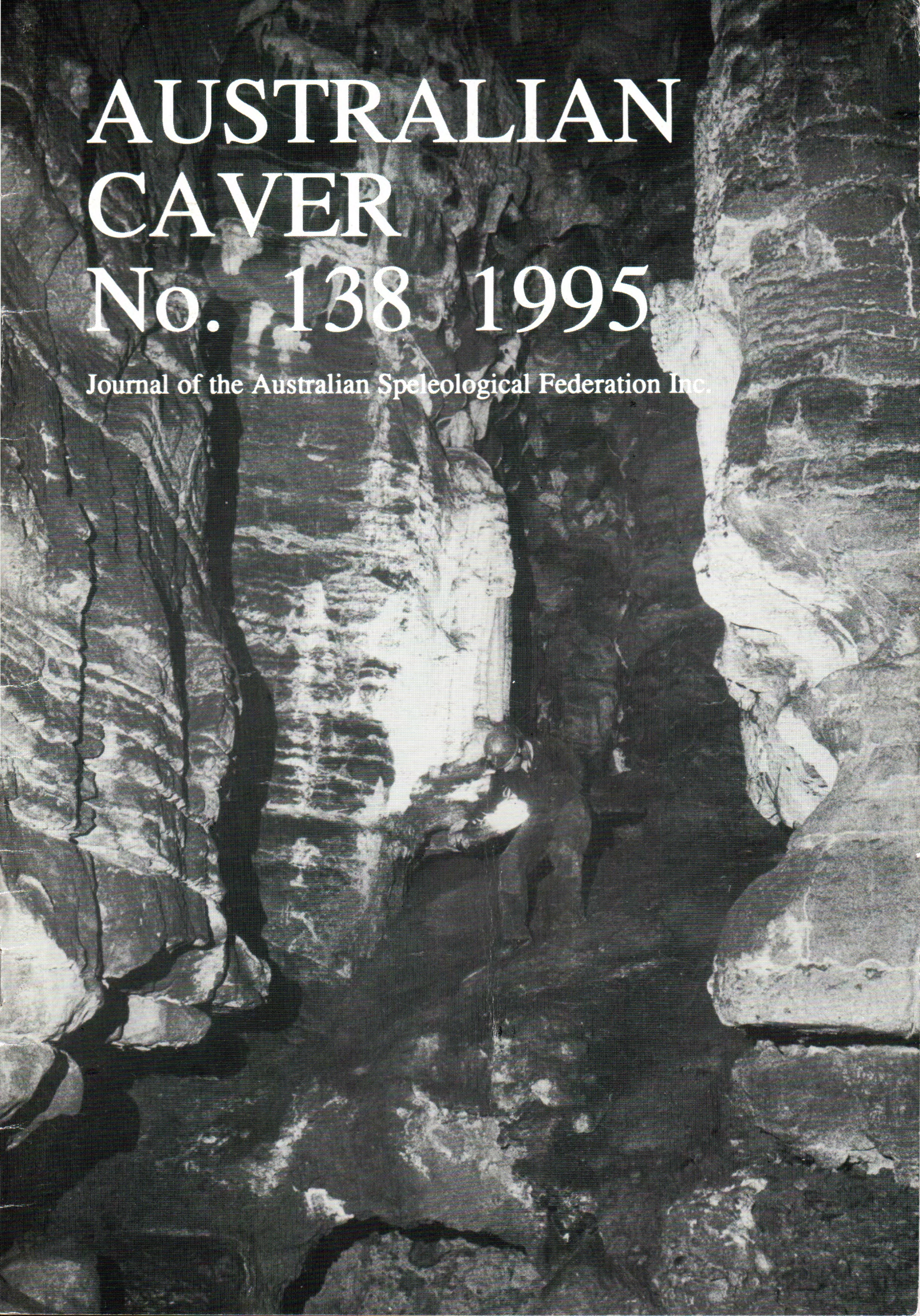


# AUSTRALIAN CAVER No. 138 1995

Journal of the Australian Speleological Federation Inc.

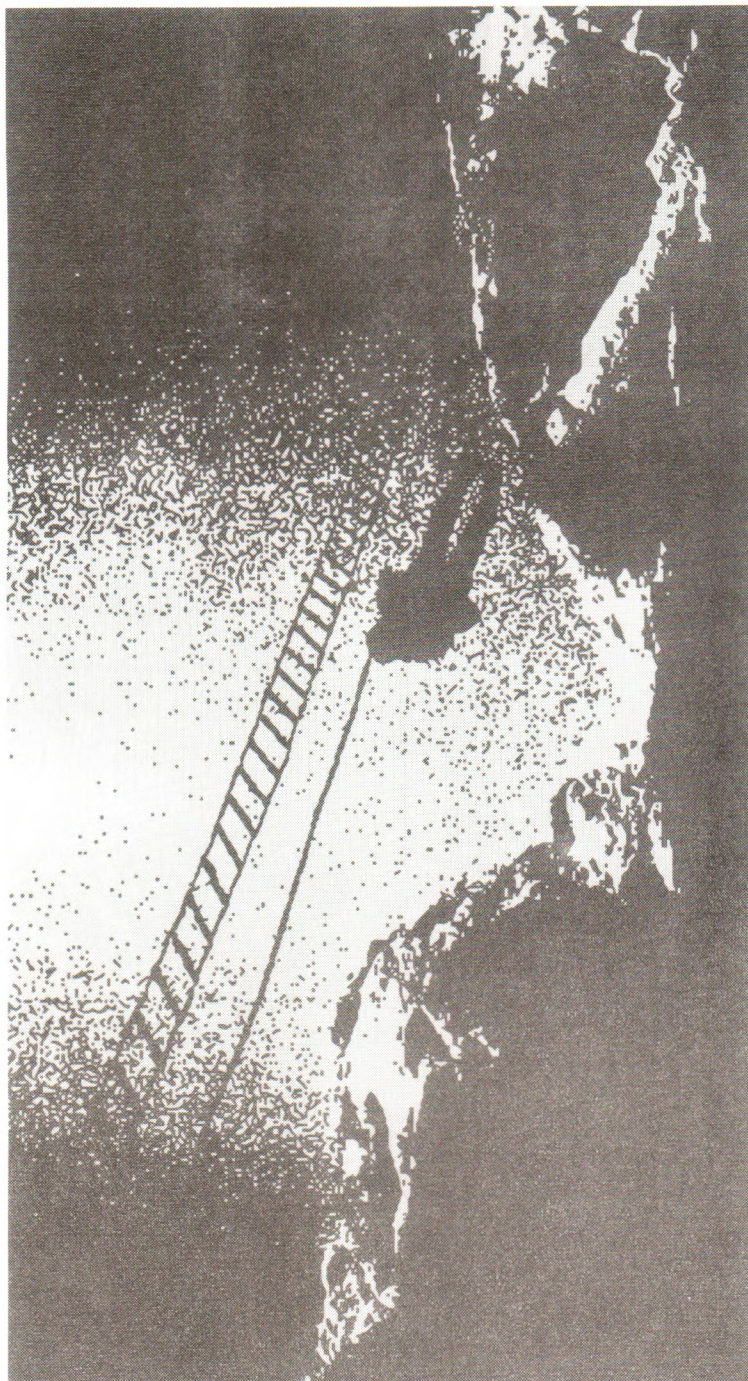




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Kestrel Number One, The Nullarbor. Photo by John Hellstrom.



# AUSTRALIAN CAVER

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No. 138

1995

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Front Cover Photo: Part of main chamber in Mooresford Cave (MF -1), Buchan. Photo by Peter Ackroyd.  
Back Cover Photo: John Oxley in Sigma Cave, Wombeyan. Photo by Jill Rowling.

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## EDITORIAL

During the 1995 ASF Council meeting held at Vulcon, as editors of Australian Caver, we put forward our suggestion that we would produce Australian Caver in two formats. Two issues a year were to be in the same format as usual, and the other two issues were to be in Newsletter format. There was no content for the newsletter edition so we decided to wait until we had enough material for this issue.

Vulcon 95 was an excellent event and everyone involved in the organization deserve special thanks, especially Susan White and the rest of the organizing committee. It was a great chance for cavers throughout Australia to get together and discuss caving, cave science and cave politics. The pre and post conference caving trips were well organized, and offered interstate cavers a chance to see new caves in a substrate other than limestone. It was fun abseiling into the throat of a volcano. Some even managed to extend old caves and find new ones, we will publish details as soon as they become available. The organizing committee also produced two quality publications, the Vulcon Precedings and the Vulcon Guidebook, which make great reading and were invaluable for their cave descriptions and maps.

Virtual caving has taken off in Australia quite rapidly with a lot of cavers accessing the Internet. This has been very beneficial to us as we have been able to take snippets of information from the Internet and include them in this magazine. It has also meant that authors can supply us with information without the hassle of sending floppy disks. With the exception of NT and Qld. there is at least one person from every state with an email address. So if you have an article, notice, or letter you want published, please see someone in your state with an email address. We still accept letters and floppy disks sent via Australia Post.

Chris Bradley and  
Cathy Brown

## WANTED

Volunteers to Assist With a Tourist Cave Development Project in the Highlands of Irian Jaya.

This is your chance to visit the highlands of Irian Jaya or Indonesian New Guinea, explore some of the last virtually unexplored extensive karst fields in the world and visit the largest underground river in the world whilst working on the tourism development and conservation of the caves of Wosilimo. The Yasukhogo Rural Development Foundation of Irian Jaya is presently planning an indigenous community owned tourism development project in and around the village of Wosilimo which will incorporate the installation of lighting and walkways in Wikuda Cave, the development of two other caves for adventure caving, the gating of other caves in the region for conservation, the training of a local youth group in caving/abseiling skills as well as development of a small zoological garden, guest house and more. The project is expected to commence in mid 1995 and we are presently looking for volunteers to assist with this development. We are specifically looking for an expert in the installation of cave lighting systems and one or two people experienced in walkway construction, cave cleaning, mapping, photography, explosives and other related skills. Employment would be on a voluntary basis for a four to six month period. Wages would not be available but the Yasukhogo Foundation would pay the costs of airfares and provide accommodation (possibly on my lounge room floor). As yet we are unable to determine exactly how much money is available for payment of airfares and accommodation and therefore how many people we will be able to sponsor but interested people should contact me to negotiate these issues. Please forward a resume/curriculum vitae to:

Robert Hewat  
d/a/ Sanggar Latihan Bethesda  
Kotak Pos 296  
Wamena 99502  
Irian Jaya  
Indonesia

Copies of the project proposal are available from me on request.

Robert Hewat

---

### FROM OZCAVERS ON THE INTERNET:

#### WA Speleology Server Moves House.

Due to the movement of our WWW server an alternative home for the WA Speleology Server has been found. The new URL is:-

<http://techpkwa.curtin.edu.au/interests/Speleology/intro.html>

The WA info now uses HTML Version 3 - so you need Netscape V1.2 to see some of the changes. Note that it will still work with other WWW browsers you will just not be able to see all of the "goodies".

Note also that the site has been rearranged and new information added. Further information and photos will be added to this site as they become available.

If you have some photos or information that you would like to add to the WWW site please send it to me and I will include it.

Check it out!!  
Regards

Rauleigh Webb  
INTERNET: [rauleigh@osi.curtin.edu.au](mailto:rauleigh@osi.curtin.edu.au)  
7 August 1995



# LETTERS TO THE EDITOR

Robert Hewat  
d/a Yayasan Yasukhogo  
Kotak Pos 370  
Wamena 99502  
Irian Jaya  
Indonesia

Dear Editor,

I am an Australian caver presently working as a community development worker in the Jayawijaya district of the highlands of Irian Jaya or Indonesian New Guinea. One of the projects I am working on is a community development program in the Wosilimo Region including agricultural, tourism and community unity development. The main part of this project involves the development of Wikuda Cave for tourism, the preparation of several other very beautiful caves in the area for adventure cave tours and the promotion of abseiling in the Wikuda Doline whilst other activities include the development of a wildlife park of native New Guinea mammals and reptiles, trekking, mountain bike hire, native canoe trips and more. As a result of this and my personal cave exploration in the region many local youths became involved in cave exploration and mapping in the area and have recently been learning SRT and descending vertical caves with me. They have recently formed their own caving team, the Jayawijaya Speleo Team (Tim Speleo Jaya) which is intended to provide recreation for the local youths and to lead abseiling and adventure caving groups as a tourism activity. Unfortunately, these people are indigenous people living in a small village with virtually no income (most of them can't even afford shoes) and therefore no ability to purchase equipment. At present they are using my equipment, however I only have two sets of SRT equipment, one carbide lamp, two helmets and no cave clothing or foot wear. This means that at most one person can follow me caving at any one time, and even then very under equipped, and that when I leave Irian Jaya the caving team will have no equipment whatsoever.

Is there any possibility of obtaining a donation of caving equipment or clothing from you or your club? We would be happy to list you as a donor to the project on the boards we plan to erect in front of the Wikuda Cave advertising donors. We also intend to publish a short guide to the caves of the Wosilimo Region and Jayawijaya and we would be more than happy to include a full or half page add, depending on the size of your contribution, in this guide. I believe that this would bring you quite a lot of business as the guide would be sold to tourists, at a minimal cost, over many years. Many of these tourists will have enjoyed their first underground experience in Jayawijaya and may return to their own country and take up caving as an ongoing hobby. We would also be more than happy to send any quality caving photographs which we produce so you can use them for advertising yourself and/or to meet other requirements that you may make. We would also be more than happy to provide accommodation, food and logistic support to any groups of cavers or cave scientists or general tourists you know who wish to visit this region. I have enclosed a wish list of equipment which we are

seeking, anything which you could donate would be very much appreciated.

If you require any further information, such as a copy of the project proposal for the entire project, cave surveys, photographs, or further information of the Jayawijaya Caving Team, or if you wish to provide us with any information or the names/addresses of other possible sponsors please contact me at the above address.

I look forward to hearing from you and I hope that you can help us and we can reciprocate your assistance and kindness.

Yours Sincerely  
Robert Hewat

## WISH LIST OF EQUIPMENT FOR THE JAYAWIJAYA CAVING TEAM

This list is arranged roughly in order of priority:

- 6 sets of Ascenders
- 6 Descenders - Auto Stops, Rapell Racks
- 30 Screw Gate Carabiners
- 12 Spring Gate Carabiners
- 10 Mallions
- 6 Harnesses
- 50 metres of Webbing Tape
- 10 Carbide or Electric Lamps
- 10 Helmets
- 20 Mini maglite or similar torches
- 10 pairs Boots
- 10 pairs Overalls - Caving Suits
- 10 Gear Sacks
- 250 metres of Static Rope
- 5 Rope Protectors
- 20 metres of Shock Cord
- 1 x 20' 1 x 30' & 1 x 50' Caving Ladders
- 2 x 8' & 1 x 20' Wire Tracers
- 5 Waterproof Canyon Bags
- 3 Rescue Pulleys
- 10 Under Suits or Thermal Underwear
- 10 Thermal Balaclavas
- 10 pairs of Gloves
- 5 Wet Suits
- 10 Pitons
- 10 Asorted Nuts or Chocks
- 1 Hammer
- 1 Bolting Kit
- Bolts
- 25 Bolt Hangers
- 5 Survival Blankets
- 10 pairs of Kneepads
- 5 Pocket knives
- 10 sets of Wet Weather Gear
- 5 Sleeping Bags
- 2 Tents or Bivy Sacks
- 1 set of Surveying Equipment
- 1 Compass
- 1 x Rope Washer
- Fastex & Ladderlock Buckles
- 1 x Stove
- 5 x Water/Fuel Bottles
- Asorted Spare Parts



# ASF AWARDS

## Fellowship

At the 39th Council Meeting held during Vulcon, the Council elected Lloyd Robinson a Fellow of the ASF. This award was made in recognition of Lloyd's outstanding service to the Federation and to Australian caving and speleology.

Lloyd has been actively involved with Federation over many years. He gave distinguished service as president of the Federation from 1986 to 1992, the longest continuous term of any previous incumbent. During this time he presided over a major restructuring to improve the executive and increase the responsiveness of the Federation.

Apart from his term as president, Lloyd has served on various ASF Commissions and Committees to which he contributed both hard work and wisdom. He continues to support the ongoing work of the Federation.

Lloyd joins four other individuals who have been honoured for their long term distinguished services to the Federation. (See AC no. 135, p9).

## Eddie Smith Awards

During the Caveman's Dinner at Vulcon the retiring president, Miles Pierce, announced the conferring of the Federation's Eddie Smith Award for outstanding service to Australian Speleology to Brian Finlayson and jointly to Grant Gartrell and Rod Wells.

The award to Dr. Brian Finlayson was made in recognition of his work in Australian karst research, his pivotal role in encouraging and supporting karst investigations by others and in linking professional karst research with Club based speleology. Brian was a member of UQSS in the 1960s and has been an involved member of VSA since 1979. He is currently Associate Professor of Geography and Chairman of the Geography Department at the University of Melbourne. His leading research has included the study of underground streams in granite rocks and the synthesis of the geomorphology of the Buchan karst. His commitment to promoting the exchange of ideas in speleology includes organisation and participation in several karst workshops.

The joint award to Grant Gartrell and Rod Wells specifically recognises their roles in the discovery, interpretation and preservation of what is now known as the Victoria Fossil Cave at Naracoorte (SA). The Fossil chamber was first entered in 1969. Grant and Rod recognised the potential value and significance of the site and were active over many years to ensure its protection and proper management. The site has since proved to be one of the most significant accumulations of Pleistocene sub-fossils in the world. The Victoria Fossil Cave was given World Heritage status in December 1994, a process to which the Federation also contributed.

Rod has continued to lead and co-ordinate research on

the fossil deposit and has been widely recognised as making a major contribution to our understanding of the Pleistocene period in Australia.

Grant has continued to pursue his passion for exploration and discovery of new caves, the most recent being a spectacular addition to the Kelly Hill cave system on Kangaroo Island. He also played a leading role in the exploration of the Sellicks Hill quarry cave and in efforts to preserve it.

## Certificates of Merit

The Certificate of Merit is awarded to recognise specific contributions to the exploration, scientific study, conservation or documentation of caves, including roles of leadership, administration, publication and development of new techniques and equipment. At the Vulcon dinner six awardees were announced:

Fred Aslin - For documentation of cave flora and fauna, initiation and involvement in palaeontological excavations, maintaining cave records for south eastern South Australia, discovery of new caves and karst features. Fred has also introduced many others to responsible caving activity and had a major role in setting up the cave rescue capability in Mount Gambier.

John Brush - For his many contributions to cave exploration, cave surveying, mapping and documentation, in NSW, NT and Thailand, and his active involvement in the administration of NUCC and CSS in various capacities over many years. He is an active member of the Yarrangobilly Research Group and has been involved in speleological publications.

Craig Hardy - For his great personal and financial commitment and sacrifice in relation to the Mount Etna (Qld) conservation battle. In this campaign Craig acted as media spokesperson, organiser and tactician. His dedication went far beyond the call of duty. He quit his private practice to work full time for the cause. Although mining of Mt Etna did continue, his selfless efforts contributed to its eventual cessation and the reservation for conservation purposes of the remaining limestone which contains important caves. Craig has also taken active roles and made monetary contributions to other important conservation battles including Fanning River, Undara, Yessibah and Ida Bay.

Ken Keck - For his long term advocacy for responsibility and conservation in caving practice, his active support of the Federation and its aims and his positive leadership, both in the Metropolitan Speleological Society and in the wider caving scene. He has taken a particular interest over many years in the exploration, history and presentation of Abercrombe caves and can take credit for two books on Abercrombe.

Max Meth - For sustained dedication to systematic exploration and cave and karst documentation in South Australia and on the Nullarbor. An active CEGSA



member since 1971 he is now records officer for the Nullarbor Karst. Under his meticulous leadership the 340 numbered features in 1986 now total to more than 1400, a majority of which he has personally visited. Max has also done valuable historical research on early visitors to the caves of the Nullarbor.

Lloyd Mill - For distinguished service to the ASF from 1982 to 1993, initially as treasurer and later as a Vice President. During this period he played a leading role in developing awareness of the need for an organisation review of the Federation and then bringing about

consensus on the shape of the present structure. As a member of VSA, Lloyd carried out the first modern study of geology of Buchan Caves.

Further information on the ASF Awards and previous recipients is contained in issue 135 of Australian Caver.

Miles Pierce  
President and Awards Commission Convenor 1993 -94

## Co-Ordinator of Thampana Surveying

It has been suggested by a couple of members that Ken Boland consider taking on the role of co-ordinating the surveying of Thampana. This comes about after a certain amount of duplication of work including some carried out by Peter Ackroyd and Graham Pilkington.

The Co-Ordinators role would be three fold:

1. Making appropriate data/maps available
2. Reserving surveys initiated to those doing them
3. Suggesting where others might start fresh surveys

Any comments about this role should be directed to one of the following members:

Mark Sefton  
Graham Pilkington  
Peter Ackroyd  
Ken Boland

## Information Required on Bendethera Caves

ISS Inc. (Illawarra Spelo Society Inc. in undertaking a research/exploration of the Bendethera Caves Area, near Moruya in NSW. If anyone has any historical or current information on the caves could they please contact Bob Kershaw:

PO box 95 Unanderra NSW 2526  
CompuServe: 100231,1053  
Internet OzEmail: rkershaw@ozemail.com.au

Bob Kershaw

## EXECUTIVE COMMITTEE MEMBERS 1995

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# INSIDE EARTH

Caves Beneath The Nullarbor

Inside earth caves beneath the Nullarbor touring art exhibition is opening in Melbourne 12th September - 31st September 1995. Come along and support the art work of fellow cavers.

You and your friends are invited to the opening of an Art Exhibition.

## INSIDE EARTH

### CAVES BENEATH THE NULLARBOR.

Recent paintings by June MacLucas (Dip BFA & Member of CEGSA)

#### OPENING

9th December 1994 at 6.30pm

#### FREMANTLE ART CENTRE

1 Finnerty Street

FREMANTLE

Gallery hours 10 - 5 Monday to Sunday

Phone 09 335 8244

Exhibition includes recent and historic cave photography and videos by CEGSA and other prominent Australian Cavers.

Co-ordinated by Adelaide artist and CEGSA member June MacLucas, Inside Earth brings together an artistic impression and photographic record of the great caves that lie beneath the Nullarbor.

Paintings and drawings by: June MacLucas.

Photographs by: Ken Boland, Kevin Mott, Nicholas N Birks, Rob Klok, Norm Poulter  
Elery Hamilton-Smith and Nullarbor Pioneer Caver Captain J. Maitland Thompson.

Videos by: Greg Bulling, Tony Carlisle and Andrew Wight.

To be opened by

Professor Elery Hamilton-Smith  
of La Trobe University, Melbourne

Tuesday September 12 1995

6.00 pm - 8.00pm

Exhibition closes 31st Sept 1995.

St Francis Pastoral Centre gallery  
St Francis Church, 329 Lonsdale Street  
Melbourne. (03) 663 2495

Gallery Hours Mon-Fri 9am - 5pm  
Saturday Closed  
Sunday 10am - 3pm

This exhibition opened at Prospect Art Gallery, S.A. 1994 Fremantle Art Centre, WA 1994 and Community Art gallery, Riddoch Art Gallery, Mountgambier 1995. After Melbourne it travels to Broken hill Art Center, NSW in 1996.



# CAVE SEDIMENTS: WHAT CAN THEY TELL US ABOUT THE PAST?

Dave Gillieson  
Dept. of Geography & Oceanography  
University College, University of NSW  
Canberra ACT 2601

## Why do sediments matter?

Early in their underground career most cavers will become intimately acquainted with the unctuous cave muds which adhere to just about anything that contacts them. They will also be aware of the seemingly vast amount of haphazardly piled angular boulders which make up cave breakdown. The reward for negotiating these breakdown piles and mud wallows is the privilege of viewing pristine calcite formations. When most people think of cave sediments, they have in mind the clastic sediments made up of fine or coarse particles of mineral or organic matter. A great deal of research has been carried out on the material deposited with these clastic sediments (bones, pollen, artefacts) as a means of elucidating environmental or human histories. Less research has been undertaken on the processes by which sediments are produced, transported and deposited within the cave system. In part this is due to the difficulty of observing and measuring these processes in flooding caves.

The bulk of material moving through a cave system is sediment. There is in fact very little difference in the nature of surface and underground clastic sediments, although we must devise more time-transgressive models of sedimentation for cave sediments given the ubiquitous nature of palaeokarst. In addition, there is an important interaction between cave sediments and cave morphology which produces a range of depositional structures and passage shapes. Cave sediments are tricky to understand but can potentially tell us a fantastic amount!

## Cave Sediment Types

Clastic sediments form from fragments of rocks (the regolith) which have been broken up by physical or chemical weathering processes. These fragments are further transformed by the winnowing effect of sediment transport and by chemical alteration (diagenesis) during long or short periods of repose in the surface or underground environment. Not only the geologic origin of the sediments, but also their place of origin, determines their classification as either allogenic (origin outside the cave) or autogenic (origin within the cave). Cave sediment types (Table 1) are thus diverse and include organic debris and its chemical derivatives (phosphate and nitrate minerals), inorganic chemical

precipitates, and ice. In any single cave the total assemblage will depend on both the past and present geologic and climatic environment. Cave sediments thus provide us with a potential library of environmental information - if we can read the language they are written in. To do this we need to understand the nature of the materials and their processes of transport, deposition and chemical alteration.

## Processes of Sedimentation

Cave sediments may be deposited by either gravity-fall or aqueous transport processes. The distinction between these becomes blurred when we consider such processes as turbidity currents sliding down steep sediment banks into a cave pool, or the injection of fluidised mudflows into tropical cave passages by landslides (Gillieson, 1986).

### Gravity-fall processes

These involve the slow or rapid movement of clastic sediments in air, either as a dry or as a saturated mass movement. The deposition of air fall tephra (volcanic ash) in caves is a special case of this type. The principal types of deposits moved by gravity-fall processes include cave breakdown, debris cones under avens, cave wall fans below fissures, loess and related deposits, bushfire smoke and fine charcoal, mudflow deposits and glacial till. In addition the deposition of lint and skin cells in tourist caves is a major process of sedimentation by gravity-fall, and may total several tonnes per year in heavily used caves!

By far the most widespread form of gravity-fall sediment in caves is breakdown. The alteration of passage shape by breakdown seems to be the ultimate fate of most caves once the water which formed them goes elsewhere. Whilst the passage is water filled, stress lines in the rock are evenly distributed around the cavity; once the water is removed, local concentration of stress leads to failure of the arched section, usually along bedding planes. This process propagates upwards leading to the development of breakdown domes or avens. In many cases this propagation intersects overlying non-limestone rocks, allowing this material to enter the cave. A good example of this is the elusive presence of sandstone blocks in Gunbarrel Aven, Wyanbene.



**Table 1: Cave Sediment Types**

Type	Origin	Nature
Clastic	Allogenic or Authigenic	Angular boulder debris; subangular to subrounded gravels and cobbles; sands and silts; cave clays.
Organic	Allogenic debris	Woody debris; humus and fine particulate organic matter; dung and spores.
	Authigenic deposits	Bat and bird guano; phosphatic mineral crusts and laminae; nitrate-rich deposits; subaerial stromatolites.
Chemical	Allogenic	Tufa and travertine fragments; pisolites (iron nodules); caliche.
	Authigenic	Calcite and gypsum speleothems and interlayered deposits. Tufas and travertines.
Ice	Authigenic cave drips, wall condensation, cave pools	Ice stalagmites and stalactites, pond ice, rime crystals.

Breakdown blocks vary in size from fist-sized rocks to boulders the size of houses. Their shape depends greatly on the thickness of the bedding. Thus a thinly bedded limestone will tend to produce platy fragments while a massive limestone will tend to produce more cubic fragments. This purely stress related breakdown may be modified by frost shattering near entrances to produce platy, angular debris of cobble to boulder size. Thus in Greftkjell cave, Nordland, Norway, frost shattered debris can be found up to 50m below the entrance snow plug while more massive breakdown is found throughout the cave to a depth of 230m. Closer to home the entrance chamber of Murray Cave, Cooleman Plain is host to a modest amount of frost-shattered rocks on floor and walls. The age of this is as yet unknown.

#### Waterlain Sediments

Caves can be seen as underground gorges and floodplains, in which clastic sedimentation proceeds in modes similar to those of surface streams. This provides a conceptual scheme for sedimentation processes where water is the transporting agent. The major difference between the surface and underground streams is that in the latter, the water and sediment is confined

within a conduit. This results in two main effects:

1. Dramatic fluctuations in water level due to either flood stage or to passage morphology result in steep gradients in energy along a cave passage. There is thus greater range of sediment textures per unit length of channel than on the surface. This affects both estimation of past flow velocities from sediments, and also stratigraphic correlation.
2. Subsequent flows of water down a particular cave passage may wholly or partially remove the sediment deposited by a prior event. The resistance of an individual "parcel" of sediment to this process of reworking will depend on its texture and on the passage geometry at the site. The fate of a parcel of sediment entering a cave is to be shunted through the passage with successive removals of some constituents by sorting, and a gradual reduction of total volume (Figure 1). Thus the life history of a parcel of cave sediment is one of periodic reworking until its identity is lost, its volume becomes negligible or it is placed in a very low energy environment. Eventually it may emerge from the spring as muddy water!



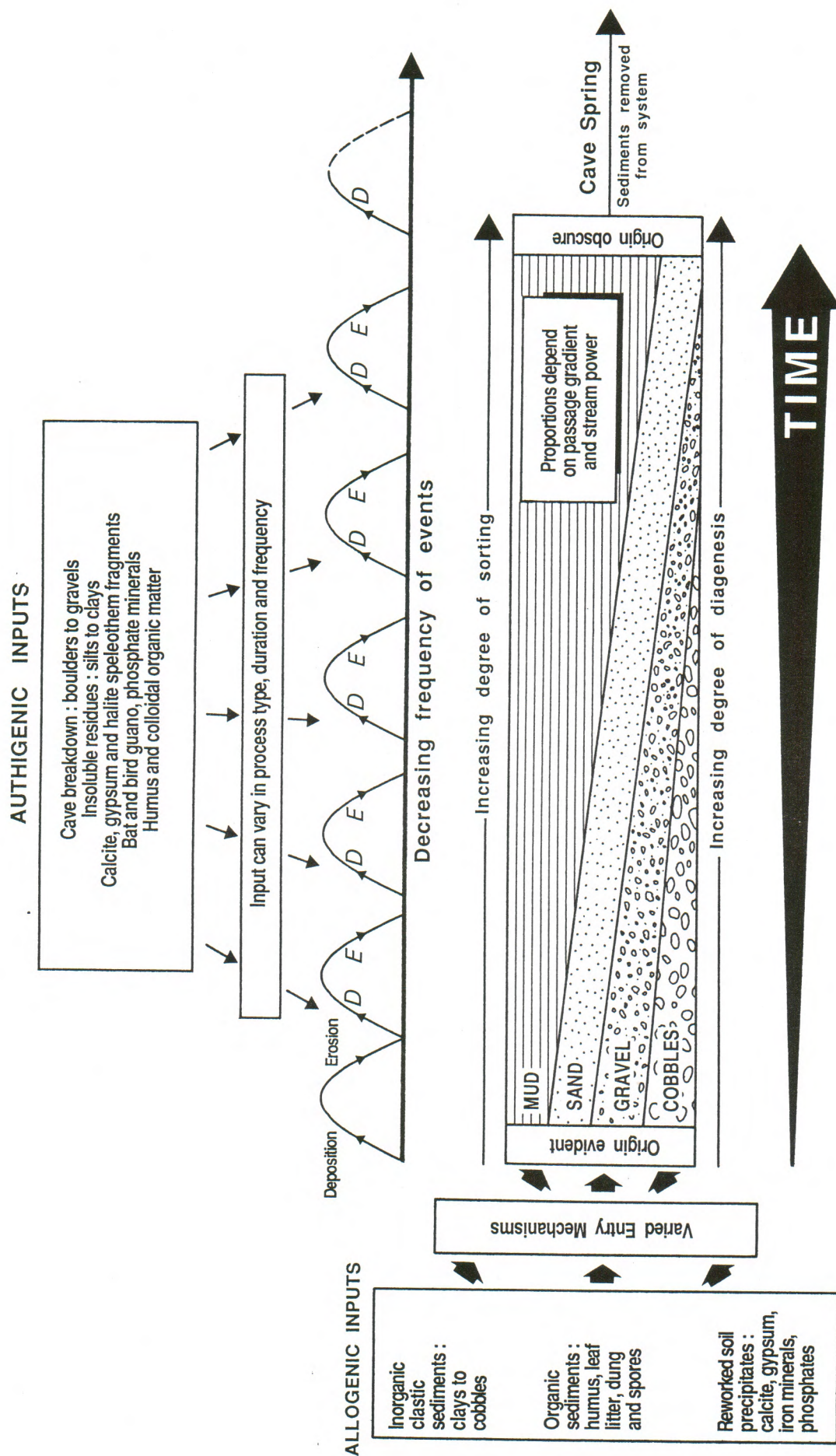


Figure 1: A scheme of cave sedimentation. Parcels of sediment move through cave systems and are reworked periodically, changing their nature and texture with each episode. From Gillieson (in press).



The degree of this reworking will largely depend on the texture of the sediment. Thus the large particles of boulder size, and the very fine cohesive clays will both be resistant to reworking once emplaced in a cave. In Westmoreland Cave, Mole Creek, Tasmania, dolerite boulders of Last Glacial age are wedged in the passages and appear little altered by weathering. In contrast, sand sized sediments will be readily moved and reworked. This is due to the velocity of erosion being higher than the velocity of transport for coarse and extremely fine particles. In Mammoth Cave, Kentucky, backflooding deposits of silt from Echo River may be moved to higher elevations by successive floods (Palmer, 1981). After every flood, a thin layer of clay is deposited over all submerged passages. This phenomenon is very common in epiphreatic caves, and may act to retard solutional attack on cave walls in the tropics (Gillieson, 1985).

Some parcels of sediment may be shunted into side passages during very high floods and will there remain unaltered beyond the reach of successive flow events. Other parcels may be sealed in by rapid flowstone growth or capped by very fine muds which are resistant to erosion. Thus the Cricket Muds of Clearwater Cave, Gunung Mulu N.P., Sarawak, have sat undisturbed (apart from the burrowing of crickets) for the last three-quarters of a million years. These very fine grained muds often have a mean grain size finer than 0.001mm and behave as colloids. On settling from suspension they may accrete at steep angles, draped on underlying rock, flowstone or sediment surfaces, quite commonly with minor slumping. There may be surge marks in these fine muds produced by the swash and backwash of pulsed floods in cave passages (Bull, 1981). This can be seen in tidal passages such as those in Otter Hole, Forest of Dean, UK.

These fine muds are useful in that they may provide a palaeomagnetic record and may also preserve pollen. In Castleguard Cave, Canada, there are three phases of fine silt filling which are interpreted by Schroeder and Ford (1983) as varved sequences deposited under full glacial conditions. These three silts persist for several kilometres in the cave and were clearly deposited under passage-full conditions. The youngest silt is older than flowstone dated at c.140,000 years, but is younger than a stalagmite which is older than 720,000 years. The pollen from the oldest fine silt provides evidence of a somewhat warmer climate, with broad-leaved trees such as magnolia and oaks now found much further south in Kentucky and Alabama.

Extensive gravel trains in cave passages may relate to the winnowing of fines by successive flows of water which are incompetent to move the

gravels themselves (though some slight movement by bedload traction may occur). The shape of the gravels themselves are held to be different: cave gravels may be flatter due to their transport through inverted siphons. This process can be seen in the far end of Murray Cave, Cooleman Plain.

### Chemical Alteration of Cave Sediments

Once emplaced into a cave, any sediment is existing under conditions of total darkness, near constant high humidity, and near constant temperature. This reduces the amount of chemical alteration that can occur. However, with time some migration of solutes into and out of the sediment will occur. This may be as the result of wetting and drying cycles due to floods. In this context the porosity and mean grain size of the sediments has a great influence on the degree of diagenesis. Spectacular blue and red banded clay sediments in Selminum Tem, New Guinea, owe their banding to alternate layers of very fine clay and slightly coarser silt. Reducing conditions are maintained in the fine clays, with a dominance of ferrous iron salts, while in the silts the increased porosity allows oxidation and a dominance of ferric iron. Sediment banks are commonly cemented by iron oxide bands or by calcite from drips. Truly ancient sediments have reaction rims, often of calcite or phosphatic minerals, which may penetrate into the adjoining rock surfaces. This can make their identification and analysis very difficult, but we are beginning to realise the great extent and value of ancient sediments as palaeokarst indicators in Australian caves (Osborne, 1984).

### Analysing Cave Sediment Sequences

Careful analysis of individual sediment sections may permit estimation of both the regime and energy of past water flows through a cave passage. If we know the mean grain size of a sediment, we can use the curve in Figure 2 to estimate the velocity required to transport the material. This curve was derived by the Swedish geomorphologist Hjulstrom back in 1935 after studying many rivers in Scandinavia, and it has stood the test of time. In Figure 2 these relationships are displayed according to mean grain size of the particles. The velocity of transport is always less than the velocity of erosion, as more hydraulic force is needed to tear the particles away from the cohesive bed of sediment than is needed to keep them in suspension or hopping in saltation. The critical velocities of erosion for fine particles such as silts and clays are as great as those required for coarse sands and gravels. This is due to cohesive forces between the fine grains, and the smooth surface of the sediment bed which reduces turbulence. Thus it is very hard to erode fine clays, but once eroded they can be



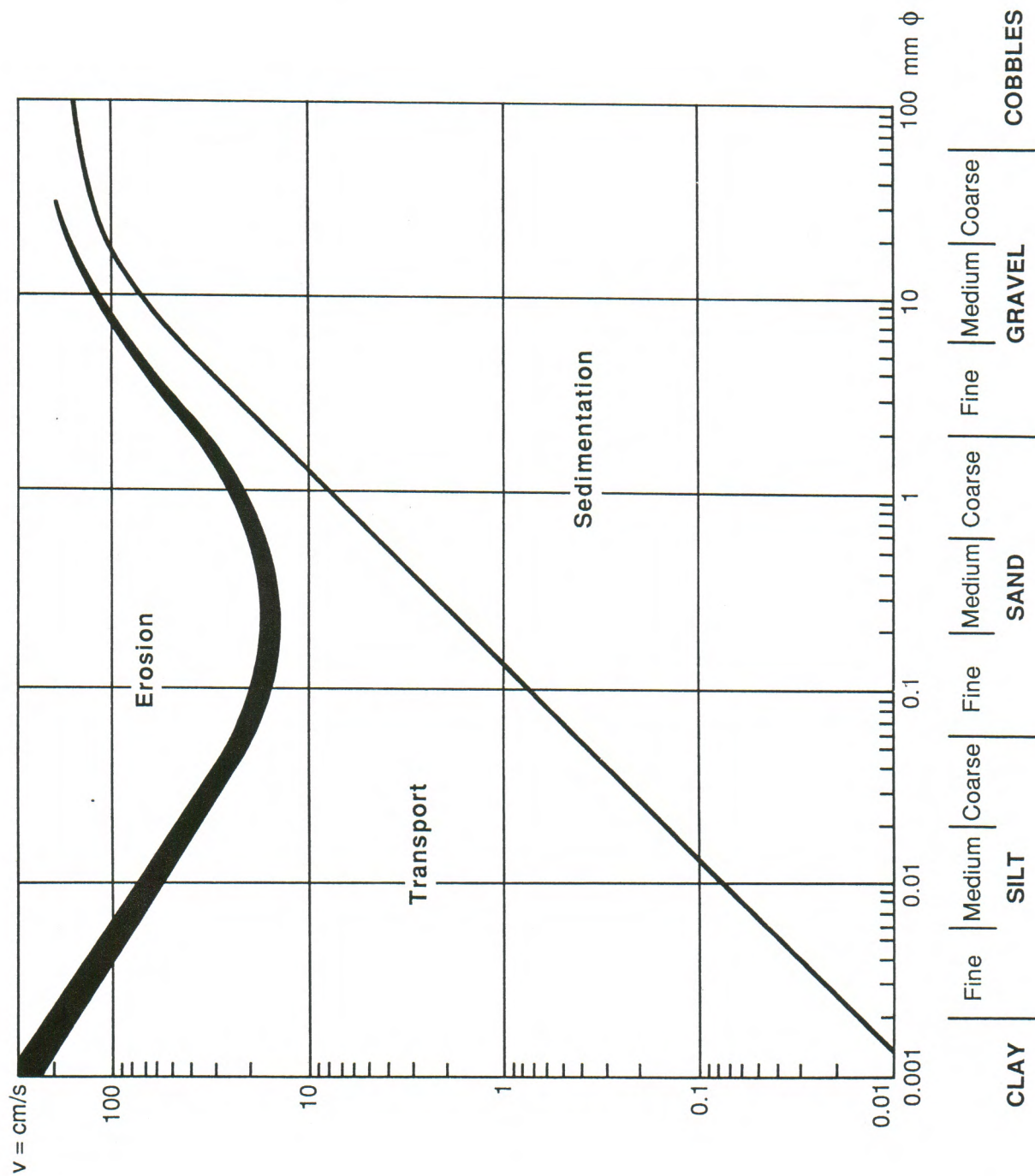


Figure 2: A modified Hjulstrom diagram showing velocities of erosion and transport for different mean grain sizes of sediments. From Gillieson (in press).



kept in transport very easily. In contrast sands are easily eroded and transported, and their velocities of sedimentation are not much less than their critical erosion velocities. Thus sands tend to move through a cave system in a series of hops from temporary storage to temporary storage, and may move right out of the cave altogether. To some extent this explains the markedly bimodal nature of cave sediments, in which gravels and muds predominate.

If we know the passage dimensions we can multiply the velocity estimate by the cross-sectional area to get discharge in  $\text{m}^3\text{s}^{-1}$ . This estimation is based on sediment transport theory developed for open channels on the surface, so results must be interpreted with caution. Clayey gravels display bimodal texture distributions, and act like "plum puddings" in that the surface roughness caused by protruding gravel particles enhances the erosion of the fine clays by locally increasing flow velocity. Thus there are important factors in sediment erosion and transport which are not accounted for by sediment transport theory.

The best way to analyse sediments is to cut a vertical face on a sediment bank and examine the layering carefully. But remember that you can only do this once and you have to get it right first time. Cave sediments are a fragile resource

not to be squandered. The thickness and inclination of sediment layers in a bank will tell much about the duration and energy of flow in a cave passage, while the disruption of those layers by slumping or by erosion will provide information on fluctuations in flow which may correspond to seasonal or longer-term perturbations in the karst system. The most difficult thing to determine is whether a thick bed of sediment is the result of one or many flow events in the cave. The only way to resolve this, apart from a very careful examination of the sediment structures, is by high resolution dating of a number of layers in the bed. This may be possible using the record of short-term or secular variation in the earth's magnetic field which is obtainable from lake and deep sea sediments; if you are very lucky the cave sequence can be matched to these master curves. If you have lots of money or access to a dating laboratory then radiocarbon or uranium series methods can be used.

In Eagles Nest Cave, Yarrangobilly, a deep fill of large basaltic boulders is capped by flowstone in Flatbed Cavern. This flowstone yielded an uranium series age of  $51,000 \pm 8000$  years. This provides a minimum age for the massive gravel fill which may relate to increased sediment transport under cooler, wetter conditions during a glacial period. The catchment of the cave no

**Table 2: Sequence of events from the Nettle Cave deposits, Jenolan (modified from Morris et al., in press).**

Years B.P. (before present)	Mammals in the deposit	Events at Nettle Cave	Vegetation	Climate
20,000 to 14,000	Small mammal fauna included <i>B. parvus</i> , <i>C. lepidus</i> , <i>M. fuscus</i> and <i>A. swainsonii</i>	Erosion of topsoil above cave; low amounts of silt and clay in deposit	Dominated by grasses and sedges; small pockets of woodland at lower altitudes	Conditions very cold and dry; maximum aridity around 16,000 BP.
14,000 to 9000	<i>B. parvus</i> and <i>C. lepidus</i> locally extinct; <i>M. fuscus</i> and <i>A. swainsonii</i> reduced. <i>R. fuscipes</i> and arboreal species increase.	Water ponding in caves, increased amounts of silt and clay. Probable hiatus in deposition	Open forest and woodland well established by 9000 B.P.	Water and warmer conditions from 14,000 to 11,000 B.P. Slightly drier towards the end of this period.
9000 to present	Small mammal fauna similar to today. Arboreal species increase in abundance, native mice decrease in modern times	Increased silt and clay corresponding to wetter period.	Wet and dry sclerophyll forest, similar to present	Wetter, warmer conditions from 7500 to 5000 B.P. Drier since that time, but still wetter than last glacial.



longer has any basalt so the surface must have been quite different. Ian Houshold has been working on the long-term geomorphic history of Yarrangobilly (Houshold et al., 1987) using cave sediments and palaeomagnetism, and has identified a magnetically reversed sediment (circa 750,000 years old) in Jillabenan Cave. His study will allow estimation of the rates of downcutting of the Yarrangobilly gorge, and the likely ages of the caves in the sequence.

### Cave Sediments and Surface Processes

Cave sediments have the potential to provide us with a good record of the environmental history of their catchments. At Jenolan the air-fall sediments in Nettle Cave have been excavated to reveal a rich bone deposit from the roost of sooty owls which, then as now, use the cave. Charcoal in the sediments has been dated to give an environmental record for the last 20,000 years (Morris et al., in press). Prior to 14,000 years ago the fauna forming the owls' dinner were species inhabiting open sedge and tussock grassland, such as is found today near Kanangra Walls. The Mountain Pigmy Possum *Burramys parvus* and the Broad Toothed Rat *Mastacomys fuscus* were present in what must have been cold, open grasslands. These species are now extinct in the Jenolan area. These species and other cold climate fauna declined from 14,000 to 9000 years ago. About 9000 years ago the forest had re-established as the climate warmed, and a wide range of forest dwelling marsupials and rodents were prey for the owls (Table 2). From the faunal evidence, the Jenolan area has been fairly stable for the last nine thousand years.

The estimation of extreme flood discharges is of practical importance for the design of dams and for flood mitigation. A relatively new method uses palaeoflood techniques to estimate the probable maximum flood. In outline, palaeoflood techniques are based upon the occurrence of slackwater deposits (SWD) in bedrock gorges. These are deposited at sites sheltered from high velocity flows, and ideally form sedimentary sequences in which individual flood events can be discerned. Cave sediments in limestone gorges can provide a unique source of data for these reconstructions.

Once such deposits are located they are described in section and the site surveyed to establish height above the river channel. Suitable material is collected for dating by various absolute techniques, principally radiocarbon and thermoluminescence. The next step is to model the discharges corresponding to the slackwater deposits. The requirements for such flood reconstructions are detailed surveyed cross-sections and field estimates of roughness, as

Manning's  $n$  values. The calibration of such models in palaeoflood hydrology is aided if detailed information is available for a recent flood debris line.

In the Kimberley region of Australia Windjana Gorge has been cut through the Napier Range by the Lennard River, which drains approximately 1200km<sup>2</sup> of remote sandstone terrain in the King Leopold Range to the north of the gorge. Numerous caves and narrow side gorges preserve flood deposits. Five distinct slackwater deposits were identified in Windjana Gorge (Gillieson et al., 1991). The flow simulation of Windjana Gorge indicates that the lowest two slackwater accumulations are recent and fall within the range of the mean annual flood. In the last 500 years only six slackwater accumulations have survived at these two lowest sites. These are associated with minimum discharge estimates of 100-200m<sup>3</sup>s<sup>-1</sup>. A flood deposit 2000 years old is associated with a discharge estimate of 1000m<sup>3</sup>s<sup>-1</sup>; this discharge has been exceeded several times in the last decade. The oldest slackwater deposit is dated at 2800 years and has an associated discharge estimate of 2600m<sup>3</sup>s<sup>-1</sup>; this is larger than the maximum recorded flood of 1986. Thus the stratigraphic record suggests that only one flood in the last two thousand years has equalled the 1986 flood, and that only one flood has exceeded it in the last three thousand years.

Fire histories can also be obtained from cave sediments. Back at Yarrangobilly in Eagles Nest Cave thick bands of charcoal in sandy clays have been dated using radiocarbon. Between 28,000 and 22,000 years ago over one hundred fine bands of charcoal from bushfires were deposited. Allowing for statistical uncertainties, this suggests that at the start of the last Ice Age the bush was burning every 35 to 85 years. A large stalagmite from Jillabenan Cave also has smoke and charcoal layers; it is being analysed by Andy Spate to determine fire frequencies over a much longer timescale.

Ernst Holland from the Jenolan Caves Reserve Trust and I have started a project looking at long-term fire histories from cave deposits at Jenolan, Wombeyan, Borenore and Abercrombie. We have been looking for thick cave sediments with charcoal bands in many caves, but if you know of good sites please let us know about them. We would also welcome help from cavers interested in learning about cave sediments. We can be contacted at the above address, or by fax on 06-2688313, or by email at d-gillieson@adfa.oz.au. So next time you're in a cave, have a closer look at the sediments. You may learn a great deal!



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# DEFINITIONS AND COLLOQUIAL TERMINOLOGY

Garry K. Smith

Many words have been introduced into the English language over the last hundred years. Some because there is a need to describe a new item or process which has been discovered. Some examples are Karabiner, Piton and Wetsuit. On other occasions a new word or group of words may be used to describe an action or new sport. Examples which spring to mind are Chimneying, Cave Diving, Prusiking and Abseiling. There are the words which are spelt differently, depending which school you went to. A classic example would be Karabiner or Carabiner. The need to formalise the spelling and exact definition was recognized many years ago when the ASF first published in 1968 the Speleo Handbook, edited by P. Matthews.

The 1985 Australian Karst Index added to this on-going process with an excellent glossary of terms listed in section 14. The authors must be commended on such a comprehensive list of definitions for words in use up to that period.

Currently there are a number of slang and colloquial caving terms which have been used widely for many years. The exact definition of these words remain open for interpretation, as there appears to be no recent listing of their correct meaning. Hopefully this following list will be thought provoking and set the wheels in motion toward having some additional words officially recognized in the Speleological fraternity.

**ARMCHAIR CAVER** An experienced caver who is now incapable of caving or a person still able to, but has lost the urge to actually go caving. On the other hand they may spend much of their time writing or reading caving books and hours may be spent reminiscing over photographs from past trips.

**BOOBTUBE** A clear flexible tube about one metre long. Used like a straw to drink water from small crevices or inaccessible pools. The original name was the Super Siphon Sucker, first utilised widely around 1973-74 by Jeffrey Smith a Venturer Scout in the Kotara Unit (N.S.W.). Jeffrey used it extensively on bushwalking, caving and cross-country skiing trips and the use of such a tube spread widely among outdoor enthusiasts from there. Several name changes occurred over the next few years, however during the last 10 to 15 years the name Boob Tube has been most widely used.

**BOULDER CHOKE** A collapse of rock from floor to roof which makes further progress difficult or dangerous.

**FOUL AIR** Cave atmosphere containing a high concentration of carbon dioxide (CO<sub>2</sub>) which affects a cavers respiration and metabolism. This term usually refers to air which contains 1% CO<sub>2</sub> (by volume) or greater. Simple test:- A lighted match will go out if foul air is present.

**GROT-HOLE** A small insignificant cave with no possible leads, often tight and difficult to manoeuvre oneself in.

**GROUND-TROG** The systematic search of the surface ground for cave entrances.

**JUG-HANDLE** A small loop of rock shaped like a handle, used as an anchor point or hand hold to aid climbing.

**KRAB** Short for Karabiner. A steel or aluminium alloy snap-link used in rope work.

**MICROBOD** A term used to describe a child or an adult caver of small build - able to fit through narrow passages and seemingly able to dislocate their joints to negotiate tight corners.

**OVERHANG** A ledge or shelf of rock which projects past the rest of the rock face below. Also referred to as part of an abseil (either above or below ground), where the abseiler is hanging free of the rock face. This occurs once an abseiler has passed a projection of rock which makes it impossible for the abseiler's feet to touch the rock face without swinging on the rope.

**ROOF-SNIFFING** The act of edging oneself along a small water-filled passage, on your back with only sufficient airspace for eyes and nose. It should be pointed out that this practice can be very dangerous for inexperienced persons.

**SCROGGIN** An edible random mixture of nuts, dried fruit, rice crisps, unwrapped lollies, chocolate and edible seeds. The mixture is consumed by cavers, bushwalkers and other outdoor enthusiasts as a source of high energy food. It is made up to suit an individuals taste and requirements.

**TOURI** A group of tourists at a commercially developed caving area. In other words those people who go on guided or self guided tours where fixed lighting is provided to view the caves. "Stay out of sight of the tourists (touri)", is often one of the conditions attached to a caving permit, where the permit cave is in the close vicinity of a commercial tour cave.

**TROG-UP** Attiring oneself in suitable clothing and necessary equipment in readiness to go underground.



# THE EVENTS LEADING UP TO THE DISCOVERY OF LABYRINTH CAVE, W.A. (AU - 16)

Lloyd N. Robinson

After the heady days of cave exploration in the Augusta-Margaret River region of Western Australia during the first half of 1958 the author returned to New South Wales to await the outcome of deliberations as to whether a section of the 'new cave' (much later named 'Augusta Jewel Cave') would be developed for tourist purposes.

From a governmental point of view, events moved faster than is usual - no doubt, the issue of developing the 'new cave' was kept to the fore by the Perth newspapers.

From a practical point of view there were difficulties in arriving at a cost for the project. The means of gaining access to the cave, either by way of a tunnel or by enlargement of the original entrance to accommodate a spiral staircase were difficult to cost.

The explorers of the 'new cave' were given the opportunity of undertaking the project should it proceed; Spackman and Robinson expressed an interest, Bastian elected to complete his studies.

We all suspected that in the strip of Karri forest running towards Deepdene there were more caves to be found, most with no open access to the surface.

At the time, we were impressed with the ease that Spackman and Robinson had opened a second means of access to the 'new cave': it took one day to survey and open, and another five days to prepare this second entrance as a means of a reasonably easy access for officials to view the 'new cave'.

It was obvious this would have been a natural opening to the 'new cave' in past years, even though, at the time, there were no indications on the surface that a void existed approximately one metre down through a matted mass of roots, soil and stones.

A bushfire had completely burnt out the thick undergrowth from Easter cave to well beyond Skull Cave. As it burnt its way towards Deepdene, it became less intense, burning odd patches before finally petering out.

Many hours were spent going over the burnt area in the hope that we could repeat in reverse what had been achieved at the 'new cave', using such methods as thumping the ground with the end of a pole, and using a steel spear as a probe. This soon proved frustrating and tiresome with a large area involved. We reasoned it would be better to have some idea of where any near surface caverns were before undertaking such an exercise. It is these thoughts the author pondered while back in the East.

As explosives would have to be used to gain tourist access to the 'new cave', it was reasoned that we should take advantage of the shock waves resulting from the explosive charges, and attempt to turn their use towards cave detection.

Our sole interest was in locating near surface caverns, where entry points are more likely to be found.

Three factors were in our favour, namely:  
a) the search area was reasonably flat;  
b) we had known near surface caverns in the search area that could be used in trials;  
c) a lot of blasting would be required.

Unlike today, the disposal stores of 1958 were filled with a variety of equipment from World War 2 that was gradually being released by the armed forces.

Of interest was a battery powered amplifier and detector; These and army-type headphone sets were at give-away prices. These items



Digging out the soil from the solution pipe entrance to the Labyrinth Cave. Photo: Lloyd Robinson.





Helictites in the White Chamber in Labyrinth Cave. Photo: Lloyd Robinson

were purchased and modified for our intended use.

On the 24th of December, 1958, Robinson and Spackman set about driving a tunnel into the 'new cave' from the surface. Due to concerns of meeting time constraints, and the fact that it required the two of us on hand to ward off would-be sightseers during blasting, we did not carry out any trials with the cave detection equipment, until the tunnel was well on its way.

For the firing of the initial tunnel shots we, each in turn, went into the 'new cave's' main cavern to observe if the blasting was having an adverse effect on the long straw stalactites. The cavern certainly reverberated following each blast; this is what we hoped to pick up on our detection equipment.

Towards the end of the summer tourist season the tunnel had reached a stage where it only required one person to be on hand during blasting operations. We now had to allow time for the fumes to clear, so the rounds of shots were fired before lunch break and at days end.

For the first trial the detection equipment was set up on the surface above the main cavern of the 'new cave'. The detector which had been fixed in the globe position of a metal photographic reflector, was buried face downwards in the soil.

The first trial was ear shattering; the operators hearing being in no condition to hear any reverberations for some time afterwards. For use so close to the blasting area, the equipment was dampened for further trials which were never highly successful. Better results were had above Moondyne Cave, where we were able to detect its large cavern without much trouble. However, we still attained signs of a cavern when testing the Moondyne cavern. This could have been

caused by the type of ground cover reverberations from an unknown cavern.

Over the following month we carried out further testing at random times, working towards DeepDene. The Labyrinth Cave area was of interest, as the districts long-standing senior residents made no mention of any caves or dolines in this area. This area was the limit of our testing, as the signals were faint.

Tests in the vicinity of the then unknown entrance to the Labyrinth Cave showed, promise, although we could not determine which test

site was over a near surface cavern - a case of too many faint reverberations.

We saw fit to mark this area for a future attempt to find a surface weakness that could lead into a cave system.

No further developments were ever given to this project. For the rest of the year the 'new cave' (finally named 'Augusta Jewel Cave') contract had to be completed for the first tourist party on the 26th December, 1959, and we had a very wet winter to face.

When Harley Webster arrived over the summer holiday period he was able to be directed to the above marked area. He persisted, searching through a section of four metre high, thick undergrowth which had failed to burn, and found an unknown doline that led to the cave that bears his name (AU-6). The rest has been well documented.

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Editors Note: This paper was first presented at the ASF "Vulcon" conference held at Hamilton (Victoria) in January 1995. We will re-publish "The Discovery of Harleys Cave and Labyrinth Cave" in the next Australian Caver.



# MINI BUSES

## A TRANSPORT SOLUTION FOR CLUB TRIPS

Garry K. Smith

How many times has your Caving Club decided to go to a distant Karst area and the problem of transport has been thrust in the lap of the same few people? Well, there is a solution that is economically viable on trips which are around 400km and more return.

A 15 seater mini bus is a relatively cheap alternative to wearing out the same few individuals vehicles? Before hiring a mini bus there are a few factors you should consider.

### 1. HOW MANY PEOPLE ARE THERE ?

The ideal number for a 15 seater minibus is between 10-12 people. Twelve people including the driver, is the maximum number I would recommend for a trip where camping and caving gear is taken. This is assuming that only the essential equipment is taken by individuals. Otherwise a trailer or roof-rack may be required. If you can't quite fill the bus why not ask around other clubs to make up the numbers and keep the cost per person to a minimum?

### 2. GET THE BEST DEAL

Phone around to ascertain the current hire rates! Rating systems vary greatly from a standard charge per day, plus petrol, to a hire fee plus charge per kilometre travelled. It

may even be cheaper in the long run to hire at a high rate with unlimited distance. Which ever the rating system, you will have to work out the cheapest over the length of trip anticipated. Take into consideration that the 15 seater buses usually average around 7 km per litre and calculate costs for the most expensive petrol.

Some of these problems do not arise if your club owns or has access to a privately owned bus. However if your club owns a bus, don't forget to take into consideration that mechanical repairs, maintenance, registration and insurance can become very expensive from year to year. As well, some dedicated person would have to ensure that the above mentioned items are looked after.

### 3. FINANCES

When the cost-per-person is known, add a couple of dollars per person to allow for unforeseen expenses. If necessary a refund can be paid at the conclusion of the trip.

\*If you are confident of filling the seats, place a deposit with the vehicle hire company to ensure the booking for the nominated date.



Newcastle cavers return to their snow covered mini van (mid Winter) after a long day underground at Tuglow Caves.



\*Collect the money from each person at least 2 weeks prior to the trip. This ensures that the bus will be filled. If a person has to withdraw, then it allows time to fill the vacancy.

#### 4. VEHICLE LICENCE AND REGULATIONS

In N.S.W. the Road and Traffic Authority regulations require a driver to have a class 1A licence to drive a passenger vehicle to seat up to 12 adults (or children) including the driver. i.e.. this includes a 15 seater Toyota Hiace with a total of 12 people. Drivers with a 1B licence may drive a passenger vehicle to seat up to 30 persons, including the driver. Note here that a hired 30 seater mini bus is not classed as a coach, because it is registered as a vehicle for hire. Current N.S.W. regulations allow voluntary drivers belonging to non profit organisations to not require Log Books, provided the vehicle (9 to 30 seater) is not used to convey passengers for hire or reward or in the course of trade or business. It should be noted that the positions (seats) on the bus should not be sold or the driver will need a Log Book. However a donation can be requested to cover the cost of fuel and bus hire fees.

#### 5. VEHICLE INSURANCE COVERAGE.

Specifically inquire about the vehicle insurance before hiring. In some cases Bus rental firms will not insure any vehicle damage with drivers under the age of 21. Other firms have a higher rate for young drivers. In most instances, each driver must present their licence to the hire company before departure to be covered by insurance.

#### 6. CHECK LIST WHEN COLLECTING MINIBUS

Beside checking the usual things like lights, radiator water

and oil level, make sure there is a full tool kit in the bus. If you are going to a snow area, make sure that ant-freeze is in the radiator. Carry snow chains if applicable.

#### 7. UPON RETURN

Make sure that the fuel tank is full and the bus is clean. This job is made easy if you do a bit of preplanning, by ensuring there is a waterhose, soft broom, dustpan and brush ready upon your return. Many hands make light work. Remember, do the right thing and you may get a discount in the future. You will also be upholding the Australian Speleological Federation's good name.

#### 8. BUS VERSUS CAR CONVOY.

Consider the bus concept just outlined compared to a car convoy carrying a similar number of people.

8.1 When everyone is together it is possible for a sing along, quiz or jokes. Keep in mind that radios and cassette tapes kill conversation and personal expression.

8.2 On the other hand a group using 2 or more cars has trouble keeping track of each car and more chance of breakdowns, lost time and less chance of closer group companionship. However some of these problems may be overcome if each vehicle is fitted with a CB.

8.3 Using a car convoy may be a few dollars cheaper for each person with fuel expenses. But what about the wear and tear on each drivers car. Are they compensated in the long run?

8.4 Another bus plus is that most bus hire firms are covered for breakdowns by the NRMA or subsidiary hire firms. A final but important thought - driving at a constant 80 km/h is quicker than a fast disaster.



A group of cavers near the Main Entrance to Dip Cave (Wee Jasper), prior to dispersing into several underground parties.



# CURSE OF THE PHARAOHS

Dr Tony Wheeler

In November 1922, Howard Carters's workmen were examining the last of the possible sites of Tutankhamen's tomb. Howard Carter was a leading archaeologist, coming to the end of seven frustrating years avidly searching without success the Valley of the Kings for Tutankhamen's tomb.

The excavation was in the north-east corner of the tomb of Rameses VI among a collection of rude labourers' huts, probably originally built for their labouring ancestors who had built Rameses VI's tomb itself.

The first hut was cleared away and the surface removed to a depth of three feet when a steep cut in the rock below was discovered; further exploration to 13 feet below the tomb of Rameses VI revealed an entrance in the rock to a large descending passage 10 feet high and six feet wide. The passage was cleared deeper and deeper until at the 12th step the top of a stone doorway, plastered and sealed, was revealed.

This discovery had all the promise of the entrance to the undisturbed tomb of a Pharaoh, so Carter promptly called his financier, Lord Carnarvon. Shortly Lord Carnarvon, with his daughter, was in Cairo and two days later in nearby Luxor.

By the evening of the following day, November 24, the stairway, 16 steps in all, was cleared to reveal the stone door with the seal of Tutankhamen set in plaster. Removal of this door exposed a further descending passage full of rubble. Two days of hard work cleared the route to a second door, identical to the first, except with the seals of both Tutankhamen and of the Royal Necropolis (cemetery). A hole was tentatively made through this stone door, a candle inserted, and Carter anxiously strained to see by its flickering light. That moment must have seemed endless to the others; Lord Carnarvon interrupted: "Can you see anything?". Carter replied, "Yes, wonderful things."

And so the treasures of the tomb of the Pharaoh Tutankhamen were discovered, later to travel the world from exhibition to exhibition with pictures filling the colour magazines.

The treasure was cleared from the anteroom, and later from an inner room. It was this inner room that was the Pharaoh's burial chamber, and was opened by Lord Carnarvon on Friday, February 17, 1923. The Pharaoh's mummified remains were found within no less than three coffins, one inside the other; the outer two were of hammered gold on wooden frames and the innermost was of solid gold, and all of great beauty.

Archaeology was big news in the early years of this century as marvels from man's past were revealed through the medium of the newspapers to the curious. A prime site was the Valley of the kings in Egypt, but a continuing disappointment to explorers was the fact that virtually every tomb excavated had been previously plundered by robbers.

Tutankhamen's reign

Tutankhamen had reigned briefly (1361-1352 BC) and inconspicuously over Egypt as the third of the four 18th dynasty 'Amarna Kings' until his death at 18 years of age. His original tomb was appropriated by his successor, and Tutankhamen was buried with all the majesty due a Pharaoh, though presumably in a lesser structure. Although Tutankhamen's tomb was entered twice by robbers, because of their prompt capture only minor damage was done. Later in the 19th dynasty, the Amarna Kings were publicly condemned and stricken from the royal lists; Tutankhamen's monuments were usurped and the location of his tomb forgotten.

In the 20th dynasty, the tomb for Rameses VI was cut unknowingly immediately above that of Tutankhamen, the stone rubble further covering the forgotten tomb. In this way, Tutankhamen's resting place was well hidden and protected from the later great series of tomb robberies and twentieth century archaeologists.

Tutankhamen's fame was eventually assured not for anything he had done in his life; rather his current popular fame is the result of his insignificance, because the richness of his treasure is due solely to Tutankhamen's tomb having been contemptuously ignored, buried and forgotten and thereby hidden from robbers. Tutankhamen's fame is due to his being the most intact, complete and undisturbed tomb yet discovered.

The Curse

The contrast between the magnificence of Tutankhamen's treasures and their desecration by foreigners (the archaeologists) may have been the original motivation for the invention of the story of the "Curse of the Pharaohs" - that all those involved in the abomination would be doomed.

Whatever the motive, sensationalist journalists falsely reported that the delay in opening the second door into the tomb (while Carter awaited Lord Carnarvon's arrival so that he could witness the triumph) was due to hesitation. It was further suggested that this hesitation was inspired by an inscription on the door of the tomb: "Death shall come on swift wings to him that touches the tomb of the Pharaoh"

This inscription was purely fictitious, the invention of a journalist - no such inscription, or 'Curse', ever existed.

Nevertheless, the lie was widely reported. And sure enough, Lord Carnarvon subsequently developed a marked lassitude, headaches, breathlessness and enlarged glands. He was removed to Cairo but the illness progresses insidiously to bilateral pneumonia. By April 6 1923 (six weeks after the inner tomb had been opened), Lord Carnarvon was dead, from 'natural' causes. This apparent coincidence, or consequence, ensured world-wide and lasting fame for the Curse.



Others in the original party also later died, fuelling the story, reinforcing widespread belief in the Curse. Arthur C. Mace, assistant keeper at the Department of Egyptian Antiquities of the Metropolitan Museum of Art, New York, died, and so did George Benedite, head of the Department of Egyptian Antiquities of the Louvre, Paris.

As a result the Curse was more firmly established in the popular consciousness, and was commonly suggested as the cause of death of more and more people, even if only remotely connected with the expedition. For example, the Curse was blamed for the deaths of not only Carter's past secretary, Robert Bethnell, but incredibly also of Bethnell's father, the 78-year old Lord Westbury.

The fact is that, regardless of any supposed Curse, several of those intimately connected with the desecration of the Pharaoh's remains remained fit and well, and even prosperous, including the greatest 'culprit' of all, Howard Carter, the expedition photographer, and the physician who conducted the autopsy on Tutankhamen's bodily remains. (Carter eventually died in 1939 aged 66 years, and the physician in 1950 aged 75 years.) Though the continued survival of these key participants obviously contradicted the Curse, this was not 'news' and therefore went unreported. By 1935, twenty-one deaths had been attributed to the Curse.

And so was born the Curse of the Pharaohs, perpetuated as a myth in its own right in Journalism as well as an incidental piece of background to much contemporary fiction set in Egypt. And it is still popularly believed that the deaths of so many in that archaeological party so soon after the desecration of Tutankhamen's last resting place are still unexplained, and just possibly the Curse of the Pharaohs was responsible. Whatever the reality, anything untoward to do with the exhibition of Tutankhamen's treasures is still routinely blamed on the Curse, from the loss of a key to one of the exhibits, to a police officer who had once guarded a Tutankhamen exhibition subsequently suffering a stroke.

### Diagnosis

The cause of the deaths among the archaeological party may well be the same as the recently identified cause of the 'bad luck' that plagued the members of the Transvaal Speleological Society, most of whom became seriously ill soon after joining, and indeed some so much so that they died.

All had succumbed to a pneumonia-like disease, some slowly deteriorating inexorably to death. But the truth was an infection with the fungus *Histoplasma capsulatum*, which causes fever, lassitude, cold in the head, headache, backache, nausea, breathlessness, coughing, a burning sensation in the throat and chest, and chest pain when breathing deeply.

The careful exposure of monkeys, rabbits, guinea pigs, rats and mice to the cave environment confirmed the suspicion that the fungus was contracted by inhaling cave air polluted with dust from dried bat droppings on which the fungus grew. The medical history of this

Society's members also confirmed that a mild disease, presumably the result of a slight infection by only a small dose of the fungal spores, with recovery was never followed by a second illness; presumably recovery was associated with immunity to further infection.

This characteristic was already well known and put to good use by Rhodesian *nanga* (witch doctors) further north. The *nanga* had maintained the prestige of their powerful group in the tribes by claiming that the local caves were *m'tagati*, or bewitched, and that only true *nanga* could enter without death. Consequently, those men who aspired to the coveted ranks of the *nanga*, and the great wealth and social power that went with membership, made their application only after much deliberation and if fully convinced that they possessed the special qualities that made the *nanga*. Suitable applicants were taken to the caves for an initiation, with all the appropriate ceremony and mystique, following which a good many did indeed die; the explanation being that these men had been rejected by the gods for not having the necessary *nanga* qualities. Even those who survived to full membership of the *nanga* often did so only after a serious illness.

The secret of the Rhodesian caves was not in any witchcraft but in the droppings left by the bat occupants; the illness was a fungal infection of the same *Histoplasma capsulatum*. Men receiving a larger dose of the fungal spores, or having a weaker constitution, died while those who survived did so with immunity to further infection, wealth and power.

This illness, often called 'cave sickness' (when recognised as distinct from other respiratory infections and before its cause was identified) was not attributed to *Histoplasma capsulatum*, until the late 1940s/early 1950s. The investigation of a number of local epidemics among groups of cave explorers and workers in hen coops and pigeon lofts revealed that it is the fungal spores carried with the dust from dry guano that carries the infection.

Lord Carnarvon's problems had started after Tutankhamen's tomb had been discovered; to prevent vandalism and pilferage, an iron door made of bars had been installed across the entrance to the passageway, unwittingly allowing bats to pass through to spend their nights upside-down in the empty passageway and tomb. This problem became so bad that before work could start on some days, the roosting bats had to be cleared from the excavations. (Six months later a permanent solid, and incidentally bat-proof, door was installed.)

Lord Carnarvon's symptoms and illness certainly fitted that of a *Histoplasma Capsulatum* infection, and indeed a number of deaths due to pneumonia-like illness had occurred before and since among other archaeological groups excavating other sites in the Egyptian Valley of the Kings.

As for the Curse of the Pharaohs, that is as it has always been: a little coincidence, pure fiction deliberately created by sensationalist and irresponsible journalists, and gullible readers. There never has been any Curse of the Pharaohs.



Tony Wheeler is secretary of the Queensland committee of Australian Skeptics, and teaches science and biology at Sarina State High School.

Editors Note: 'The Curse of the Pharaohs' was first published in *The Skeptic* (Summer 87), journal of the Australian Skeptics Inc. and has been reprinted with the kind permission of the Author.

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# CAVING AND SEX

Bruce Stewart

Well the title got your attention as the written word sex often does but maybe the title should be caving and sexuality anyway what the hell, this is not an article that is pornographic or demeaning to either sex, rather it's about discussion about why people go caving and why they REALLY go caving.

Over the years I've been on a few caving trips and have met and caved with all sorts of people and recently caving with some friends, one in particular really jogged my brain into gear to take a closer look at why people go caving or get involved in speleology at one level or another and what they get out of it.

I believe there is a crossing point between sex, sexuality and people going caving or becoming bedridden caving politicians, this is not something that you would normally hear spoken about at caving meetings or on trips sitting around the fire at night but maybe it's some food for thought.

Read no further if you are offended by this topic.

You've decided to read on so please don't take any of this toooo seriously but maybe you can relate some of this to someone you know or your own experience and as dangerous as it maybe I'm going to categorise some different types of cavers and caving politicians that I've met over the years and make some generalisations.

**THE SPORT CAVER:** Often an athletic type and usually widely travelled and an active member of the local caving group and probably is or was a committee member and sometimes a "trip leader" of weekend bonding sessions to the local caving area.

Sometimes a loner and very muscular usually wears T shirts too tight with one's pecks sticking out (in the case of a male) saying to everyone else I bet you're wondering how big my @\$% is.

Equipment is often prevalent in the serious sport cavers list of penis extensions and lots of rope for slinging sessions and sometimes the latest in technology if they're not the poor type and they love to pull it out of the bag when everyone else is around in the hope of attaining higher order in the social/ sexual strata of the trip.

The height of sexual presence is telling everyone else and usually with the opposite sex present about some epic trip down a vertical cave in full harness with water coming from all directions and how they fought on to the bitter end only to have to turn around and pull all the bondage equipment out and how buggered they were at the end from their self flogging ordeal which is really about self inflicted pain and suffering and my guess is a subliminal form of bondage and in some extreme cases outright sado-masochistic behaviour.

The sport cavers car can sometimes be used as a gauging tool to judge how much of a statement he or she wants to make and the one's that ride motor bike's

are classic love you and leave you types and if you're lucky enough to get a ride it's often a statement of I'll take you for a ride and show you mine if you show me yours.

Big cars, small cars, fast cars, slow cars, fat ones and skinny ones and ones where all the wheels turn I think make a statement about the sport caver and his socio sexual standing in the caving group next time your away on a caving trip take a look around at what people drive and what they wear you might get a surprise and a laugh.

The last of sport cavers are the mega ego types who have been there and done that and no one else will ever be up to there standing in the sexual strata of the caving world and they just love to give slide shows at caving meetings and flex their muscles up on the podium in front of everyone and tell everyone how good they are and how tough it was but my guess is that these types have the smallest penises (if male) and are really showing their inadequacy just by flogging them selves that bit harder.

**THE POLITICAL EXCAVER:** We all know them, they just love to have their presence felt anywhere they go and will do almost anything to be the centre of attention but often never go caving because they are either too fat, too unfit, or just plain scared to go underground.

They believe they have done it all and now spend their time making it more difficult for others to go caving by bogging every little thing down in the ifragloom of bureaucracy and coming up with new standards of how to wear a suspender belt or how many may participate in a bonding session at once and the politician usually stands back and takes photos for his or her private collection.

The smallest of issues can become problems of enormous magnitude for the politician and drawn out to incredible lengths to justify their existence and this says a lot about their sexuality probably because deep down they simply feel sexually inadequate or deprived when some young firmed cheeked able bodied caver comes along with new and fined tuned equipment and does in ten minutes what it took the generally old guard six to nine months.

**THE ARMCHAIR CAVER:** These cavers have just simply gone a bit soft in all departments in old age but this is not to say that they were not once horn bag cavers in their day, generally like a good bottle of red and a smoke occasionally even go underground sometimes, but my observation is that these people are observers of life and generally don't have many sexual hang-up's bar the lack off participation.

They are smart enough to know when enough is enough and have given up the bonding sessions to take up the comfort of an armchair and a glass of red or even a beer and a smoke to sit back and watch the



incontinence of political life stain the future of caving.

Sexually these people are probably satisfied with the underground and internal experience of the life of caving and in some rare cases they are sometimes known to have a last ditch "go for it" "do or die attempt at hard caving which is probably the ultimate orgasm for the armchair caver.

But sadly this often results in the realisation that their equipment is old and can no longer stand up and perform to the rigours of modern day caving with many realising that the soft option should have been strictly adhered to and left to the younger horn bags of this world to redo what probably has already been done only to end up themselves being "armchair cavers".

**THE SOLO CAVER:** The solo caver is a rare breed and often difficult to observe as generally they are the wham bam thank you maam types who enjoy a quickie with no strings attached or they are generally of small diameter.

The simple analogy is that it's self masturbation in the privacy of whatever cave your in and the pleasure and pain experiences are rarely shared with others and so this form of caving is for either quiet types or self conscious totally self centred can't cope with the real world sexually frustrated type.

Solo caving possibly should be undertaken by all at some stage so as to allow one to be free of peer group socio sexual strata experienced caving with others and to allow one to be naked and free to experience the burn of lime on ones cheeks.

This is for the purist and should not be taken lightly as it might take off in popularity as caving with some can be an anal painful experience and you can wear what ever colour you like!

**THE STUDENT CAVER:** These are cavers who usually stay in caving for the term of whatever course they happen to be doing and are either pre or just post pubescent types who discover caving and probably turn out to be total sexual deviates after the experience.

Often acne'd and never stop talking about what they learnt the day before only to be forgotten the next and are usually in a hurry to conquer all in the shortest period of time and this says a lot about their sexuality as my guess is they all premature ejaculate.

There's not much going for the student caver so if you meet one good luck, oh and ear plugs are pretty cheap these days so if you ever meet one in a cave it's handy to carry them and pull them out so as to avoid an ear bashing.

Well AC got pretty boring so I thought I would rev it up a bit by writing something that touches on other aspects of caving, lets face it there are some pretty different and interesting people who play around with caves.

## FROM OZCAVERS ON THE INTERNET:

**Waitomo WWW Pages now available.**

Dear Ozcavers,

Waitomo, in the central North Island of New Zealand, is well known to cavers. Waitomo District Council announce the availability of their World Wide Web pages:

<http://www3.waikato.ac.nz/waitomo/>

These pages provide information about the caves and commercial caving activities in the area. There's a neat set of photos of the caves and caving. There is also all you need to know (we hope) on getting there, accommodation and restaurants, and other activities in the area. If there's anything missing you can ask the Visitors Information Centre for further information.

Regards, Martin Lennon (pp Waitomo District Council)  
MLENNON@chcsn1.ait.ac.nz>  
25 June 1995

## ARTICLES

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# SPELEO SYNOPSIS No 20

October 1994 - April 1995

Peter Ackroyd

## AUSTRALIA

### **Illuminations 3 (Oct 1994)**

This magazine, published by the Mole Creek Caving Club in Tasmania, contains an article on the history of the exploration of *Croesus Cave* and includes photos from the 1950s. There is also the news of the successful prosecution of a pair of gem-hunters caught removing irreplaceable quartz crystals from a cave near Mount Weld.

### **Southern Caver 58 (Jan 1995)**

In the southern part of Tasmania, Southern Caving Society has been busy with major extensions in two Junee-Florentine caves, JF-341 and *Rift Cave* [JF-34], eventually connecting them to form the 9 kilometre long *Three Forty-one System*. A trip from either entrance to the other necessitates going up several pitches, so crossover (exchange) trips will no doubt be in vogue. SCS has also been active in *Growling Swallet* [JF-36], *Niggly Pot* [JF-237] and other caves in the south of Tasmania.

## NEW ZEALAND

### **NZ Speleo Bulletin 168 (Dec 1993)**

This issue has a summary of caver accidents in New Zealand. There is also a short article on a cave in tuff on Gannet Island, west of Aotea Harbour.

### **NZ Speleo Bulletin 169 (Mar 1994)**

The 1987 & 1989 China exchange trips are described in this issue. The area of China examined by the New Zealand cavers was to the west of Guiyang, in Guizhou Province.

## EUROPE

### **Cave Science 20(3) (Dec 1993)**

This issue is mainly taken up with articles discussing the caves and karst of Xingwen in Sichuan Province, China. Other articles cover the history of two caves found in the 18th century at Plymouth, UK, by quarrying activities and the mineralogy of moonmilk in some Romanian and Norwegian caves.

### **Descent 120 (Oct/Nov 1994)**

Lava caves in the Canary Islands (Spain) and in Tenerife, and an expedition to the Cuetzalan region of Mexico are the lead articles in this issue. A good article on the dating of caves includes explanations of radio carbon, uranium/thorium, electron spin resonance (ESR) and paleomagnetic methods. There is the final part of Jim Eyre's amusing account of the pirates of Fountain Fell and, in the letters page, a "how to pronounce Welsh" guide — essential reading when faced with the dilemma of pronouncing words like Llangattwg.

### **Cave and Karst Science 21(1) (Aug 1994)**

With a new title, and new editors, this British publication (formerly *Cave Science*) appears set to become a less scientific, more topical journal. This issue contains abstracts from a geomorphology symposium held at the University of Oxford during September 1994. It contains several items on Australian karst.

### **Descent 121 (Dec 1994/Jan 1995)**

Just to show that there is no such thing as a "caved-out" region, a major new cave in the UK (which has probably the highest density of cavers per unit area in the world) has been found in South Wales. Named *Ogof Draenen*, it is already 15 kilometres long and is growing fast! It was found after some long term digging in very squalid, tight and dangerous conditions in a hole off the Clydach Gorge.

### **Caves & Caving 65 (Autumn 1994)**

There are several short articles in this issue, covering a plethora of subjects. We have cave diving in Mexican cenotes, caving in the lava tubes of the Canary Islands, a method of displaying three-dimensional cave maps using a public domain computer program called 'Rayshade', an expedition report covering some 300 metre deep quartzite shafts in Zimbabwe, a trip to the gypsum karst of Pinega in the far north of Russia and a report of the 1993 Oxford University Caving Club expedition to northern Spain.

### **International Caver 11 (1994)**

This issue introduces us to several less well known caving areas. The horizontal cave systems in the Bordeaux Region of France are comfortable and well decorated. The short caves to be found in northern Pakistan are associated with very hard, re-crystallised limestone and are largely used as refuges by hunters and road gangs. The largest underground lake in the world, found in *Drachenhauchloch*, a cave in Namibia, South Africa, has been re-surveyed and accurately measured at 2.5 hectares in area. Pumping from nearby wells by farmers has lowered the water-table, and hence the lake, by 7 metres since the first survey was carried out in 1987. An overview of the karst regions of Slovakia is followed by an article chronicling the accurate relocation and survey of caves in Tanzania, Africa, which had been first recorded in 1910 by a colonial policeman. A roundup of recent discoveries throughout the world and a review of a bobbin type descender, the 'Gemlock', completes the issue.

### **Descent 122 (Feb/Mar 1995)**

The main news in this issue is the astonishing rate of discoveries in the UK's newest major cave *Ogof Draenen* in South Wales. The current rate of exploration stands at 7 kilometres per month and the cave is now in excess of 20 kilometres long! In other articles, there is an amusing tale of underground filming, and a less amusing account of exploring deep quartzite caves in Zimbabwe, South Africa. In the



course of exploring one fissure, the 305 metre deep *Mawenge Mwena*, for the first time, one caver found he was prusiking on just the core of the rope — the quartzite had cut through the sheath entirely!

#### **Caves & Caving 66 (Winter 1994)**

This issue contains an expedition report of the trip to Matienzo in Northern Spain. The report includes reference to the death of an experienced caver who abseiled off the end of a rope to plummet down a 90 metre shaft. Reports on lightweight trips to Brazilian and Russian caves are also included in this issue. The latter trip was mainly to examine paleolithic art in a cave in the Urals.

#### **Proceedings University of Bristol Spelæological Society 20(1) 1994**

This prestigious club journal discusses the discovery and exploration of one of Ireland's biggest caves, *Poll na gCéim*, including maps, geology and hydrology. There is also an index to the biological supplements and records of the former Cave Research Group of Great Britain and an account of the discovery (and subsequent death of the first explorer) of *Plumley's Hole* in Burrington Combe, UK.

#### **Descent 123 (Apr/May 1995)**

This issue covers the deaths of three cavers visiting *Marble Arch Caves* in Ireland. Apparently they drowned when they were washed into a sump by a flood pulse. More reports are included on *Ogof Draenen* in South Wales. The cave is now well over 20 kilometres long and has leads not yet pushed to completion. Every effort is being made to preserve speleothems and sediments in the cave. A short report on a huge cave explored during the China Caves Project and a detailed review of 'Pelican' waterproof camera cases completes this issue.

### **USA**

#### **NSS News 52(7) (Jul 1994)**

A completely enclosed cave, opened up by mining operations, is the lead article in this issue. The cave, *Crystal Cave*, was found late last century in Joplin, Missouri, by miners sinking a shaft. They found a chamber with extraordinarily large calcite crystals (0.5 metre) covering every surface. The cave was shown to the public until the 1930s when a rising watertable made it uneconomic. In other news, the NSS has conducted a survey of its members and there are two short articles — personal caving lights and how to take underground panoramic photos.

#### **The Windy City Speleoneers 34(3) (Jun 1994)**

This Chicago based newsletter has reprinted a good descriptive article on how the human eye adapts to the dark and the mechanisms by which we see in differing light levels.

#### **Nylon Highway 38 (Sep 1994)**

This issue contains, *inter alia*, some information on specially made ascending and descending gear.

#### **NSS News 52(8) (Aug 1994)**

This issue contains an article on the reopening of a

very rich Pleistocene excavation in *San Josecito Cave* in Mexico. Originally excavated in the 1930s by Dr Chester Stock, the site has yielded many extinct or rare species of birds and mammals.

#### **NSS News 52(9) (Sep 1994)**

There are two major articles in this issue. The first describes a trip into a short, but exciting, river cave in Guatemala and the second relates the history of exploration of the 4.3 kilometre long *Fixin' to Die Cave* in Colorado, USA. In the Techniques and Safety section, Bill Storage describes the perils of leaving aluminium alloy karabiners in caves for extended periods. Some tests he performed show startling corrosion rates.

#### **NSS News 52(10) (Oct 1994)**

An article about an Australian cave is in this issue. *The Efflux* at Bungonia in NSW is Australia's highest impact cave dig, running for well over 40 years. A report on caving in Korea is the other main article. A major event is recorded in the letters page of this issue — the first instance of cave leader being sued by someone injured in a cave accident.

#### **Georgia Underground 31(2) (Dec 1994)**

*Georgia Underground* is the Dogwood City Grotto's newsletter from Atlanta, Georgia. This issue has many good articles, including a discussion on access problems brought about by thoughtless cavers, a history of *French's Saltpetre Cave* in Alabama, trip reports from the Xilitla Project, which explores caves in Mexico, including the 673 metre deep *Sótano de Alfredo* and finally, a thought provoking article on the problems of caver accreditation.

#### **NSS News 52(11) (Nov 1994)**

This issue contains the second part of the three part series covering the 1991/92 NSS expedition to the Guizhou Province of China.

#### **NSS News 52(12) (Dec 1994)**

Reports of a 1994 British expedition to Belize (Central America) and the confirmation of 200 year old human remains found in a cave in Nevada are the main items in this issue.

#### **NSS News 53(1) (Jan 1995)**

This issue contains a detailed, day-by-day account of significant discoveries made on a 1993 trip into *Lechuguilla Cave*, New Mexico.

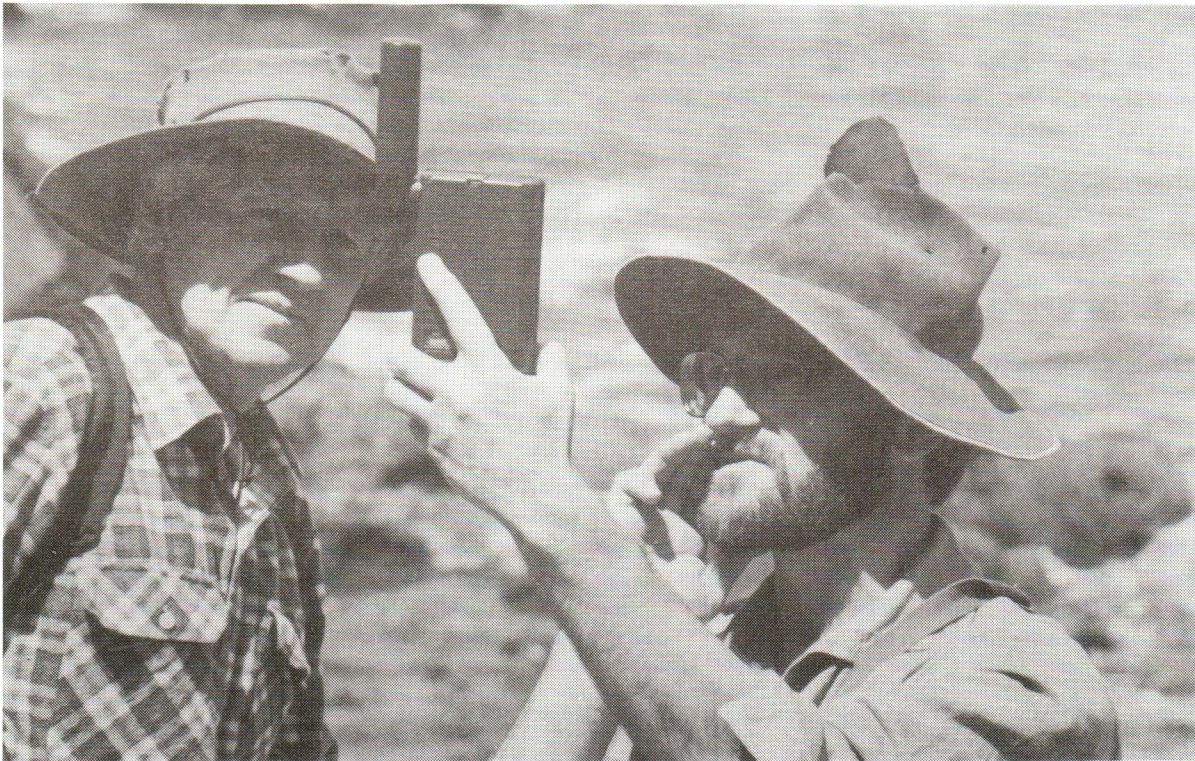
### **Bungonia State Recreation Area Plan Of Management**

A plan of management for the Bungonia State Recreation Area has been prepared and is on public exhibition from the 4th August 1995 until the 27th November, 1995. The closing date for public comment on this plan is 27 November 1995.

Copies of the plan may be obtained free of charge from the Nowra District Office (Ph: 044 239800), Southern Regional Office and the National Parks and Wildlife Service Information Centre, Hurstville.



# DOWN UNDER ALL OVER



Peter Matthews and Peter Ackroyd Photo: Elery Hamilton-Smith

## **1997 ASF Conference**

The SASC will be hosting the 1997 ASF Conference.

The Council at its Board meeting last night (19 June 1995) voted in favour of ALL clubs supporting and running the 21st ASF Conference.

The majority of Board members are favouring the location of the conference in the Flinders. Logistics are still to be worked out.

Since it would be inappropriate to hold the Conference in Summer in this area, the Council are considering holding the conference in Winter 97.

Is anyone able advise of the University holidays in their respective states for 1997. The Council will attempt to hold the conference during a time when the majority of these holidays overlap.

Alan Jevons  
President, South Australian Speeological Council  
20/6/95  
email: ACCAGJ@ms-smtpgate.santos.com.AU  
or: ozcavers@osi.curtin.edu.au

## **Sellicks Hill**

The ASF appeared before the Environment, Resources Development Committee of the SA Parliament, yesterday.

Appearing were:

Dr. Grant Gartrell (CEGSA and codiscoverer)  
Dr. Armstrong Osborne, Sydney Inst. (SUSS?)

Ms. Willow Forsyth, (SUSS)  
Snr. VP: Patrick Larkin

Grant presented a paper outlining the discovery of cave 5A20 and the negotiations that occurred between the quarry management and the cavers between Sept 91 and 10 Dec 93, the date of the implosion.

Armstrong presented details about the significance of the cave from scientific, heritage and tourism value perspectives.

Willow presented our first paper analysing the Government's compensation figures that they said outweighed the further investigation of this cave. Those figures were: \$40 million to close the mine \$8-14 million to quarantine the area around the cave.

Willow was able to show that given the known information we have from the transcript of the independent Review of Facts, the Grimes & Moore Reports and industry information, these figures are significantly unreasonable. They are closer to: \$8 million to close the mine and \$2 million to quarantine the area.

The paper also demonstrated that due to other known facts about the operations of the quarry, it would be in their best interests to properly investigate the economics of a potential show cave for perpetuity versus the short life of the quarry, 20 - 30 years. It appears that the gains to be made from this quarry are similar to that of the potential show cave over this period.

Patrick presented a quick case for the Legislative Reform issue. Unfortunately the committee started the



hearings late and we ended up the loser of time at the end. However Patrick is preparing a written submission to the ERD.

Thanks go to all the above and to Clare Buswell, Mark Sefton, Peter Horne and Ernst Holland for all the supporting efforts behind the scenes.

The Quarry, the independent mining geologist, and the Dept. Env. & Natural Resource have all given their evidence to the committee. Next are the Conservation Council of SA, Env. Legal Advisory Service, SA Museum and the Dept. Mines & Energy.

The ERD Committee hopes to report to Parliament in early July.

Alan Jevons  
8 June 1995

## Old Homestead Cave

Another assault on Old Homestead over the Easter to Anzac break has added a further 550m to the total



George MacLucas descending into Lindsey Hall Cave, Nullarbor, May 1995. Photo: June MacLucas.

survey of this cave.

This time round the team consisted of 2 CEGSA and 5 WASG personnel with the main survey exploration achieved in the Gentlemen's Mess area.

Total survey length now = 24.5km plus a known further 2km we just haven't had time to survey yet.

Still plenty of leads and unexplored side passages.

The next trip is planned for the last week of Sept/first week Oct 95.

All those keen surveyors please contact.

Graham Pilkington  
CEGSA  
(08) 396 3044

## Karst Science Informal Seminars

This is the third in a series of informal seminars on karst science - Buchan in 1991, Wombeyan in 1993 - and now at Naracoorte on 12-15 Feb 1996.

It will include papers, a visit to the World heritage Naracoorte Caves Conservation Park and a bus tour of the remarkable karst features of the lower South-East. Conf Fee is \$80 including lunches, paper work, bus. Location is at Wongary Host Farm - dinner bed & breakfast for \$150. Or you might choose to camp which will be cheaper or stay at a motel which will be dearer.

Send expression of interest, offer of papers, etc. to me ASAP

Cheers

Elery Hamilton-Smith  
(Co-convenor with Ken Grimes)

## New Zealand Cave Diving Death

I have been sent a newspaper article from Tue May 22 1995 NZ Herald titled "Diver: I got over crying." It starts

"The leader of a cave diving expedition Kieran McKay contemplated giving up diving when he saw his friend David Weaver drown at the Pierce Resurgence."

Apparently David suddenly passed out at 75m and descended to a ledge at 85m. Keiran attempted to raise him to shallower depths but was unsuccessful.

The team was not using mixed gas.

Keir Vaughan-Taylor



## Draft Data Use Agreement for comment

A working group of the Australian Speleological Federation's Documentation Commission recently produced a draft document for comment concerning "Data Use Agreements" to help smooth the operation of ASF's distributed cave database system, soon to be released to clubs.

This system delegates the updating of the national database for each cave area in Australia to an agreed club, and for the periodic consolidation of the data (less the exact locations) to State and National databases. All clubs are entitled to read-only copies of the central database.

As we all know, the dissemination of cave information is a contentious issue. In addition, the distribution of cave databases has scope for all kinds of "ownership" and "publication" disputes. On the other hand, the availability of cave and karst information is essential for ongoing conservation battles, research, management, and exploration. Therefore the above Agreements attempt to set out clearly the rights and responsibilities of all parties beforehand, so that an effective, safe and harmonious system can result.

The draft document, prepared by Peter Ackroyd and already the result of input from many people, was issued to all clubs for comment at the Jan 95 ASF Conference, and the draft has now also been loaded on to ASF's WWW pages at URL:  
<http://hermes.its.unimelb.edu.au/~u1217515/asf/duadraft.html>

A zipped Postscript file (220K) of the document is also available from me for direct emailing, or for downloading from the above page.

This system is only going to work if we can hammer out the Agreements so that they are practical, and meet everybody's legitimate needs for the data. It is important therefore that they get plenty of discussion before being finalised.

We are also very keen to get comments from anyone around the world who might have already had experience or has ideas in this area.

Comments should be either posted to the Convenor of the Working Group:

Peter Ackroyd  
Data Use Agreement Working Group  
384 Canning St  
North Carlton. Vic 3054  
Australia  
Tel: +61 3 9347-8058  
(sorry - no email address)  
or emailed to him via myself at:  
[matthews@melbpc.org.au](mailto:matthews@melbpc.org.au)

Peter Matthews  
Convenor  
ASF Documentation Commission  
17 July 1995

## Updates to ASF & ACKMA WWW pages

Recent updates to the "Australian Speleology" World Wide Web (WWW) pages include:

Australian Speleological Federation (ASF) pages:

- links to current ASF draft documents out for comment:
- NORLD Cave Leader Accreditation (on Sherry Mayo's server)
- Karst Index Data Use Agreement

Australasian Cave & Karst Management Association (ACKMA) pages:

- addresses and phone numbers for caves and cave managers of Aust & NZ tourist caves. Includes a link to the new Waitomo WWW pages.
- ACKMA Executive address list for 1995-97.

In case you are new to Ozcavers listserver, the ASF and ACKMA WWW pages can be reached via the "Australian Speleology" pages at the URL:  
<http://hermes.its.unimelb.edu.au/~u1217515/austcave/>

Invitation:

If ASF or ACKMA officers, or other individuals, have material which they feel should be available via these WWW pages, they are invited to either send me an ASCII copy for loading, or else advise me of the link if the material is on their own server. In either case, please email me before sending anything. Examples would include material from ASF Commission convenors, dates for coming events, etc, etc.

Explore the pages, use your imagination, and see if you could fill any of the many current gaps. A good example is Rauleigh Webb's loading and maintaining of several ASF standard documents at his WA site, which have then been pointed to from the central ASF pages above.

The ideal is if we can have a range of people creating, and maintaining, various pages according to their area of interest or responsibility. The material can either be on their own server, or they can send it to me for loading. Whichever way, it can all be conveniently accessed from the master "Australian Speleology" pages

Note that the Aust Speleology pages are designed to include also material which is not ASF-related - e.g. ASF and ACKMA are both actually subsets of the "Australian Speleology" pages.

Is there anyone who could prepare suitable pages to summarise the state of Australian speleological research? Perhaps listing the places it is being done, the people doing it, notable work done in the past, etc?

Peter Matthews  
ASF Documentation Commission  
[matthews@melbpc.org.au](mailto:matthews@melbpc.org.au)  
17 July 1995



## Obituary - Vale Russell Gurnee

Russell Gurnee died in New York on February 21st 1995.

He was variously President of the National Speleological Society, the National Speleological Foundation and the Explorers Club of New York. Vice-President of the International Union of Speleology and Chairman of the Eighth International Congress attended by many of us in Kentucky in 1981. In this last role his diplomacy helped create a closer relationship between NSS and the Cave Research Foundation and he was a steadying hand on the sometimes xenophobic and parochial element in NSS who didn't want their traditions interrupted by their foreigner. The outcome was by far the most successful international congress ever held.

Russ lived his belief that the essence of speleology lay in cave exploration, and that we do not need to invoke science to justify our passion. His influence in the renowned Explorers Club markedly raised the profile of caving as one of the few remaining realms of pure exploration. He and Jeanne caved all over the world, carrying out original investigations in the USA, Mexico Guatemala and South America, and caving widely in the Caribbean and Europe. During 'glasnost' he opened a speleological dialogue with and caved several times in the USSR. His leadership of the Rio Camuy expeditions in Puerto Rico led to a fine book and inspiring tourist development proposals. Alarmed by rural encroachment on the spectacular sinkholes leading to the underground river the Gurnees bought the property, promising to sell it back to the Land Administration at cost. They had to wait 16 years but were then able to oversee the development of Empalme Cave into one of the world's great karst spectacles.

He and Jeanne became passionately interested in cave management, carrying out pioneering studies in the USA, Barbados, Anguilla, Puerto Rico and elsewhere. In recent years they had been working on a development plan for Kartchner Caverns in Arizona. He had a lifelong interest in show caves and in 1966 co-authored the first comprehensive guide to American show caves, later versions being modestly titled "Gurnee Guide to American Caves".

In 1983 Russ and Jeanne came to Australia for the Cave Management Conference at Lakes Entrance. In one of those marathons peculiar to cavers they were passed from car to car, club to club, person to person right around south-eastern Australia. The Franklin dam dispute was at its height as they flew out to Western Tasmania with Kevin Kiernan. All who met them on that occasion recall them both with great affection and respect.

To achieve all this, Russ lived the American dream of life, liberty and the pursuit of happiness, but he knew where his priorities lay, having retired early from his own highly successful business to continue caving. The Gurnees were indisputably the best known caving couple in the USA, Jeanne being President of NSS and as recently as 1993 at an age when most retirees would be sunning themselves in Florida. Although

sometimes parochially patriotic in the American way, but he was a great ambassador for his country and for the world of speleology.

We each counted Russ as a friend for 30 years or so. My (Elery's) first acquaintance was when I received a letter out of the blue from Russ (as President of the Explorers Club). The Club had a tradition that each President should devise a distinctive and "in-character" dinner menu so as a caver, Russ naturally thought of bats, but cave bats were a bit small, so he wrote asking for a small consignment of flying foxes. So, we sent a flapping of deep-frozen fruit-bats by Pan-Am. Others of Elery's memories include Russ's amusement at the Koala's dependence upon gum-leaf chemistry: "So that's why they look that way - they are stoned out of their minds!".

But along with this sense of humour, Russ had a remarkable knowledge, wide-ranging expertise, and an insatiable sense of inquiry. It was also typical of the man that he had discarded cameras for his ever-present sketchbook with deeply sensitive and very beautiful drawings and water-colours.

Years before meeting him, I (John) had known Russ's name from the eponymous Gurnee cars in "The Caves Beyond", one of the two books which fired my interest in caving. His book on Luray Caverns was the inspiration for mine on Jenolan, and we met wherever our paths crossed, in Germany, England, Australia, Kentucky, and New Jersey. My last view of him was on a bitter winter's night in 1993. We had exchanged caving stories in a restaurant on the Hudson River facing Manhattan. As the ferry pulled out into the Hudson, he stuck out 6 inches above the group waving from the Jersey shore. He really stood tall in so many ways.

John Dunkley & Elery-Hamilton Smith.

### Do We Have Your Correct Mailing Address?

If not then let us know  
by sending your correct  
details to:

Steve Brooks  
6 Kidbrooke Pl  
Westfield. 6112  
Phone: (09) 495 1661



# IUS Congress in Switzerland

From Cavers Digest 4836

From: devon@olsen.ch (Devon Bowen)

Subject: IUS Congress in Switzerland

Attached is a "pre-announcement" of the 1997 International Union of Speleology Congress being held in Switzerland. The planning for the Congress is still in the early stages so there isn't a lot of detail. The plus side of this, though, is that there is still plenty of room to shape the activities of the Congress. Questions/comments/suggestions are very welcome.

If you want to get more information as it becomes available, please send in the form below (either by paper or electronically to me). This will put you on the mailing list for the first circular when it is ready to be sent out. I will also try to keep people informed through this list as well but there are no guarantees of that. It depends on how much information there is and how easy it is to get it in ASCII format.

Please feel free to include this information in any local newsletters that you may be connected with. Enjoy, and hope to see you in '97.

Devon

International Union of Speleology

12th International Congress of Speleology  
A Congress for All Cavers

August 10th-16th 1997  
La Chaux-de-Fonds - Switzerland

## What kind of Congress?

At the heart of Swiss speleology there are no "professionals" and the term "specialist" does not apply. This perhaps explains the ready dialogue that occurs during encounters between cave explorers and cave scientists (if even this distinction is relevant).

Consequently, the 1997 I.U.S. Congress (International Union of Speleology) in Switzerland would be a congress of encounters and dialogue. Serious scientific communication, enthusiastic exploration, and evening camaraderie are all part and parcel of the caving milieu we love. And we would like to invite you to be a part of it.

We are proposing that the summer of 1997 be an immense international festival of speleology: specialized symposia, road shows of popular exhibits, official assemblies and speleo-cinema in the major Swiss cities, thematic expositions and varied gatherings within the setting of the congress, the mingling of cavers from many nations, discussions of future international speleo-camps, etc.

And all this in a country that is blessed with

magnificent karst regions, many celebrated cave systems, and a speleological society that is over 50 years old. Furthermore, exceptional caves, pits, and karst regions await you with our French, German, Italian, and Austrian neighbours.

## What kind of Program?

- 7 days of meetings in La Chaux-de-Fonds:
- an inaugural fete
- opening ceremony and General Assembly of the I.U.S. (International Union of Speleology) with simultaneous translations
- meetings of the I.U.S. commissions
- workshops where the specialists are responsive to the cavers' needs
- public exhibitions on speleology and displays of books, stamps, equipment, posters...
- open to lectures on all themes in speleology
- symposia on specialized themes before, during, and after the Congress
- juried salons of films, videos, photos, slide shows, maps, technical inventions, cartoon strips, cave songs...
- for attendees, daily visits to local caves
- for curious companions, a varied tourist program
- for families, a playground and underground activities, too!
- the best caving films in the world shown throughout Switzerland
- evening diversions that will make one forget to sleep for a week
- free shuttles and accessible transportation to all activities around La Chaux-de-Fonds
- on-site auto rental available
- easy and reliable hotel reservations
- a daily newsletter on Congress activities to facilitate your choices
- published transactions of the Congress and the specialized symposia
- a closing banquet for all, in the old style

**Pre and Post-Congress Speleo-camps throughout Switzerland and Beyond**

The caving clubs of Switzerland and neighbouring



lands propose to set up inexpensive speleo-camps in the massifs currently being explored. You will have the opportunity to explore the large alpine systems so often described in the caving literature. These camps could become the basis for future exchanges between clubs without regard to national boundaries.

#### **Tentative Schedule (1997)**

Jul 27 - Aug 09 Pre-congress speleo-camps and scientific excursions.  
Aug 07 - Aug 09 Multi-media festival. Open dates for specialized symposiums.  
Aug 10 - Aug 16 Meetings and 12th Congress of the I.U.S.  
Aug 17 - Aug 20 Open dates for I.U.S.-Commissions and specialized symposiums.  
Aug 17 - Aug 27 Post-congress speleo-camps and scientific excursions (in collaboration with the

Bologna meeting).  
Aug 28 - Sep 03 4th Congress of Geomorphology in Bologna, Italy.

#### **Congress Address**

12th International Congress of Speleology  
P.O. Box 4093  
CH-2304 La Chaux-de-Fonds 4  
Switzerland

#### **How you can stay informed**

If you are interested in the 12th International Congress of Speleology and wish to receive the first circular about the congress please fill out the following and return it to the above address or send the information via e-mail to "devon@olsen.ch".

Last Name: \_\_\_\_\_ First Name: \_\_\_\_\_

Street Address: \_\_\_\_\_

City, State, Postal Code: \_\_\_\_\_

Country: \_\_\_\_\_

I am especially interested in the following topics: \_\_\_\_\_

I would like to help organize: \_\_\_\_\_

I speak the following languages: \_\_\_\_\_





Nautaloid Fossil - 180 mm long. Found in Devonian Limestone, inside Bryan's Pot (M - 31), Buchan. Photo by Peter Ackroyd.



