interesting to see that the Scout Caving Group is having an activities evening this week with a new 'squeeze' test – here is a photo of a fiendish-looking one. It looks like the cat got through, so that's a start... I remember a Naracoorte dinner where Athol got through a wire coathanger when a number of slimmer types couldn't and they didn't believe their eyes! And Rod MacDougal got stuck at 45 degrees halfway through a chair so we had to saw it off him. I think that was the same weekend that we crawled through the mud and slop at the bottom of Wet Cave and Rod

threw his overalls in the corner of the shed when he got home. A month later when he went to grab them for the next caving trip, they had a crop of weeds growing out of them!

Below is also a photo showing that your Prez is still desperately attempting to navigate tunnels which I could just about run through in a previous life. Joel enjoyed taking the photos – yeah thanks mate. I think I will restrict my future trips to Abrakurrie Cave which is of a more suitable size!

Cheers from Ian.



I got thru this easy in 1970.



Sure I can still squeeze, I think



Erk, GASP, Croak - I give up!

Your Prez hard at work (lying down on the job) in his "office".(ed)

%%%%%%%%%

2017 AWARDS

Leather medal (with Woggle)

Matt Smith

For being silly enough to be on two Caving Committees at once – CEGSA and Scout Caving Group

Leather Medal (with Fleur-de-Lys)

Mark Corbett

For being silly enough to do the same as Matt Smith

Stirrers Spoon

Neville Skinner

To assist him in his sneaky plans for radicalising CEGSA methods in 2018 using FUSSI methods

TRIP REPORTS

A VISIT TO UMBRELLA ROCK ARCH, GRANITE ISLAND, VICTOR HARBOR, SOUTH AUSTRALIA.

Ross Ellis. (Sydney Speleological Society)

Victor Harbor, South Australia: Sunday, 7th June, 2016.

Present: Ross Ellis (L) & Christine Ellis.

On our visit to Adelaide to attend the twins, Cooper and Owen's first birthday, we had a chance to duck down to Victor Harbor and see an arch on Granite Island that I had known about for many years but had never managed to visit. I'd purchased two view folders that contained photos (Photos 1, 2) of it on my visit to Victor Harbor in 1957, and I'd seen photos of it and the island in a book by Anon (c. 1890s) that I'd purchased at some stage.



Victor Harbour through Umbrella Rock, Granite Is.

Photo 1: Umbrella Rock. 8 colour Camera Views of Victor Harbour, S. A. Murray Views: Gympie, Q. Serial No. CCV 4493. Photos: Unknown, c. 1950s.

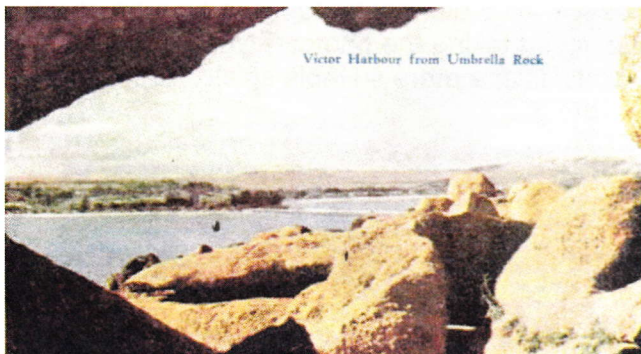


Photo 2: Umbrella Rock. 6 colour & 6 b & w views in Picturesque Views of Victor Harbour, S. A. C. A. Pitt Ltd., Payneham, S. A. Photos: Unknown, c. 1950s.

Sunday, 7th June, 2016: We left Adelaide about 10:15am and made our way down to Victor Harbor, stopping at the John Yates Memorial Lookout along the way. It was quite a pleasant drive and we arrived in Victor Harbor about two hours later.

If you intend to go out to Granite Island, either on foot or on the horse drawn tram, make sure you put an adequate amount of money in the parking

meter before you start off. Otherwise, you will have to do a bit of running around, as we did, or risk the almost definite probability of a parking fine.

While I sorted out the parking meter, Chris bought tickets for the return trip on the horse drawn tram (Photos 3, 4), and we enjoyed the leisurely trip out along the extensive pier to Granite Island. The pier has been used since around 1894 (<http://horsedrawntram.com.au/about/history/>).

Granite Island: Various developments on the island have come and gone. A chair lift closed in 1996, and there was once a restaurant but it seemed as if it had closed. However, there was a kiosk where we bought a bottle of water as the day had become quite hot.

The island is reasonably sign posted and a map (Photo 5) shows the well maintained track called the Kaiki Trail. This trail circumnavigates the island and it takes in the various lookouts, lovely coastal views and impressive geological features (Photo 26). The distance is about one and a half kilometres and it takes about an hour to walk, including stops for photography.

We started up the flights of wooden stairs (Photos 9, 10) that marks the start of the track and which takes you up to a high point of the island (Photos 11, 12).

Off to the side of these stairs, we took photos of an arch I had noted as soon as we got on to the island (Photo 6). I thought it looked like a tired baby penguin leaning its head against a rock (Photos 7, 8, 10), so I called it Penguin Arch.

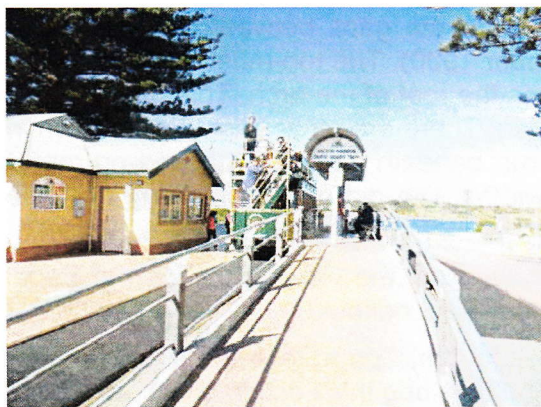


Photo 3: The horse drawn tram station.
Photo: Ross Ellis.



Photo 4: The horse and the tram. Photo: Ross Ellis. →

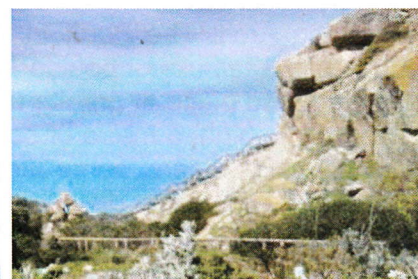


Photo 6: First view of Penguin Arch.
Photo: Christine Ellis.



Photo 7: Penguin Arch and stairs.
Photo: Ross Ellis.



Photo 5: Map of Granite Island. Photo: Ross Ellis.



Photo 8: Penguin Arch.
Photo: Ross Ellis.



Photo 9: Penguin Arch and stairs. Photo: Ross Ellis.

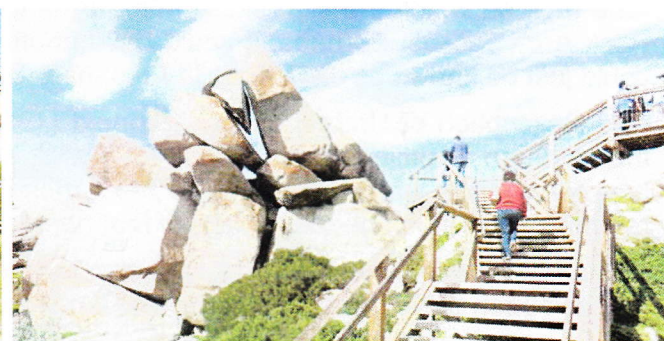


Photo 10: Penguin Arch and stairs. Photo: Ross Ellis.

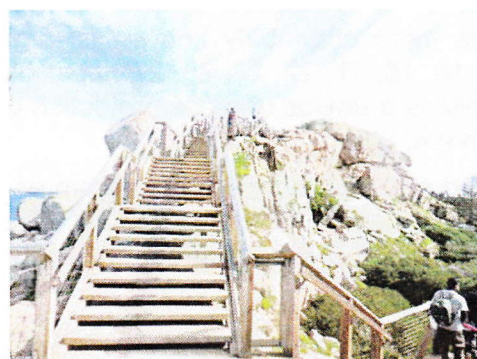


Photo 11: Stairs. Photo: Ross Ellis.



Photo 12: View from Lookout. Photo: Ross Ellis.

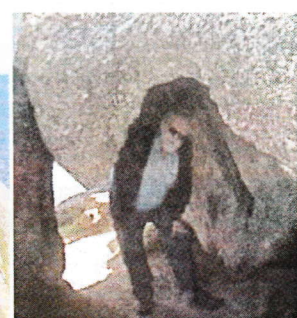


Photo 13: Boulder Tunnel.
Photo: Christine Ellis.

Penguin Arch: The Penguin Arch area consists of several separate gaps between large slabs of granite in a tall pile of boulders known as The Rocks (Handlebar 1900). The top-most arch is created by a pointed piece of granite (the penguin's beak) which forms the roof of the arch. This gap is about two metres high, a metre or so deep and only half a metre wide. There are other gaps, lower down in the pile of boulders, some larger and some smaller. They run beneath boulders stacked on top of each other for some distance and of various heights and widths. We did not go into any of these (Photos 10, 22, 23).

Continuing on up the stairs we stopped and enjoyed the views from the viewing platform of Bridal Spray Lookout (Photo 12) and started off along the track to Yunthian Lookout.

About this point the battery of my camera died and it was left to Christine to take the photos on her simple mobile phone. Consequently, we missed taking any photos along this section as we wanted to save the phone's use for Umbrella Rock Arch (Cover Photo, p. 345), the main reason for this visit.

We saw several interesting weathering features just past the lookouts and along the track to Ngurunderi Lookout.

Boulder Tunnel: As we approached the point on which Umbrella Rock Arch is located we came to a section where the track passes through Boulder Tunnel, which runs between two rounded boulders (Photos 13, 14, 15). Boulder Tunnel is about two metres high a metre wide and a couple of metres through.

Umbrella Rock Arch: And not much further along the track, where it rose up slightly, we saw the back view of Umbrella Rock Arch (Photo 16). The track then wound around behind a very large boulder and brought us to what I think might actually be the Umbrella Rock (Photo 17, 19, 24).

Umbrella Rock and Umbrella Rock Arch: I always thought that the arched passage (Photos 16, 18, 24, 24, 27, 29) of the Umbrella Rock Arch was so named because it was large enough to shelter people in a rain storm. Upon seeing Umbrella Rock (Photo 17) for myself, and then locating on my return home during my research for this article an old photo of it (Photo 19), I realised what some of the reasoning for the name might be.

I think that the original Umbrella Rock (Photos 17, 19) was the weathering pan or gnamma (Bourman, Murray-Wallace & Harvey 2016) that sits in front of the boulder (Photos 17, 19, 21) through which the Umbrella Rock Arch passes. Old photos (Photos 19, 21) show a sign saying Umbrella Rock and it sits on top of the boulder behind what I think was the original feature that was named Umbrella Rock (Photos 17, 19).

The rock on which the sign sits (Photo 18) is the rock through which the passage of the Umbrella Rock Arch passes. Perhaps, it could have another name, something like Brolly Rock, and the arch could just be known as the Umbrella Arch, near Umbrella Rock.

Old Description of Umbrella Rock: Diomed (1912) gives this description of Umbrella Rock. Round the southern coastline of this wonderful island, and many hundreds of feet above sea level, a path has been made which takes you to the Umbrella Rock — a curious formation, which wonderfully resembles the much-needed article of that name.

What I believe is Umbrella Rock is shown in Photos 17 and 19. It looks something like an umbrella that has been blown away in a storm and landed upside down minus its central bent handle.

It is actually a tortoise-shell rock about five metres long, two metres wide and about a metre high at both ends. Four people can sit comfortably inside it.

Umbrella Arch Arch: Umbrella Arch (or Umbrella Rock as it is more commonly known) is large enough to shelter several people from a rain storm (see Photos 14, 16, 17, 22, 23, 25, 27), possible ten or more. This could be the reason for its name, as an umbrella is a device used as protection or shelter from rain and the top surface of the rock has a rounded shape.

Its arched passage is about two metres high, six metres wide and a similar length through from end to end. It has a dish or bowl shaped profile when seen from inside (Photos 25, 27). The archway frames a splendid view of the town of Victor Harbor and it is this view that has made it a rather famous place.

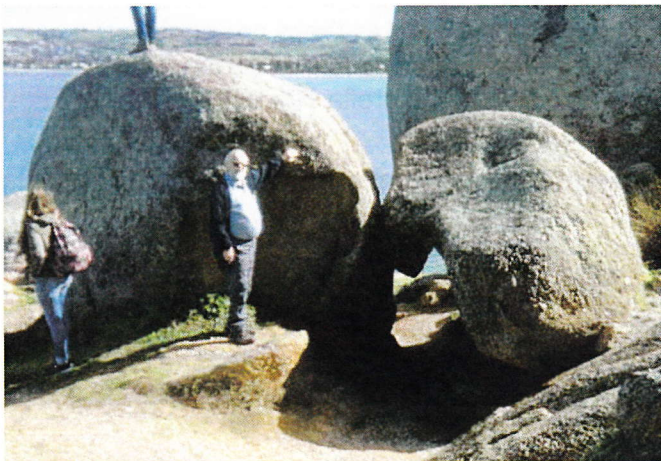


Photo 14: Boulder Tunnel. Photo: Christine Ellis.

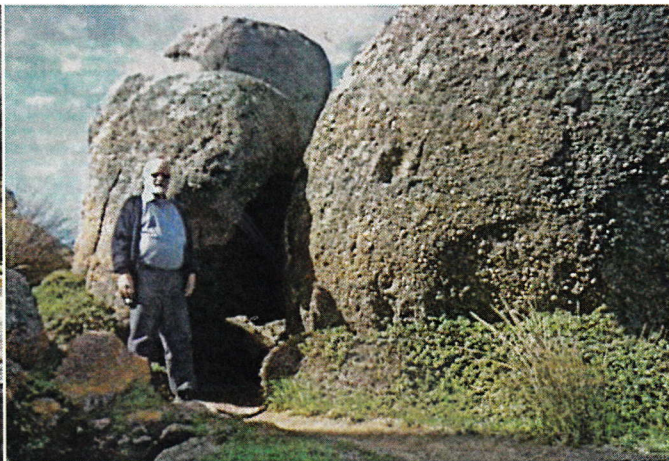


Photo 15: Boulder Tunnel. Photo: Christine Ellis.

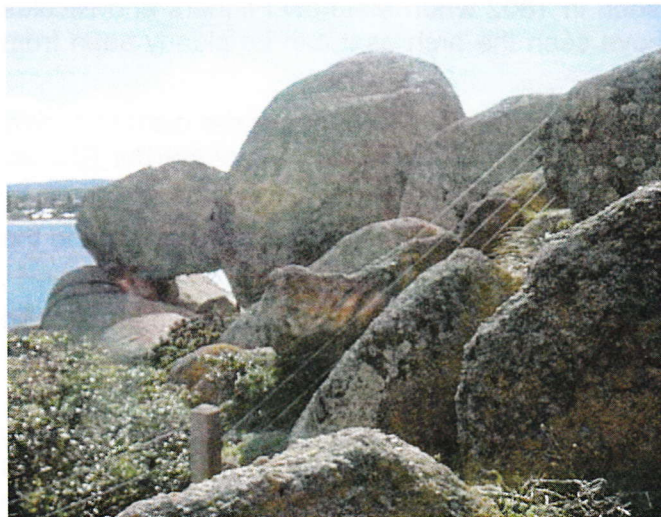


Photo 16: Umbrella Rock Arch. Photo: Christine Ellis.



Photo 17: Umbrella Rock. Umbrella Rock Arch is through the boulder in the background. Photo: Christine Ellis.

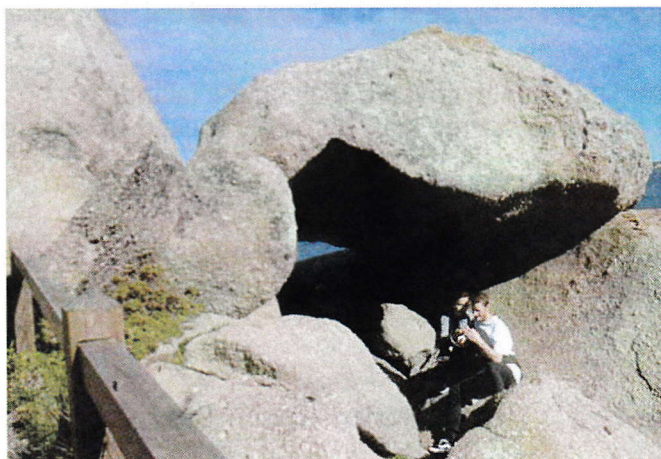


Photo 18: Umbrella Rock Arch. Photo: Christine Ellis.

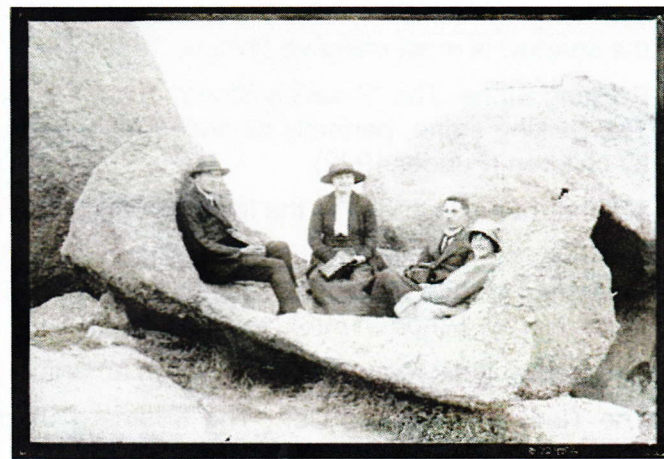


Photo 19: People at Umbrella Rock, Granite Island.
Photo: Len Bradley, c. 1910. State Library of South Australia.
Catalogue No. B 73952. (<http://www.slsa.sa.gov.au/>).

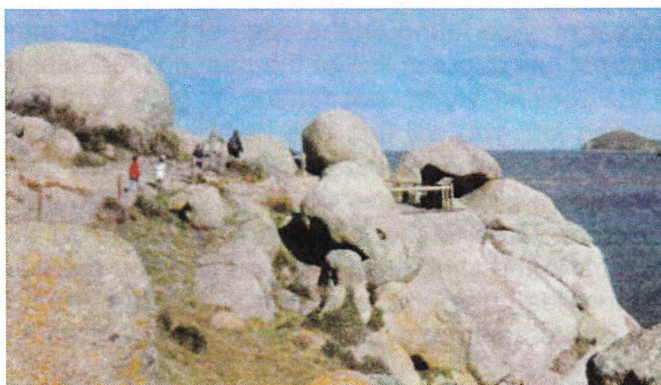


Photo 20: Umbrella Rock Arch. Photo: Christine Ellis.



Photo 21: Richard Aldersey at Umbrella Rock. Photo: Jack A. P. Kaines, 1917.
State Library of South Australia.
Catalogue No. PRG 1638/1/26.
(<http://www.slsa.sa.gov.au/>).

The arch has been known by the name Umbrella Rock since the 1890s as there are photos of it titled as, Granite Island, Port Victor, Port Victor, from Umbrella Rock, Granite Island (Anon 1890s. S. G. Spink. Photo.), Umbrella Rock, Granite Island (Anon 1897a), and Umbrella Rock, Port Victor (Anon 1897b)

Early Description of Umbrella Rock: There are three remarkable rocks on the island..."Umbrella Rock" makes a shade like an umbrella, and Victor Harbor can be seen through the opening... (Funder 1922, 10 years old).

Geology: Some of the geological aspects of Granite Island are mentioned in the book, Coastal Landscapes of South Australia it is the largest of the islands along the Fleurieu Peninsula Coast and features post-glacial weathering features such as tafoni (tortoise-shell rocks), shield and boss forms and weathering pans or gnammas. Such features have been given names including Umbrella Rock, Nature's Eye and Rocking Stone (Bourman, Murray-Wallace & Harvey 2016).

Granite Island, Encounter Bay: This is a descriptive name applied to the island and has been in use since at least 1878. The island would have been seen in 1802 when Matthew Flinders and Nicolas Baudin encountered each other there. They may have seen the arch as it can be clearly seen from the shoreline near the pier.

Victor Harbor gains its name from HMS Victor, the ship which Captain Richard Crozier used to survey the area in 1837. It was known as Port Victor until 1921, when it reverted to Victor Harbor (Davies 2013).

Other Features on Granite Island: Although we did not see them, there are other features around the island worth seeing and photographing. They are;

Nature's Eye: This is a pool on the edge of the granite that has the appearance of a human eye. To get down to it involves a difficult climb. Access to it has been closed as rough seas make viewing it dangerous. It is on the edge of the granite close to rough seas.

A peculiar sight known as Nature's Eye. I located it on tiny Granite Island, just a short walk, or ride by the famous old horse tram, from the town. A notice with an arrow pointing to a pile of rocks announces the spot, which is reached then after a rather arduous climb down over the rocks. The "Eye" consists of an oval pool of water, with a round, smooth stone in the centre. The shadow of an overhanging rock completes the picture of a life-like eye, probably seen at its best at about 1pm when the shadow is most effective (Westie 1952).

Rocking Stone: The "Rocking Stone", a huge boulder, is the only movable rock on the island. The rocking stone, perfectly balanced, although of immense weight, can be easily rocked to and fro by children (Funder 1922).

Another name is added to the list in 1896.

The Cradle: The latest issue of the Mutual Provident Messenger, which is published quarterly by the Australian Mutual Provident Society, contains an excellent picture of the Cradle and Umbrella rocks, Victor Harbor (Anon., 1896).

The following six features are named in an article by J. R. Deacon (1921)

The Tank or Armoured Car:, The Southern Cross:, Half A Melon:, Boxing Glove:, Easy Chair: and Rocking Chair:

Mr. J. R. Deacon, who is on a visit from Port Pirie, has come across rocks on Granite Island which represent the following objects; A tank, or armoured car may be found on the edge of the water after reaching one or two hundred yards from top of the steps; just about in line of the beacon. A southern cross may be found by going down the track of the rocking stone, not turning to your right, but straight on you will see it. Also, from that point, turning left, you will find one half of a melon (well striped). As you go along nearly to the Umbrella Rock. a very large rock is near the path (which goes down and up fairly sharp). At an inward bend you will find a boxing glove, about 15 yards from track towards the sea. On reaching the boxing glove, and 10 yards to the left looking down below the glove, you will find an easy chair. Then when you come to the Umbrella Rock you can see a cradle about 10 feet long close up against the Umbrella. Underneath the umbrella there is a stone 2 feet 6 by 18 inches which I put in position, sat in it. And I, with others, enjoyed the rocking chair (Deacon 1921).



Photo 22: Base of Penguin Arch Boulder Pile. Photo: Unknown, c. 1930. State Library of South Australia. Catalogue No. B 7485. ([Http://www.slsa.sa.gov.au/](http://www.slsa.sa.gov.au/)).



Photo 23: Penguin Arch Boulder Pile. Photo: Unknown, c. 1919. State Library of South Australia. Catalogue No. PRG 280/1/18/200. ([Http://www.slsa.sa.gov.au/](http://www.slsa.sa.gov.au/)).



Photo 24: Granite Island, Port Victor. Photo: S. G. Spink 1890s. Reprinted from Gems of South Australian Scenery, p. 5.



Photo 25: Port Victor, from Umbrella Rock, Granite Island. Photo: S. G. Spink, 1890s. From Gems of South Australian



Photo 26: Port Victor, from Granite Island. Photo: S. G. Spink, 1890s. From Gems of South Australian Scenery, p. 7.



Photo 27: Hand coloured Postcard. Umbrella Rock, Granite Island and Port Victor, South Aust. Australian Government. Printed in England. Specially reproduced for "The British Australian and New Zealander" by Raphael Tuck & Sons. Ltd. Series 9. Photo: Unknown, c. 1906.

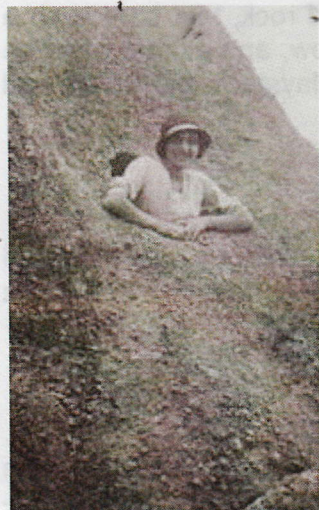


Photo 28: Hole in the Rock. Granite Island. Photo: Unknown, c. 1930. State Library of South Australia. Catalogue No. B 72453/5. ([Http://www.slsa.sa.gov.au/](http://www.slsa.sa.gov.au/)).

Photo 29: Postcard. The Umbrella Rock on Granite Island, Victor Harbour, S.A. Photo: Unknown, c. 1936. State Library of South Australia. Catalogue No. B 44633. ([Http://www.slsa.sa.gov.au/](http://www.slsa.sa.gov.au/)).



The following two features are named in an article by an anonymous author (Anon 1896a).

The Walrus:

Brobdingnagian Pudding:

...an enormous boulder "weathered" into a shape like a Brobdingnagian pudding, and close to it is the "Umbrella Rock," an enormous fragment which the action of the wind and spray for ages has fantastically hollowed out in a fashion suggesting the title bestowed upon it. From beneath this curious freak of nature the descent is sheer down to the water. A larger picture of this remarkable geological formation is presented showing the interior of the "Umbrella Rock" with a panoramic view of the pretty town of Port Victor. In the near neighbourhood is another gigantic boulder bearing an extraordinary resemblance to a walrus—one of nature's caricatures indeed it has been so christened (Anon 1896a).

From my computer dictionary I found that the word Brobdingnagian is an adjective meaning gigantic and a noun meaning a giant. Its origin is from the early 18th century: from Brobdingnag, the name given by Swift (in *Gulliver's Travels*) to a land where everything is of huge size. Hence, this name must refer to one of the numerous, large, granite boulders on Granite Island.

These two features are described by Anon (1927).

Bridal Spray Rock:

Better 'Ole:

The Bridal Spray rock is the best example of foaming spray to be seen, and spectators are usually awe-inspired at the sight, as the water is flung high into the air. The perfectly balanced rocking stone, although of immense weight, can be easily rocked to and fro by children. Nature's eye is discovered aiming the granite boulders in the midst of the perpetual swirl of the breakers. The umbrella rock, curiously shaped to form a huge umbrella, is another of Nature's handiworks. The Better 'Ole, a delight to the amateur photographer, is still another of its features (Anon 1927).

Father Christmas Rock:

The caption of an anonymous photo, The Island is connected with the mainland by a causeway, and the rock formations there have taken on some grotesque shapes. In addition to the Umbrella Rock there are Nature's Eye and Father Christmas Rock (Anon 1939).

Another four names are noted by Handlebar in 1900.

The Rocks:, Cannon-shaped Rock:, The Haystack: and The Pulpit:

An hour's ramble on Granite Island is indulged in, and we noticed some of the alterations effected by the improvement (?) committee—so we are informed. That portion of the island known as The Rocks has come in for some doubtful alterations. This is the visitors' favourite spot for watching the unceasing roll of the mighty deep and its effects on the rocks. The cleft that gave such delightful shelter from the noonday sun and protection from the wind blowing from the Bluff, has been partially filled by jagged, spiteful-looking pieces of crushed rock hurled from above, and presents a forlorn picture, resembling an abandoned quarry. All the natural ruggedness, that nature has probably been ages accomplishing, has been vandalised, so to speak. The cannon-shaped rock, that bore such a defiant attitude towards Seal Rocks, has also been hurled in the abyss below, and all that need be done to make the island uninteresting is to destroy the Umbrella Rock the Haystack, the Pulpit, and the Rocking Stone (Handlebar 1900).

A ten year old school girl added this name to the list.

Swinging Rock:

Another time we would go to the Umbrella Rock, and try to climb to the top. Then I would go to the Swinging-Rock. I would put some coin under it, and get it back, bent and unrecognisable to keep as a curio. I would go to see the Ramp, Bluff, and also the Breakwater (Lawrence 1913).

An anonymous 1930s photograph is reproduced in 1998 of a named feature.

Hole in the Rock:

It is easy to recognise the site of this 1920s photograph taken on Granite Island. There must be thousands and thousands of people who have been photographed framed by the 'hole in the rock' - but there would not be many quite so charming as this unknown, elegant lady with her shady hat and parasol. And just how long has the 'umbrella rock' sheltered folk from sun and rain? This and other

photographs can be viewed at the National Trust's Encounter Coast Discovery Centre on Flinders Parade, Victor Harbor. It is open from 1-4pm Wed-Sun and from 10.30am to 4.30pm school and public holidays (Anon 1998).

After spending a fair bit of time at the arch we made our way back to the tram via a nicely made section of wooden pathway and stairs.

We arrived back in Adelaide at about 5.30pm after a round trip of about 150 kilometres.

References:

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JSSS

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3SWXKRM18

Date 5 Dec 2017

Party F Aslin, K Mott

In CEGSA News Vol 62 (2) p28 a trip to locate caves in western Victoria recorded the approximate location of a cave with the temporary number 3SWXKRM18. The cave has been quarried since the original excavation which unearthed remains of *Sthenurus gilli*. This site is of importance as the specimens from the cave were used to describe the species.

Since that trip in April 2017 Fred has had discussions with the owner of the quarry. He states the cave from which the bones were excavated were not that particular quarry but an adjacent quarry. He was present when the bones were excavated.

He took us to the quarry where the cave was located and showed us the approximate location. The correct site of the cave was located with GPS and the records amended. The accuracy is +/- 30m.

A nearby "island" of quaternary dune has several small caves up to 5m long and a number of entrances. Some of these reportedly breathe. This collection of features was given the temporary number 3SWXKRM26.

A small cave in the side of the dune nearby has since been filled in. This cave reportedly extended back for approx. 15m. This was given the temporary number 3SWXKRM26.

A nearby doline 6m diam x 1m deep leads down to a cave approx. 20m long. This feature was given the temporary number 3SWXKRM27.

Kevin Mott

%%%%%%%%%

Past Trips from General Meetings**November 2017**

No trips reported.

December 2017

No Meeting

January 2018

1. **Pam Payne** took a family trip to Punyelroo Cave.
2. **Peter and Janine Kraehenbuehl** went cave diving in Belize and Mexico, including in Dos Ojos Cave.
3. **Grant Gartrell** did some blackberry spraying around cave entrances at Delamere as a prelude to finding what lies beyond.
4. **Neville Skinner** reported a recent FUSSI trip to Corra Lynn Cave
5. **Matt Smith** described two recent Scout Caving Group trips, one to Naracoorte which included a visit to Cathedral Cave, and another to Gloop Cave on the River Murray

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TECHNICAL and OTHER ARTICLES

MEMBERSHIP FEES

If you have not renewed by 31st March this will be your last communication.

CEGSA MEMBERSHIP FEES became due on January 1st. To ensure continuity of membership and privileges (particularly insurance) please pay before March 31st.

Joining fee applies after March 31st.

CEGSA MEMBERSHIP FEES FOR 2018 YEAR

Full Membership	\$ 45.00
Full Country Membership	39.00
Associate Membership	37.00
Long Term Associate	45.00
3 Month Introductory	5.00
Joining Fee (N/A to 3mth Intro)	12.00
Discount for Country Membership	6.00
Print Form CEGSA News	25.00

ASF LEVY FEE FOR 2018 YEAR

Single	\$ 68.00
Family	119.00
3 Month Introductory	20.00
Journal Subscription	25.00

2018 YEAR FEES

	CEGSA	+ASF	TOTAL
Full Membership	\$45.00	\$ 68.00	\$113.00
Full Country Membership	39.00	68.00	107.00
Associate Membership	37.00	68.00	105.00
3 Month Introductory	5.00	20.00	25.00

Variation for Family Membership

1 st Full Member + 2 nd Full Member	\$90.00	\$119.00	\$209.00
1 st Full Member + 2 nd Associate Member	\$82.00	\$119.00	\$201.00
1 st Assoc Member + 2 nd Assoc Member	\$74.00	\$119.00	\$193.00

Discount for Country Membership applies for Family Memberships.

Please make sure your payment of fees includes CEGSA and ASF, if applicable.

Membership Fees can be paid direct into CEGSA Account BSB 105-900 Account No 950661040 and reference with your Name, CEGSA Fees or Membership Number.

Graham Pilkington. Membership Officer.

Approved CEGSA Trip Leaders

Name	Caving Leader level
Marie Choi	Horizontal and Laddering
Stan Flavel	Horizontal and Laddering
Grant Gartrell	Co-ordinator
Paul Harper	Horizontal and Laddering
Richard Harris	Horizontal
Peter Horne	Horizontal and Laddering
Peter Kraehenbuehl	Horizontal, Laddering and Vertical
Ian Lewis	Horizontal and Laddering
George MacLucas	Horizontal, Laddering and Vertical
June MacLucas	Horizontal
Steve Milner	Horizontal, Laddering and Vertical
Tim Payne	Horizontal, Laddering and Vertical
Graham Pilkington	Horizontal and Laddering
Eddie Rubessa	Horizontal and Laddering
Mark Sefton	Horizontal and Laddering
Matt Smith	Horizontal and Laddering
Tom Szabo	Horizontal and Laddering
Michael Woodward	Horizontal, Laddering and Vertical

All the above named are also CEGSA Trip Coordinators.

Members may query the classification of any Trip Leader at any time with the committee.

It is a requirement that each trip be organised by an approved Trip Coordinator to be classed as an official CEGSA trip. It is also a requirement that dependent party trips be led by an approved Trip Leader at the appropriate skill level for the cave being entered. Trip Leaders are expected to maintain their First Aid training.

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Annual General Meeting Report

The Annual General Meeting was held at the home of Graham Pilkington on Saturday 10th Feb. 2018. There were three awards presented for 2017.

The Annual Report was presented and accepted, followed by the election of officers and committee. The results of the election were as follows:

President: Ian Lewis.

Secretary: Matt Smith.

Committee Members: Steve Milner, Graham Pilkington, Ken Smith, Neville Skinner and Mark Corbett.

There were 2 motions passed at the AGM.

1. "That all monies collected from members under Rule 1(h) are held in trust by CEGSA for the payment of members' ASF membership fees. These monies do not form part of the Groups' income or expenditure and belong to the ASF."

2. "That all monies that have been collected from members under Rule 1(h) were for the payment of members' ASF membership fees and did not form part of the Groups' income or expenditure."

These are **not** changes to the rules but just clarification of the administration of **rule 1(h)**, printed below for your information.

RULES 1(h) All members pay an Australian Speleological Federation levy appropriate to their membership status.

See notice of motion on p 28.

The meeting was preceded by a social gathering and BBQ meal.

Athol Jackson.

KOONALDA CAVE, NULLARBOR PLAIN, SOUTH AUSTRALIA – ISSUES IN OPTICAL AND RADIOMETRIC DATING OF DEEP KARST CAVES

KERYN WALSH

Department of Anthropology, South Australia Museum, Adelaide, South Australia, Australia

Abstract: Koonalda Cave is located on the Nullarbor Plain of South Australia and is one of 17 deep karst caves in this region. In 2014, the cave was listed as a National Heritage Place in recognition of its significant archaeological and cultural heritage features. In order to understand the antiquity of and complex human activity in this site a range of dating methods have been applied including typologic, radiometric and luminescence. Each has been challenged and the chronology of this highly significant site has relied on contextual data from other sites. This paper presents an overview of the archaeology recorded at Koonalda Cave, the issues in dating sites in deep karst systems and emphasises the urgent need to resolve these issues so that a reliable chronology can be presented for Koonalda Cave.

Keywords: Koonalda Cave, Allen's Cave, Nullarbor, dating techniques, Gallus excavation.

1. INTRODUCTION

Koonalda Cave is a deep karst cave located on the Nullarbor Plain of South Australia (**Fig. 1** and **Fig. 2**). In 2014 it gained National Heritage Listing due to its highly significant cultural heritage values (Commonwealth of Australia, 2014).

Koonalda Cave is a series of large vault like chambers connected by hundreds of meters of passages varying from cavernous to extremely narrow (**Fig. 3**). The entrance to the cave is accessed by descending into collapsed doline and the cave floor is reached after a steep descent over boulders. The cave floor is approximately 75 m below ground surface and from here two main passages branch off to the north and the northwest (**Fig. 3**). The former offers virtually no archaeological evidence but does contain large lakes whilst the latter contains significant archaeology and has evidence for a former lake (**Fig. 3**). Flint is recognised by the protrusion of large nodules occurring in distinct bands that are visible high above and down to floor level.

Archaeological research was initiated by Dr Alexander Gallus in 1958 following an earlier speleological report of possible evidence for Aboriginal occupation (Pretty, 1960). Gallus continued his investigations into the 1980s but since that time both interest and funding to continue the research have been infrequent.

Although the Nullarbor Plain is characteristically flat, arid and treeless, the archaeology indicates that humans were present by at least 35,000 years ago (Roberts *et al.*, 1996 and Smith, 2013). This time span includes the Last Glacial Maximum (LGM) which held the sea some 150–200 km further to the south of the Plain and consequent particularly inhospitable conditions. The LGM commenced some 25,000 years ago and continued across approximately 10,000 years before amelioration set in (Smith, 2013). Despite the changing environmental and climatic conditions, Koonalda Cave continued to be visited by humans before, during and after the LGM. It is only Koonalda Cave and nearby Allen's Cave (approximately 80 km west of Koonalda cave) that have provided evidence for on-going visitation during the LGM (Walshe, 2012; Cane, 2013 and Smith, 2013).

Early archaeological investigations recorded parietal art and flint 'mining' which sparked enormous public interest both nationally and internationally (Gallus, 1968a and 1968b and Flood, 1997). The term 'mining' is deceptive in view of far stronger evidence for Indigenous people using flint that has naturally fallen from the cave walls, rather than using digging tools to excavate it from the walls. The use of the term 'mining' has been used rather uncritically in Australian archaeology and can be

misleading when comparing with reports of prehistoric mining in Europe, for example. This complex but worthy discussion is not critical to the focus of this paper and will be pursued elsewhere.

Dissent over the age of the site and its particular archaeological features arose soon after investigations commenced (Wright, 1971; Flood, 1997; Gillespie, 2002 and Bednarik *et al.*, 2003). Despite applying different methodologies over time, the difficulty of providing reliable dating for Koonalda continues to provide a significant challenge for the interpretation of Aboriginal presence in the site. In turn this has prevented a reliable chronology for the sedimentology, physical formation and palaeoenvironment of the cave (Jennings, 1961; Wright, 1971 and Gillespie, 2002).



Fig. 1. *Koonalda Cave – collapsed doline on flat surface of Nullarbor Plain.*



Fig. 2. *Location of Koonalda Cave, South Australia.*

2. SAMPLING HISTORY

Gallus dug three archaeological trenches into the main chamber of the northwest passage between 1960 and 1973 (Gallus, 1968a; 1971 and 1973). Extensions to the third trench were dug by Richard Wright in 1967 in response to questions over the reliability of the radiometric results produced earlier by Gallus (Wright, 1971). Trench 111 offered the most comprehensive assemblage and extensive profile. Unfortunately, the depths and descriptions of each horizon or layer displayed in Trench 111 lacks consistency across the individual reports by Wright and Gallus (Wright, 1971). As it is the stratigraphic profile drawn by Shirley Jago and presented by Gallus in Wright (1971:89) that has been the focus of numerous subsequent reports, it is this profile which is reproduced here as **Fig. 4**.

Trench 111 was excavated to below 4 m and displays two distinct horizons consisting of essentially an upper white horizon some 2 m thick and a lower red horizon of approximately 4 m thickness in total (it was not excavated to bedrock). A very narrow intermediate band between the two very distinct horizons was described as rosa tinted limestone dust (Jennings, 1961; Gallus, 1968a and 1968b and Frank, 1971).

The upper white horizon was described by Gallus as 'plastic white' limestone in varying phases of cementation, slumped against the cave wall. The plastic white is free of roof fall but contains wall fall. This horizon contained an assemblage of worked flint in an otherwise sterile layer (**Fig. 4**). The presence of this single assemblage suggests that either human visitation was occurring infrequently or the wall fall occurred rapidly between regular visits. Frequency of visitation may have been influenced by availability of light but this will also be pursued elsewhere, similarly to the term 'mining'.

Onto the sloping surface of this plastic white are uneven layers of large roof fall, clusters and bands of dense charcoal and spalled and worked flint. These are generally layered horizontally but of differing lengths due to the angle of slope caused by the slump of wall fretted material.

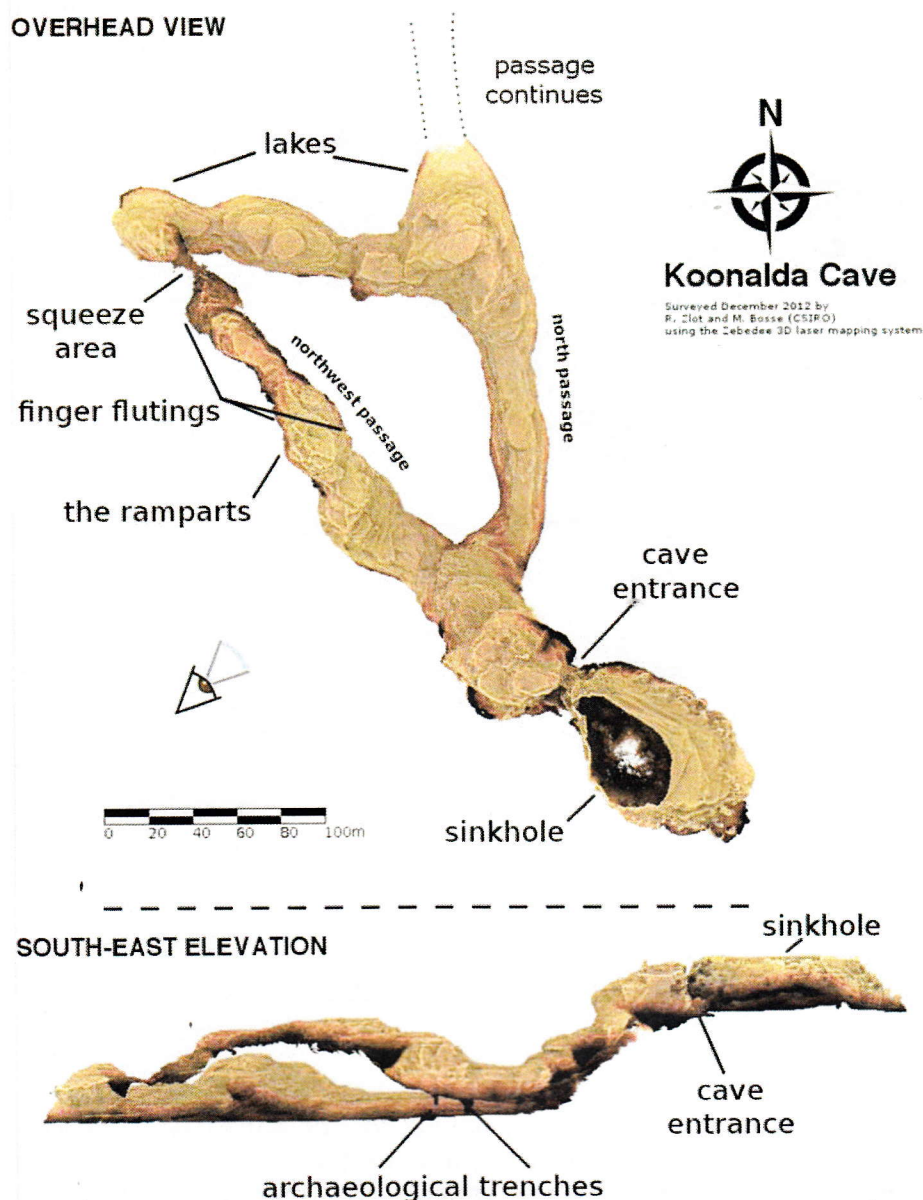


Fig. 3. 3D representation of Koonalda Cave (Zlot and Bosse 2014:202).

The lower red horizon consists of horizontally bedded sands, silts and clays eroded from the Nullarbor Plain and some spalled limestone detritus (Jennings, 1961 and Frank, 1971). Its matrix reflects a lacustrine depositional environment that once existed in this part of the cave. The shift from the lower red to the upper (plastic) white horizon was suggested by Frank (1971) to reflect the diversion of stream flow from this part of the cave floor to the north passage (Frank, 1971). This red horizon contains virtually no spalled flint and only one small assemblage of culturally worked flint in association with a bone tool and some discarded animal bone (Floor 7 in **Fig. 4**). The presence of such minimal archaeology throughout the red horizon is difficult to interpret. If the lake was filled during times of human visitation, then logically people will settle around its margins but the excavation may have been well within the lacustrine zone. Furthermore, the lacustrine conditions themselves were presumably episodic, following seasonal rainfall or cyclonic events. The strength and velocity of the sudden stream flow will also have varied but would have generally disaggregated an assemblage into a number of parts, dispersed around the

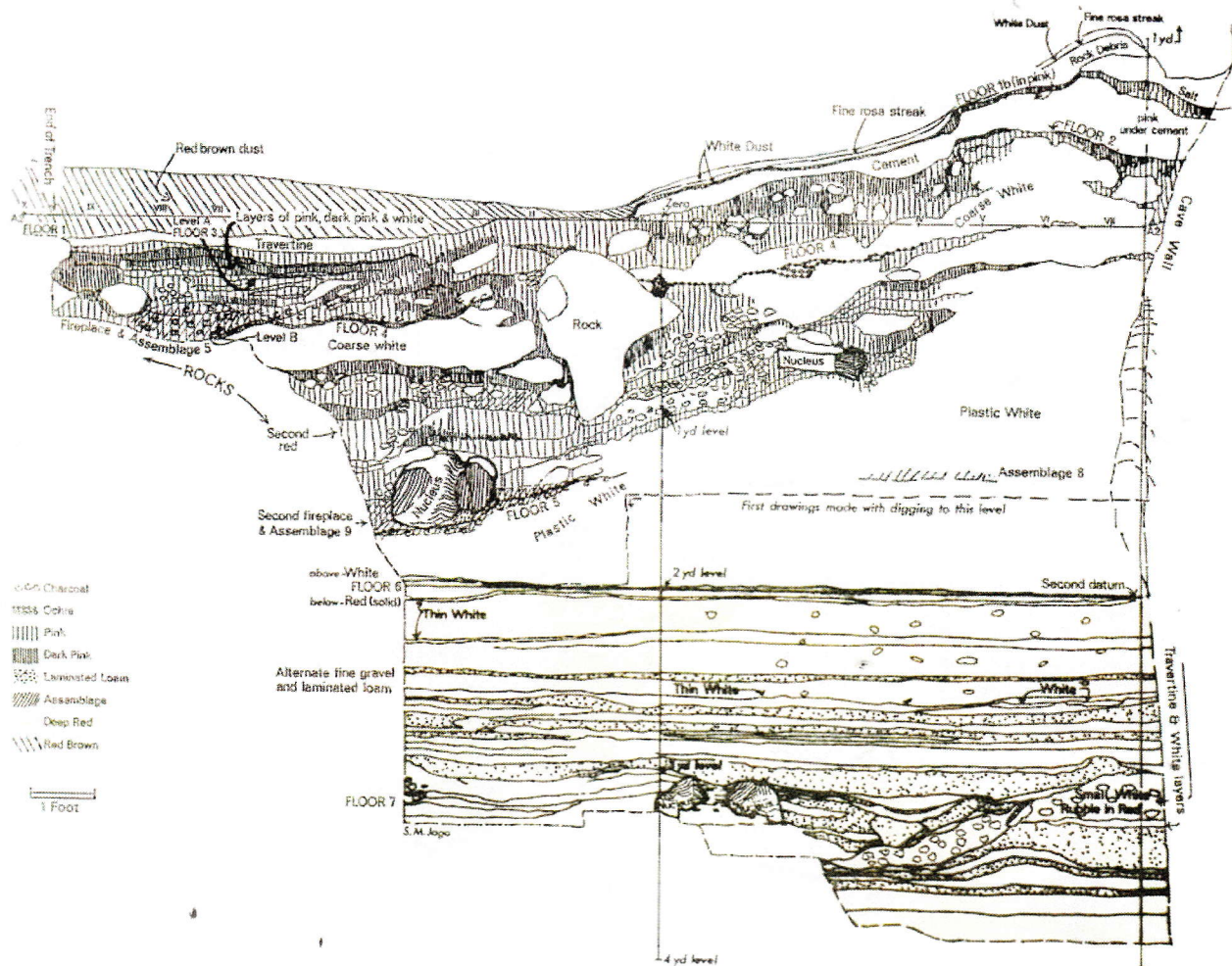


Fig. 4. Stratigraphy of Koonalda Cave (adapted from Gallus 1971:89 in RVS Wright (ed) *Archaeology of the Gallus Site*).

cave floor. Another critical factor is the fall of natural light onto the cave floor and creating a highly favourable place for humans to occupy. In all, it may be that the red horizon reflects an internally stable environment but one with sudden, variable stream flow leading to some degree of displacement of cultural evidence and the relocation of preferred working areas to drier ground. Changes in the fall of natural light seasonally and climatically will also affect this final choice. The excavation trenches were invariably placed against a wall of the cave in convention with European archaeological excavations in caves. The influencing factors discussed above, such as daylight and stream flow, on making the choice for the 'best spot' to sit and work flint on any one occasion did not determine where excavations were undertaken.

Although minimal against the vast quantity of material excavated from Koonalda Cave, the presence of a cultural floor (flint workshop) near the base of the red horizon is still of immense importance as it provides the earliest physical evidence for human presence in the Cave. The dating of this material and/or the red horizon may offer a clearer chronological context for the lake in the north-west passage and also for the parietal art.

3. DATING

Prior to availability of radiometric analysis, Gallus attempted to establish a chronological framework for Koonalda based on subtle changes in the rosa coloured limestone dust; typology of the parietal art and the stratigraphy and formation of the cave (Gallus, 1966, 1968a and 1968b). By applying his experience gained from working in caves in Europe prior to arriving in Australia post World War II, Gallus hypothesised that humidity altered the colour and hue of the limestone dust which encouraged his particularity in establishing a system to record the rosa layers as light, medium or dark. He then identified four cycles of climatic events affecting the cave between 40,000 and 10,000 years ago

and also noted sheets of travertine that had 'formed under shallow surface of standing water in depressions of rockfalls'. By drawing on his knowledge of palaeolithic and mousterian caves in Europe (using these terms as a type rather than a culture) and his knowledge of Wurm interstadials, Gallus hypothesised that the upper white layer of the profile was dated to post LGM and the lower red, particularly below Floor 7, accumulated during the LGM. He also postulated that the sediments above Floor 1, represented the transition of the Nullarbor Plain into later Holocene conditions. He saw this point in time as the moment when Indigenous people no longer included the Plain and its caves in their sphere of ecological knowledge (Pretty and Gallus, 1967). In summary, he speculated that Koonalda was occupied well before 30,000 years ago, used intensively between 20,000 and 10,000, after which visitation dwindled away and abandoned around 5–6,000 years ago (Gallus, 1966, 1968a, 1968b and 1971).

Later research by Christine Sharpe and Kevin Sharpe (2003) also attempted to construct a chronology with typology at its core. Their individual and combined research strove to establish a classificatory system based on observed stages of weathering on roof fall boulders (Sharpe and Fawbert, 2000 and Sharpe, 2008). Such systems are however fraught when working in taphonomically dynamic environments that have been built by multiple and changing agents over long periods of time (Lee Lyman, 1994).

4. RADIOMETRIC 1960–1990

The first radiometric analyses for Koonalda cave were on charcoal samples taken from archaeological excavations in the 1960–70s. No conventional cooking hearths have been identified in the excavation profiles and this is supported by the lack of food remains in the assemblages. Despite this, there are deposits of charcoal throughout the profile which Gallus believed to have been derived from the lighting of fire brands or torches in order to generate sufficient light for working flint inside the cave (Gallus, 1971).

The carbon 14 results published by Gallus (1968b and 1971) reveal a range of 13,700 to 31,000 BP. Wright also submitted samples from a trench adjacent to Gallus's Trench 111 and gained a range of 16,000 to 24,000 BP (Wright, 1971). Whilst the upper date obtained by each archaeologist is reasonably similar, the lower dates are significantly different and problematically, these lower dates were not derived from the same horizon. Gallus's 31,000 BP date came from the upper white horizon whilst Wright's date of 24,000 BP came from the bottom of the red level. Gallus argued for permeability of carbon upwards through loosely packed rockfall, as water entered the cave and flooded through the excavated areas. He reasoned that this upward movement of carbon particles led to redepositing of samples which in turn inversed the dating. This argument may be plausible but has yet to be tested.

Overall the radiocarbon dates were far from sequential and it was variously argued that the samples were contaminated; the excavations lacked expertise or that micro-permeability operated throughout the sedimentary layers (Wright, 1971 and Gallus n.d., 1968a and 1971). This controversy clouded the research and eventually affected public and institutional interest in the site. Later revisions of radiometric dating from a range of Australian sites have pointed out the inherent problems in the Australian environment, particularly when working close to the carbon boundary (Gillespie, 2002; Bednarik, 1986 and Bednarik *et al.*, 2003).

5. RECENT RADIOMETRIC RESULTS

With such discrepancy in the earlier radiometric analyses, a new round of analysis was recently undertaken on existing material held at the South Australia Museum and on samples collected in situ from the profile of Trench 111. From the museum assemblage four samples were selected from the white (upper) horizon of Gallus's Trench 111 excavation. The samples were coded according to Gallus's identifier (Gallus n.d.). Depth for each sample was measured from the stratigraphic profile provided by Gallus (1971:89) (**Fig. 4**) and are therefore approximate.

Trench 111 excavation was not backfilled and as such continues to provide access to the same profile sampled by Gallus and Wright. In 2013 two new samples were extracted from the intermediate zone between the upper white and the lower red horizons where the charcoal band described by Gallus (1971) is still visible. These were designated KLDA-intermediate zone (a) and (b). Six samples returned results ranging from approximately 7,780–23,000 BP (**Table 1**).

As shown in **Table 1**, the samples represent a span of 192 cms and are reasonably sequential against depth. Furthermore, the recently collected in situ samples (KLDA intermediate zone (a) & (b)) support Gallus's date of approximately 24,000 BP for the same interface. In turn, this date

places the interface of the red and white horizons within the LGM and concomitant with the broad scale drying and increasing aridity across the country. It is unsurprising that stream flow into the north-west passage terminated at this time. The lack of red sediments entering the cave after 24,000 years ago allowed the development of the predominantly upper white horizon. It is unclear if the approximate and equivalent dates of 17,500 for both 132 cm and 63 cm below datum suggests accelerated cave fretting and is perhaps due to hyper aridity operating external to the cave. None the less, these dates do confirm the presence of humans in Koonalda Cave during the Pleistocene and across the LGM.

Table 1. *KLDA Radiocarbon Samples and Results.*

Code	Depth from '0' datum, Trench 111 (approx.)	Age ^{14}C (cm) (BP)	Deviation ($\pm$ BP)
*C-15-34	10 above	10,085	31
#KLDA B4-16, Ass.5 Fl.4	45 below	7,787	40
*B6-2, Ass.5	63 below	17,568	61
*C-19-3	132 below	17,375	60
*KLDA intermediate zone (a)	182 below	23,019	92
*KLDA intermediate zone (b)	182 below	23,040	109

* Waikato radiocarbon dating lab; # Rafter GNS Science.

[The Carbon-13 stable isotope value ($\delta^{13}\text{C}$) was measured on prepared graphite using the AMS spectrometer. The radiocarbon date has therefore been corrected for isotopic fractionation. However, the AMS-measured $\delta^{13}\text{C}$ value can differ from the $\delta^{13}\text{C}$ of the original material and it is therefore not shown.]

The two upper most samples (C-15-34 and KLDA B4-16, Ass.5.Fl.4) were collected about 55 cm above/below each other and a reversal in the dates is evident. Gallus (1971) repeatedly referred to the micropermeability of charcoal in the upper white horizon. With ameliorating conditions operating external to the cave, it is possible that the cave fretting slowed down with rejuvenated stream flow heading to the north passage rather than pooling in chamber of the cave and flowing northwest. With such a combination of conditions, it is possible that particles moved through loosely compacted pockets formed between slabs of roof fall and redeposited. However, this remains conjecture until sophisticated sedimentary analysis can be undertaken. Such analysis may also explain the controversial V-82 of $31,000 \pm 1650$ BP reported by Gallus (1971).

Two additional dates were obtained in view of the significance of the association of charcoal with a significant object. A piece of cave wall was excavated by Gallus in Trench F. This piece (measuring approximately $10 \times 15 \times 3$ cm) displayed finger flutings on one face and was composed of calcium carbonate, matching the famous 'moonmilk' of the finger flutings gallery. Trench F was placed in the large chamber, some 100 m southeast of the gallery, clearly indicating that this piece was transported into the main chamber. Avoiding further conjecture on the terminology of 'portable art', charcoal associated with this piece (coded C3-F11 Waikato Lab) yielded a date of $18,123 \pm 59$. This result provides the only minimum date for the parietal art at Koonalda Cave.

Post cranial osteology material identified as *Canis familiaris* (dingo) was collected from the surface of Trench 111 during the original excavation by Gallus. Radiometric analysis of the bone returned a result of 3031 ± 34 (OxA-27532). The date fits well within the spectrum of published dates for the arrival of the dingo into southern Australia (Smith, 2015). Numerous dingo skeletons have been observed in Koonalda Cave over the years of exploration. These unfortunate animals appear to have been unable to escape and died from natural mortality. The 3,000 year old dingo may well have suffered a similar fate although it may equally well have followed humans into the site.

6. LUMINESCENCE 1990s

Obtaining reliable dating has long been one of the most challenging aspects of archaeology globally. With the introduction of luminescence dating techniques it was hoped that the problems of vertical displacement and/or contamination of charcoal could be overcome. However, this methodology is equally challenged by very low dose rates and incomplete and inconsistent bleaching of ancient sediments (Roberts *et al.*, 1995, 1996 and Gillespie, 2002). These traits are typical of the Nullarbor Plain sediments.

In the early 1990s, a series of sediment samples were taken from Koonalda Cave and from a nearby open rock shelter, named Allen's Cave (Cane, 1995; Roberts *et al.*, 1995 and 1996). The latter has formed from a collapsed doline offering a modest overhang rather than a deep karst cave. Optical dating was performed on all samples from both sites but only those from Allen's Cave proved viable. The Koonalda Cave samples were found to suffer significant discrepancies between optical and calibrated ^{14}C dates when surface sediments were tested (Roberts *et al.*, 1995 and 1996). It was stated that bleaching problems existed in water lain sediments transported deep into the cave and this could potentially overestimate the actual age;

"The result for Koonalda Cave demonstrates that luminescence dating methods are unsuitable for deposits in deep karst systems where episodic storage and intermittent transport of sediment in the darkness of the cave is apt to lead to an overestimate of the elapsed time since the deposit was last reworked" (Roberts *et al.*, 1996:15).

Deep karst systems present particular difficulties for trapped charge based techniques when there is incomplete bleaching in antiquity. However, the dating for Allen's Cave did not suffer this phenomenon and did indeed extend human occupation of the Nullarbor region to circa 40,000 years (Roberts *et al.*, 1996). This alone has added some weight to Gallus's original speculation of 30,000 years or more for Indigenous use of Koonalda Cave.

7. DISCUSSION

Gallus argued for great antiquity of the site, convinced that human presence commenced at least 30,000 years ago. Whilst the single radiometric result of 31,500BP was within the range he anticipated, it appeared to work against his research effort due to the discordant stratigraphic location of this sample. Gallus himself acknowledged the inconsistent radiometric results, pointing out the three different formations at the intersection of the upper white and lower red horizons. He found it unsurprising then that the carbon dates contradicted:

"...stratigraphy cannot be judged from small sections alone, as details remain obscure and escape notice; no sweeping simplifications can be attempted..." (Gallus, 1973:8).

The problems for radiometric dating in Koonalda Cave have been much discussed over the intervening years (Gillespie, 2002 and Bednarik, 2007) and more broadly, the inherent issues of attempting chronology via typology have certainly been much discussed in archaeology (Renfrew and Bahn, 2016). The application of optical dating techniques as a more recent step in establishing a precise chronological framework for Koonalda has also been challenged by the nature of its very sediments: *"...luminescence methods are unsuitable for deep cave sites where episodic storage and transport in darkness result in overestimation of the time since last exposure to sunlight"* (Gillespie, 2002:7).

The need for reliable dating is critical to interpreting the parietal art and flint procurement that has enabled Koonalda to gain national heritage listing and international recognition. Reliable dating will also enable a better understanding of cave development over time, whilst better understanding of the nature of stream flow, development of the lakes and episodic roof collapse is critical to interpreting human response to a changing cave.

It has been speculated that the subterranean lakes in Koonalda offered a reliable and large source of water during the LGM (Smith, 2013). However, the lake in the north-west passage appears to have dried up in the LGM (Frank, 1971) and it is not known when the lakes in the north passage formed. The north passage is void of finger flutings and virtually void of flint activity, despite offering as much potential as the north-west passage. The north passage may have been inaccessible until such as time as Indigenous people were no longer involved in these activities. Equally, the north passage may have been accessible but avoided due to being a true dark zone unlike the main chamber (where the major flint quarrying has occurred) and the north-west passage (which contains the principal 'art gallery' area. Prior to massive roof fall resulting in the 'ramparts' separating the main chamber and the northwest passage, this area may have experienced more light than currently whereas the north passage has always been dark.

8. CONCLUSION

It is the significance of the art and the mining, the very cultural values that enabled Koonalda to gain National Heritage status, that are least understood due to the lack of credible and reliable dating of this site. It is crucial for the interpretation and context of these values that dating be achieved. Early attempts at establishing a concise and reliable chronology for Koonalda Cave applied typology, radiometric analysis and finally optical dating. Each have faced significant challenges that arose due to the very nature of deposition in deep karst systems.

Radiometric results currently offer a broad statement about the two distinct horizons and two significant finds: the dingo was well established on the Nullarbor Plain over 3,000 years ago; and Indigenous people had created parietal art by 18,000 years ago and were procuring flint throughout the LGM and into the early Holocene at least. Improved dating techniques are also vital for understanding human adaptation to an extremely arid zone possibly without access to reliable sources of subterranean aquifers, as hypothesised elsewhere (Cane, 2013 and Smith, 2013).

The introduction of improved single-grain dating techniques opens up the possibility of at least, disentangling the multiple events in sites such as Koonalda Cave where quartz grains are few and small. Techniques capable of reliably extracting the 1% or less quartz from the clays using aggressive floatation and decanting techniques, thus improving yields of quartz in the 100 to 200 µm range are currently being modelled (McCulloch pers.comm, Research School of Earth Sciences, Australian National University, January 2017). It is hoped that a combination of procuring fresh in situ samples and applying improved single-grain dating techniques will prove successful in addressing the varied and vital issues discussed in this paper.

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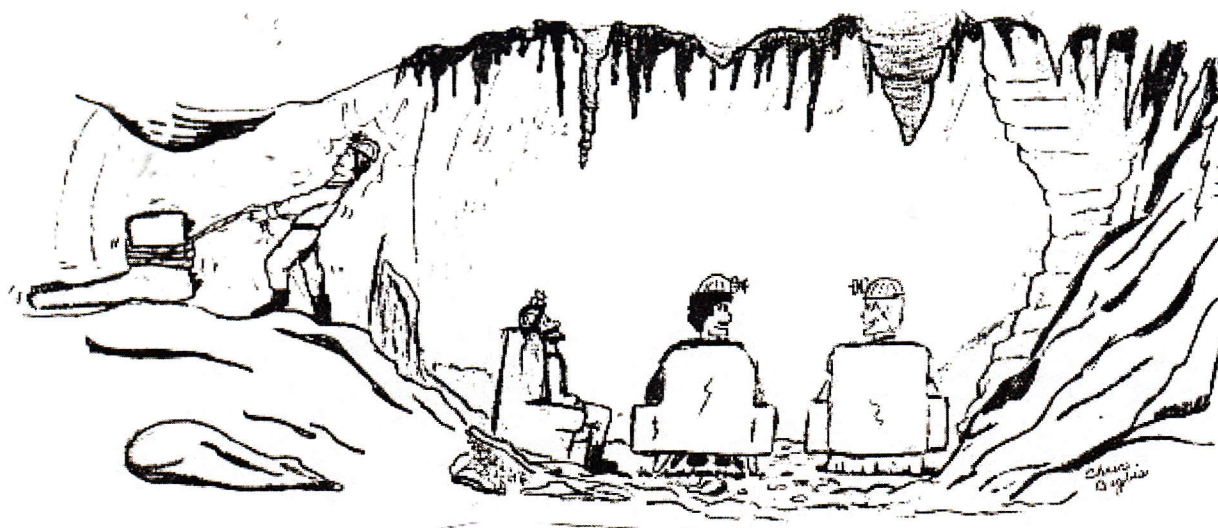
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"Hey, this armchair caving isn't as bad as I thought!"
cartoon by Chris Biggie

Naracoorte Caves Newsletter



If full car parks and booked out tour schedules are anything to go by then 2018 looks set to be another stellar year for Naracoorte and Tantanoola Caves. Additional tours were on offer to cater for increased guest numbers over our December/January peak season.

Guests visiting the Naracoorte Caves were also treated to the new look Wonambi Visitor Centre which has recently received an upgrade.

Our staff and volunteers have been working incredibly hard to ensure the grounds, gardens, caves and amenities are in the best possible shape for the year to come. We look forward to seeing you visit and enjoy South Australia's only World Heritage Listed site.

Below are comments made by guests on their experiences:

Naracoorte:

'amazing adventure caving for novice'; 'Whole family loved this place'; 'well worth a visit to this professionally run site'; 'a must see'

Tantanoola:

'A gem of a cave'; 'Very entertaining Tour'; 'Amazing'

Our newsletter will move online in 2019. Sign up to our e-newsletter by visiting www.environment.sa.gov.au/naracoorte/Contact-us/subscribe and go in the draw to win a discount voucher at the Caves Café.

New tours prove successful

Alexandra Cave

From the 22nd until the 26th of January Alexandra Cave offered additional tours while restorative work was performed by students working under guidance of local researcher Dr Liz Reed. The tours gave visitors the opportunity to view the impressive cave formations and receive an up close experience with people undertaking specialised paleontology work.

Guiding staff on these tours reported members of the public demonstrated a very keen interest in the paleontology work occurring and subsequent Q & A sessions that ensued.

The high level of demand was apparent for these types of tours coupled with more research work scheduled in 2018 provides a perfect opportunity to create further interactive experiences during the year.

New fossil themed playground

Naracoorte Caves National Park could soon have a major new drawcard for the park, a fossil-themed playground! An initiative of the Limestone Coast Ladies CWA group the playground is being enabled by a \$150,000 Go Fund My Neighborhood grant.

The Limestone Coast Ladies have been working with caves staff on the playground concept and it is expected the development will occur in stages with the first part being completed over the next 18 months.

Prior to construction occurring there will be some canvassing of community members so feedback can be obtained on the siting and type of playground experiences that might be best.

Needless to say Caves staff are very excited to see what is to come from this initiative, and have no doubt a playground area will be another linkage the Caves has with the hearts and minds of the local community.

Naracoorte Caves Newsletter



Baby bats arrive at Naracoorte Caves

To celebrate the expected arrival of over 9,000 baby bats this season, café Manager Ros Jones has introduced a special 'bat cake' and coffee deal, priced at \$8.50 and available on Mondays and Tuesdays.

This special offer not only celebrates the arrival of the bats, but also aims to support the Caves Connection Project initiated by the Naracoorte Lucindale Council by taking a lead role to identify and initiate development of products themed around the Naracoorte Caves brand.

Cave Guides have also (excitingly!) reported seeing a rare albino bat which was discovered whilst monitoring the bat populations at the bat observation centre.

What a fantastic time to visit!

Making it on the Bucket List

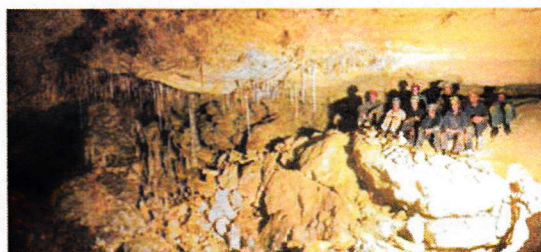
Naracoorte Caves were visited by travel writer Robin Esrock, his family and support crew in January. Robins focus is travelling and ticking experiences off his bucket list by doing a range of really interesting things at each location visited.

Needless to say Robin and his crew were suitably impressed by what was on offer at Naracoorte Caves and included the following in his travel blog: *'we had a private tour of the fantastic Alexandra Cave. The stalactites, stalagmites, columns, flow rock and soda straw were*

incredible, and the Reflecting Pool magical enough to make it onto the Great Australian Bucket List'

Thanks Robyn & glad you feel the same way as we do about the site. For more information on Robins' travels and the Naracoorte Cave visit please visit:

<http://esrockingkids.com/day/day-23/>



Book your next event

Naracoorte Caves lends itself as an incredible and unique location for a range of events. Throughout 2017 we were pleased to welcome Natural Resources South East for a number of education nights and it was great to see the Earth Keepers school holiday event in September.

Our increased emphasis on research and paleo work within the caves also led to the Children's University holding its science graduation ceremony in Blanche Cave during November, which proved to be a special night for all students involved.

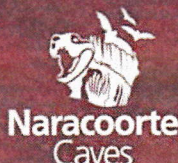
The Caves café also hosted a number of corporate, social and business functions during 2017 with menus tailored to client needs.

If you are looking for a unique location to host an event in 2018, why not consider Naracoorte Caves?

For more information, contact:
naracoortecaves@sa.gov.au



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www.naracoortecaves.sa.gov.au

SPECIAL FOCUS: DRONES



Drones head UNDERGROUND

Syed Naeem Ahmed discusses 3D laser scanning and mapping of underground mine cavities with aerial drones

Above: Fig. 1. Tilt Ranger drone

Three-dimensional (3D) laser scanning has become a de facto standard in underground mining operations for a variety of reasons, including accurate excavation audits, ground support inspections, rock face condition assessments and general surveys. Also, with the new push towards implementation of Internet of Things (IoT) principles and methods in the mining industry, 3D laser scanning and mapping are gaining widespread acceptance amongst technology developers and users.

Canadian company Clicknox and Swedish firm Inkonova have jointly introduced an unmanned aerial vehicle (UAV), the Tilt Ranger, which is designed for underground mines with the capabilities of scanning and mapping mine cavities in three dimensions. Here, we discuss a case study to understand the effectiveness of this system in scanning drifts and stopes in different underground mines.

The Tilt Ranger drone is based on tilting rotor technology. The combination of tilting rotors and wheels allows the system to be rolled on the ground as well. The scanner on the drone (V-Scan3D) weighs 930g and is capable of performing both stationary and mobile scans. The mobile scan processing is accomplished through a simultaneous localisation and mapping (SLAM) algorithm.

First tests were performed to see if multiple stationary scans can be done from the drone

Fig. 2. Stationary scans of a mine drift (multiple scans merged together)



SPECIAL FOCUS: DRONES

with subsequent manual stitching of point clouds. The drone was flown in an inaccessible curved drift. For stationary scans, the drone was landed twice along its path for two minutes. The data was downloaded from the scanner over WiFi and stitched together (Fig.2).

The final point cloud was registered with the mine coordinate system using control points provided by the mine. For this, reflective markers were placed on the control points. Since the scanner measures intensity as well, these markers turn up in different colour and can therefore be easily identified for registration (Fig.3).

The map in Fig.2 was confirmed by the mine to be an exact match of the existing map that was generated by a different scanning system when the drift was accessible.

It should be noted that it is not always possible to land the drone and perform stationary scans, especially in open stopes. In such situations, mobile scanning is the only possibility. Mobile scans of stopes were performed in two different mines and the results were compared with a traditional cavity monitoring system (CMS) used by the mine sites. Since the CMS data was available only in mesh form, the point clouds from the scans were used to create meshes for comparison.

Fig.3 shows the mesh generated from a mobile scan of a stope and the mesh from the traditional CMS unit. It is apparent that the scan from the drone fits well with the one obtained from the CMS unit with the added benefit that the drone-based scan only took about three minutes, considerably less than the traditional approach.

In many mines, stopes are much larger than the one shown in Fig.3. To investigate the viability of this scanning method in such situations, two large stopes in a mine were scanned using Tilt Ranger. Fig.3 shows the mesh of the first stope. For this scan the drone was first flown with the scanner mounted on the top of the drone and then again with the scanner mounted at the bottom. Both scans were then merged together during post-processing. There was no CMS map of this stope available for comparison as the traditional scanning system could not be used due to the particular geometry of the stope.

Fig.3 also shows the mesh of the second large stope. For this the drone was flown with

the scanner mounted on top. The wire frame obtained from the traditional system is also shown in the figure. It is apparent that the mesh obtained from the drone fits well with the one obtained from the traditional system. And as before, this scan took only a few minutes to accomplish as compared to more than an hour of set up and scanning time for the traditional system.

This case study clearly shows that the aerial drone-based scanning of underground mine cavities is not only possible but also has a

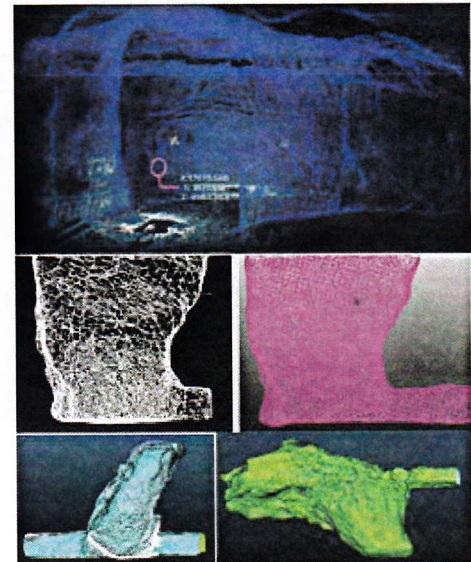


Fig. 3. Top: Control point identification for registration. Middle: Mesh from traditional CMS (left) and from Tilt Ranger drone (right). Bottom: Mesh of a stope obtained with the Tilt Ranger and mesh of a stope obtained from the Tilt Ranger together with wire frame obtained from the traditional CMS equipment

number of benefits as compared to traditional approaches. For example, the drone-based scanning is considerably faster and carries a higher level of safety for the operator. The equipment is much lighter and easier to carry than traditional CMS systems. Only one operator can carry the equipment and perform the survey.

It is expected that the use of aerial drone-based survey systems will exponentially increase as mine operators continue to see the benefits in terms of safety and cost savings. ●

Syed Naeem Ahmed is president of Clickmax Solutions. www.clickmax.com

www.engineerlive.com

15

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Syed Naeem Ahmed.

Article supplied by Ken Smith.

No GPS, No Pilot, No Problem.

TALK about a deep dive. A drone that can switch between flying and rolling along could soon be exploring inaccessible underground caves and mines without human help. Above ground, drones can navigate autonomously using GPS, but these satellite signals don't penetrate deep underground, meaning robot spelunkers normally require human pilots.

Ahmed AlNomany and his colleagues at Swedish company Inkonova are working on an alternative. "It's complicated because we are trying to invent another way of positioning using bits and pieces of technologies," says AlNomany.



Giving the drone a view of its surroundings is the first step. Using laser scanners and a technique called SLAM, which calculates the distance between the drone and nearby objects; it will build up a map of the area around it. And it can do this fast. The company recently used its manually operated drone, TILT Ranger, to map an underground mine in Mali using SLAM. In just 10 minutes, the team was able to virtually reconstruct a section of the mine with a volume of roughly 30,000 cubic metres –about a third the size of London's Royal Albert Hall. "It's not a big challenge to capture such zones quickly," says AlNomany.

Now the firm's new autonomous drone can combine its map with input from sensors, such as an accelerometer, to help position itself and move without GPS. So far, during preliminary tests, it has been able to stabilise

itself on its own in the air! When it encounters unusually shaped space, it has a backup. Equipped with wheels, the drone can move along the ground and tilt to fly or roll at an angle if needed. "If it is near a wall, the drone will adapt to it and climb it instead of flying," says AlNomany.

Adriano Mazzini at the University of Oslo in Norway thinks automated drones are now the ideal choice to explore dangerous environments. "Relatively lightweight and high-performing tools can now be added to them," he says.

Mazzini recently sent a drone over the erupting Lusi mud volcano in Java, Indonesia, to sample gas, water and mud – something that would have been unthinkable just a few years ago.

Inkonova's drones are of interest for other GPS-deprived environments too. The company was recently contacted to map a decommissioned nuclear power plant, which has thick walls that block any satellite signal from helping drones navigate. However, the mission was aborted after concerns were raised that the drone's propellers could disperse potentially radioactive dust inside. "We didn't pursue it further, but we would like to adapt TILT Ranger for this purpose," says AlNomany.

Sandrine Ceurstemont. NewScientist 17 October 2017

Article supplied by Ken Smith.

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NOTICE OF MOTION

Motion to be voted on at the 25th April 2018 General Meeting to change **RULES 1(h)**

"All members pay an Australian Speleological Federation levy appropriate to their membership status."

By adding

"The levy collected is held in trust by CEGSA for the payment of their ASF membership subscription. These monies do not form part of the Groups' income or expenditure and belong to the ASF."

Graham Pilkington.

FUSSI PROGRAMME

Note: FUSSI holds a general get together/meeting on the Third Thursday of each month except where notified. Programme subject to change.

Sunday March 4th

Murray River trip. A trip for everyone.
Thomas coordinating

SEMESTER STARTS 26 FEB 2018

Thurs 15
March:

Social Meeting.

Get your mojo working with a map & compass. Tania is going to show us how. Meet at the Uni Foot bridge and prepare to get lost in the forest. 6pm - 8pm. On Campus.

18 March

Training afternoon. For the Rope incompetent. Venue to be announced.

24/25 March

Naracoorte Trip. A trip for everyone. RSVP **28th Feb** 12 Noon. Don't miss out get your name down, NOW! Clare Coordinating.
Contact: fussi@fussi.org.au

Mid-Semester Break April 9 – 23

April 15,

One day Trip Yorke Peninsula. Thomas Coordinating

Thursday April 26th

6.30pm

Film Night. "Descent"
Noel Stockdale Rm, Flinders Uni Library.

May 12th -13

Flinders Ranges Trip. Great trip suitable for all.

Thurs 17th May

AGM.

Win the lottery and add some impressive roles to your CV. New members needed on the Exec. You could be lucky.
Noel Stockdale Rm, Flinders Uni Library.

June 14th

Library and pizza night. At the club store. On Campus, under the Union Hub.

June 17th

One day trip to the Yorke Peninsula.
Thomas Coordinating

July 3 - 24 Mid Year break

For the longer term

September Nullarbor trip Ten days of fun in the remote lands

ALL SUBJECT TO CHANGE

CEGSA members are welcome to attend. Contact Mark Sefton or Neville Skinner.

CALENDAR OF EVENTS

Date	Type of Event	Description	Contact
28/02/18	General Meeting	Royal Society Room, SA Museum, Adel. FUSSI Yarrangobilly Trip	Neville Skinner
??/03/18	Committee Meeting	TBA	Ian Lewis
10-12/ 03/18	Adelaide Cup W/E		
10-? / 03/18	Caving	Nullarbor for 3 weeks,	Graham Pilkington
28/03/18	General Meeting	Royal Society Room, SA Museum, Adel. TBA	Ian Lewis
30/03-02 /04/18	Easter W/E		
??/04/18	Committee Meeting	TBA	Ian Lewis
25/04/18	General Meeting	Royal Society Room, SA Museum, Adel. TBA	Ian Lewis
??/05/18	Committee Meeting	TBA	Ian Lewis
14/05/18	CEGSA NEWS'	Articles due	Athol Jackson
23/05/18	General Meeting	Royal Society Room, SA Museum, Adel. TBA	Ian Lewis
??/06/18	Committee Meeting	TBA	Ian Lewis
09-11/ 06/18	Queens Birthday W/E		
27/06/18	General Meeting	Royal Society Room, SA Museum, Adel. TBA	Ian Lewis
	Caving	Continuing Fleurieu Peninsula Exploration	Grant Gartrell

****Extra trips will be notified in the Calendar on the Website or at General Meetings****

To be covered by insurance it is mandatory that caving trips involving club members must be registered as CEGSA Trips. To do this, the nature and timing of the trip must be entered in the Calendar of events in CEGSA NEWS, minuted at a General Meeting of Members or entered in the Website Calendar. The member registering such a trip must be an accredited CEGSA Trip Coordinator and must agree to act in this capacity for the trip. There must also be an accredited trip leader with the appropriate skill endorsement to take a dependent party caving.

Also, please ensure that a report of the trip is submitted to the Records Officer and editor in a timely manner.