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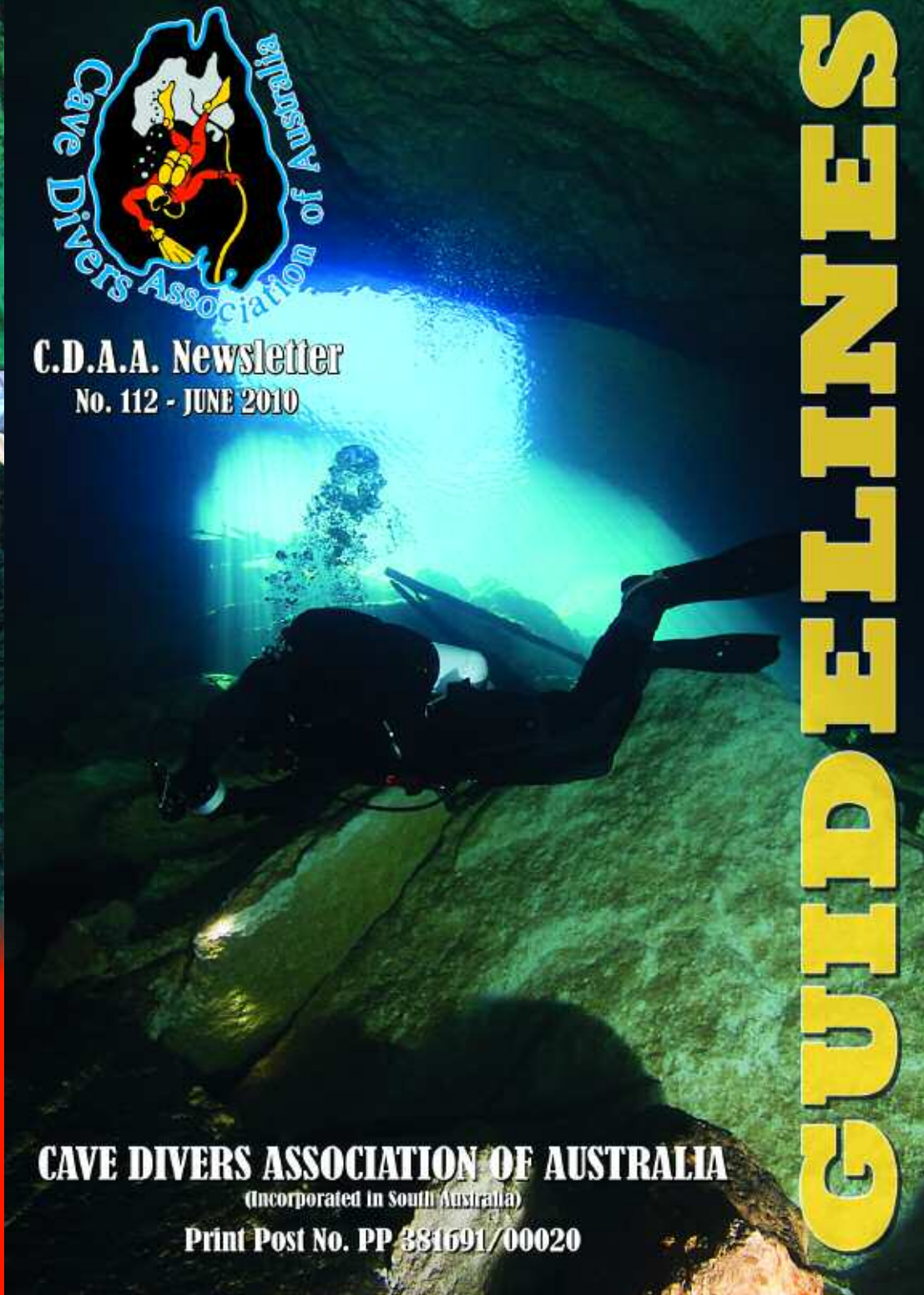
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C.D.A.A. Newsletter
No. 112 - JUNE 2010



CAVE DIVERS ASSOCIATION OF AUSTRALIA
(Incorporated in South Australia)


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SENTINEL



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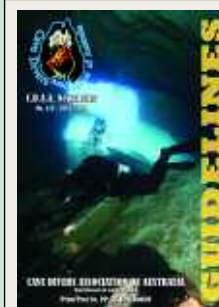
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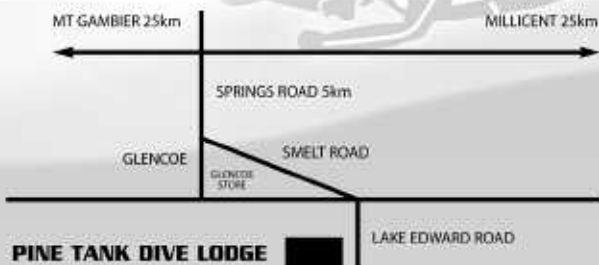
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CAVE DIVERS ASSOCIATION OF AUSTRALIA

Editorial

This edition is a bumper issue packed with articles and photographs. I've been impressed with the quality of some of the photographs coming through. A couple of members have emailed me asking about the Guidelines cover shot and what the criteria is. It is simple; the best shot gets the cover, so send them through to be in with a chance. Portrait style photographs suit best and photos should be at least 2MB file size.

Make sure to read the Director's reports to see what has been keeping us all occupied over the past 3 months, it sure has been busy.

Stuart McGregor's Blue Holes expedition report continues with part 2 of his 3 part series. Bradley Dohnt has provided a report and photos on the recent South Australian Rebreather Show and Tell. It was a well run event enjoyed by all who attended. Special thanks to Tony Davis for travelling over from Melbourne to show the Diverite Optima rebreather.

International visitor Dmitri Gorski has written an excellent article on CCR use in cave environments. Dmitri has dived all over the world and has had articles published in numerous magazines. Even if you only are mildly interested in rebreathers, this article is a must read. It is awesome to have international visitors coming to explore Down Under.

Michael Mallis has written about his recent cave course. These course reports are a fantastic insight into what prospective students can expect of their future courses.

We have had a lot of very positive feedback on Ian Lewis's Engelbrechts article and this is now the feature story on the new CDAA website. Ian continues his science in this edition, with more on Karst Geology and the formation of rockpiles. I'm hoping to coax our Science Officer Trent Lee into writing something on Karst Geochemistry in future editions.

Last edition, Neville Skinner provided a very interesting report on the latest discoveries in Fossil Cave. This reminded our long time and well respected member Peter Rodgers of his teams' original research and discoveries in Fossil Cave. Peter was featured on the cover of the last edition diving in Tank Cave with his wife Cheryl Bass, so it is great to have him dig out some of his old photos and prepare this great article to complete the picture for our members.

Ag Milowka has prepared another gutsy story detailing diving Devils Eye. I always enjoy reading Ag's stories and seeing what she has been exploring - keep them coming Ag!

We have reprinted an article on the early beginnings of the line arrow and its development by one of the AGM weekend Symposium speakers Forrest Wilson. Forrest has a wealth of experience and is currently the Vice President of the NSS-CDS.

Dive safe and enjoy, Jason Caldwell
Records and Publications Director

Email: publications@cavedivers.com.au



'Dave's 2 Bar'

We have been inundated with articles this issue, so much so I think we will have some over to use in the September issue. Golly you cave divers get to travel to some fantastic destinations! The Caves in Tasmania article in this issue look awesome, that's what I would call diving into a cave, what a sight!

Our 'Favorite Shot' feature on page 37 features Nikki Reeves' picture of Piccs. Thanks for your comments and photo submission Nikki... Keep 'em coming, I need another for the next issue too!

Finally, our first issue with Jason and a new printer worked superbly... hope you too liked the new look, all the best, Dave.

PS, email me anytime, even if you want some hints and tips on Photoshop or F-stops!... seapicsdavebryant@gmail.com

Wilson's Arrow

Cave Diving Line Arrow History

By Forrest Wilson, Joe Dabbs, and Susan Y. Gero

"THIS WAY OUT" is the message a directional marker conveys. Dry cavers were using directional markers in the maze of tunnels that constitutes a cave system long before there were cave divers. Being lost in any cave is a terrifying experience but being lost in a water-filled cave with a limited air supply is very likely a fatal error. "This Way Out" must be unambiguous to the extensively trained cave diver attempting to feel his way to the exit in a severe silt-out situation.

There are several basic rules that are necessary for a safe cave dive. One of the most important of these rules is that there must be a continuous guideline to the surface. Silt (unconsolidated sediment) is found in all underwater caves.

When suspended in water, silt may reduce the visibility to effectively zero in a matter of seconds and may persist for several hours or days. Common causes of silting are the downward-percolation of ceiling silt caused by the diver's exhaust bubbles; water turbulence by diver movements; and wash-down caused by heavy local rainstorms.

The early cave divers in Florida saw the benefit of using directional markers on the guideline. Lewis Holtzendorff came up with the idea of folding a triangle of tape around the line to form an arrow that would point the way out of the cave. These tape arrows were called "Dorff" markers in Lewis' honour. There were a couple of problems with tape arrows: they slid along the line and they were difficult to feel in a silt-out. What was needed was a standard arrow that was simple, inexpensive, and easy to attach to the line but resistant to being dislodged.

Sheck Exley asked Forrest to lead a discussion group at a National Speleological Society-Cave Diving Section (NSS-CDS) workshop to come up with an idea for a better arrow. Several ideas were tossed around, but most were deemed impractical, including one that was close to today's line arrow. After the meeting, Roger Werner had drawn an idea for arrows on

the blackboard, but Forrest felt it would not stay on the line because the slots Roger drew were straight out to the sides.

Reflecting upon Roger's idea, Forrest made some prototypes and tried them in caves. After several combinations of slot angle and relative hole shapes, he eventually formulated the current design. He hand-made several hundred arrows that were sold through the Branford Dive Centre. The arrows soon became very popular and Steve Hudson of the cave rope company, PMI, asked Forrest's permission to make a mold of one of the hand-made arrows in order to mass-produce them.

In the mid-1980's, Forrest Wilson stopped designing cave diving equipment and gave permission for anyone to copy his designs. Cave diving equipment manufacturer, Dive Rite, bought the entire production run of the PMI line arrows. A few years later, Dive Rite tried to order more arrows, but to their dismay found that the injection-molding house had sold the original mold as scrap. They successfully tracked down the buyer and had more arrows made. Dive Rite eventually bought the mould only to find that it was worn out. In 1993, Dive Rite produced a new line arrow mold, which is now kept in an injection-molding house in Jacksonville, Florida.

It is Mr. Wilson's line arrow design that is used universally today.



JUNE 2010

A smooth and quiet start to the management of the CDAA this year, which has been refreshing. I appreciate the patience with which members have accepted the change over to the new website. At last we are up and running. Thanks to Jason Caldwell and Damien Georgiou who have both contributed hugely to make this a reality. I also wish to thank our recent webmaster Tony Richardson for his tireless work in not only creating our previous website but the 10 years of commitment he has shown in managing the site. This extraordinary effort should not go unnoted. Thanks.

Tank Cave negotiations are moving along at a slow pace. Discussions have been had with the council and a survey has been obtained of the proposed allotment. This totals approximately 5 acres. Access ways need to be approved and permission from the State Government obtained for any non-complying sub division. Once these issues have been addressed we will be in a better position to look at moving forward.

I am pleased to announce an exciting list of 3 international speakers who will present at this year's Annual General Meeting (AGM).

John Garvin – John is the co-writer of the soon to be released James Cameron cave diving movie "Sanctum." He is a very experienced Rebreather instructor and wrote the first TDI Inspiration Rebreather manual. He is qualified on more than 7 rebreather units and now works in the motion picture industry.

Christophe Le Maillot – Chris is heavily involved in cave exploration in Mexican Riviera. Based in Quintana Roo he is an owner of Zero Gravity and a founding member of the Mexican Cave Exploration Project. Christophe will speak on their record breaking cave dives in excess of 8000 m in the Sian Kaan biosphere and Ox Bel ha which is currently the longest cave system in the world.

Forrest Wilson – Forrest is the original designer of our current line arrows. He is a past president of the NSS CDS and has more than 10,000 cave dives to his name. Forest will speak informally at this year's AGM.

I would encourage you all to attend this year's. Those who have never been before truly don't know what they are missing. Please see the advertisement on page 8 for details of the location and times. Additional domestic speakers will be announced closer to the date. Please refer to the website.

Lastly, tragically on Saturday the 13th of March, 2010 a diving fatality occurred in Kilsbys sinkhole, Mt Gambier. Our condolences go to the family members of Dr. Rob McAlister. Rob was a well respected doctor in Victoria, which was evident by the huge turn out at his funeral. I wish to pass on our sincerest sympathy to Rob's buddy who was present in the water during this tragic event. Members of the CDAA safety committee have met with the SA underwater recovery unit. The matter is still being investigated and an inquest brief will be prepared for the coroner in the fullness of time. These inquiries are very time consuming and exhaustive and comment by myself or other members with additional knowledge of the circumstances may jeopardise the pending coronial inquiry. I do not expect any inquiry to be completed within the next 12 months. The safety officer assisted by the training committee will conduct a full accident analysis of the event but I feel this is best conducted at the conclusion and release of the coroner's findings. Rob and his buddy were cave level divers and had dived the site previously. What has been released by the police is that Rob was diving unfamiliar equipment and became entangled in the permanent guideline within the sinkhole. He was unable to free himself and expired. I trust that members will be restrained in their speculation of the causes and reasons for this tragedy. Please be mindful of the wishes of Rob's family and friends in that we remain respectful of his memory.

Dive safe, Steve Trewavas

SYMPOSIUM 2010

This years' members' symposium will be an exciting event with three international guests speaking on various topics. We hope to see as many members as possible attending this year's AGM.

Commencing 1pm on Saturday October 2, 2010 at the Barn Palais conference room, Mount Gambier.

John Garvin

John has been diving since 1990. He specialises in teaching closed circuit rebreathers and in 2005 was invited to write the Inspiration/Evolution training manual for Technical Diving International. He is an Instructor Trainer for TDI and IANTD as well as an advanced instructor for BSAC and PADI.



After years of teaching diving in the U.K, John moved to the Turks and Caicos Islands, where he set up and ran his own technical diving facility. '02 Technical Diving' went on to become a world-class technical diving facility and helped arrange the first ever rebreather expeditions to the world's most remote and exciting dive sites, including Galapagos, Bikini and Truk Lagoon.

While living in the Turks and Caicos, John founded 'The Caicos Caves Project', a team of experienced cave divers dedicated to exploring, mapping and protecting the incredible underwater cave systems beneath the islands. He is also a qualified Recompression Chamber Safety Officer, having conducted more than 200 treatments while in Turks and Caicos. During the eight years John ran 02 Technical Diving, his company boasted a 100% safety record.

In 2003, John provided the logistics and safety diver support for Tanya Streeter's world record breaking free dive to 160m (540ft), which was filmed as part of the documentary 'Inner Breath'. John has since been engaged and consulted as Dive Supervisor and Safety Officer on several documentaries for the BBC and Discovery channels. In 2005, John was contracted by James Cameron's Earthship Productions to work on various dive-related film projects.

When not underwater, John can be found engaging in his other passions, screenwriting and playing guitar in his Sydney-based rock'n'roll band. His first feature film, along with CDAA member Andrew Wight, Sanctum (executively produced by Cameron) is currently in production.

Christophe Le Maillot

Christophe Le Maillot is both a NACD and GUE Instructor. His diving resume is impressive and his presentation will be both enlightening and exciting.



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 - Production of Cave Maps
 - Publication of Articles

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 - 150+ sidemount dives
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- Cave Passage Explored and Surveyed - + 80,000 ft
- Special Interests - Exploration, Survey and Mapping, Geology and Hydrology

Forrest Wilson

Forrest Wilson hails from Atlanta, Georgia in the USA. Forrest is Cave Diving Instructor 103, which is impressive enough, however they started the numbers at 101.



Shack Exley is 101 and John Zumrick is 102, so Forrest is the 3rd

Cave Diving Instructor to be certified with the NSS-CDS.

- He made his first open water dive in 1959.
- He began cave diving in 1969.

He has logged more than 1000 cave dives, in five countries, in a variety of caves from low visibility sumps in dry caves to staged scooter dives.

He served as Vertical Training Coordinator for the District of Columbia local club (Grotto) of the National Speleological Society (NSS).

He served as the first Training Director of the NSS Cave Diving Section (CDS) for a period of six years.

- He is currently Vice Chairman of the NSS-CDS.

He helped institute the Rescue and Recovery certification for the NSS-CDS, which later became the International Underwater Cave Rescue and Recovery (IUCRR) certification.

- He is currently diving officer for the NSS National Cave Rescue Commission.

He currently an active cave diver in the USA, Mexico and the Bahamas and is qualified in Trimix and Rebreather diving. Forrest will conduct a casual 'fireside chat' on his many cave diving adventures over the last 40 odd years.

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CCR technology – Overview and Challenges

We live in a time of change. Our technological society, that has been making huge advances in the past hundred years, has allowed us to go to places where nobody has been before, to dramatically increase the standard of our lives, now has to move to a new level and become a sustainable society. Sustainability refers both to the use of our resources and to sustainable practices in everything.



Closed circuit rebreather (CCR) diving has exploded in recent years with thousands of units on the market. A growing number of new expeditions are made on closed circuit rebreathers due to their efficiency. However, with the efficiency comes also a greater complexity that could increase the risks. Rebreather diving has become a cowboy frontier in the same way as technical diving was in the early 1990s. A thorough review of equipment, diving practice and education is needed in order to come up with standards of safe CCR diving before the efficiency advantages of these machines can be used to our advantage.

Introduction

When we breathe, the oxygen in the breathing mixture is used in our body, catalyzing the reactions that keep us alive. The rest of the gas is exhaled back unused, polluted by carbon dioxide that is created in those reactions. The whole idea with the CCR is to keep that gas in a closed circuit loop, removing the poisonous CO₂ and adding the O₂ we use up. Removal is done by means of absorption by a mixture of granular alkali carried in a scrubber unit. Adsorption is further controlled by perfusion (flow of the gas through the granular bed) since we force the gas mixture through the scrubber unit by breathing. Higher flow will naturally result in less efficient CO₂ removal. Oxygen make-up is achieved by adding 100% oxygen to the breathing loop. PO₂ is thus a variable dependant not only on

depth but also on how much fresh O₂ we add. We therefore have to monitor and control the PO₂ value in order for our breathing mix not to become hypoxic or hyperoxic. In addition, CO₂ build-up can pose a problem. In this article it will, however, not be considered, since the problem is eliminated by correct scrubber packing (so that no channelling is possible) and monitoring of scrubber lifetime. The main focus of this article will be on the challenges of establishing a safe diving practice and safe use of already existing equipment.

Disclaimer: this article is in no way a rebreather diving manual. The idea is to create a debate about how CCR equipment and diving practices should be standardized and made safer. Diving a rebreather without proper education on the unit from an authorized instructor is a deadly mistake some of us will not have a chance to repeat. Experimenting with rebreather diving is a dangerous activity – this article deals mostly with theoretical aspects or philosophies of how to operate a CC rebreather, questioning existing practices and creating a base for further development.

Glossary

- CCR** - Closed Circuit Rebreather
- mCCR** - Mechanical Closed Circuit Rebreather (oxygen is added manually)
- eCCR** - Electronic Closed Circuit Rebreather (oxygen is added electronically)
- iCCR** - Intervening Closed Circuit Rebreather (oxygen is added manually but there is an electronic safeguard)
- BOV** - Bailout Valve (a valve on the breathing loop that enables the mouthpiece to operate in open circuit mode once activated)
- ADV** - Automatic Diluent Valve (a valve that automatically injects new makeup diluent gas to the breathing loop when loop volume decrease creates underpressure)
- PO₂** - Partial pressure of oxygen (considered safe in the span of 0.16 to 1.6)
- Diluent Make-up gas** used for maintaining loop volume at increasing pressure. Can be compared to bottom gas mix when diving on open circuit as far as inert gas share is concerned
- Bail-out** - Reserve emergency gas used in open circuit mode if the ccr unit is compromised and no longer operational
- MOD** - Maximum Operating Depth

HUD - Head Up Display (a panel of light emitting diodes mounted visibly to the diver, usually on the loop near the divers face, that issues light alarms according to it's programming)

Buzzer - Audio alarm unit

Voting Logic - Automatic validation of cell read-outs.

System used on most electronic rebreathers today requires an uneven set of readout values and a majority vote decides which value is correct. For example, with a 3-value set consisting of 1.1, 1.4 and 1.4, the 1.4 value is considered to be the correct one

Setpoint - PO₂ value set by user and to be maintained during a dive.

Monitoring of the variables in a CCR

When you use a CC Rebreather, one more critical value (the contents of your breathing mixture) has to be monitored continuously compared to an open circuit system. We already monitor depth and time carefully when diving on open circuit, complacency in doing that could lead to devastating consequences. Depth is an important variable because we need to maintain for our plan to stay valid and because we do not want to be deeper than the MOD of our bottom gas mixture. In CCR diving, the MOD becomes a variable as well since our breathing mixture is no longer static! Dynamic PO₂ changes have to be monitored all the time as there is a risk that we can end up with hypoxic or hyperoxic mixture in our loop even if we stay at the same depth, and be rendered unconscious in a matter of minutes.

Manual monitoring

Manual monitoring of the PO₂ is what it sounds like – the diver must monitor the cell readout values continuously. There are no alarms to warn for too low or too high PO₂. There are usually two or three autonomous cells in a rebreather and thus two or three (hopefully similar) PO₂ values are to be monitored.

Automated monitoring

When a rebreather has automated addition of oxygen to the loop, the monitoring system is also automated and the diver does not really need to keep track of the PO₂ value. However, most training organizations today emphasize the need to monitor the PO₂ value manually anyway, even if no action has to be taken and the rebreather handles addition of oxygen itself.

Active cell validation

Dr. Bill Stone invented a technology that has newly entered the CCR market. The idea is very simple – we check if the cells show correct values by using gas of known composition at known depth for online calibration. This can actually be done on all CCR rebreathers – you have to completely flush the breathing loop with the diluent gas and check that the cells show a value in keeping with the O₂ content of the diluent gas at the current depth. This is a standard operation, but it is almost completely useless in practice. In order to completely fill the loop with diluent, you need to get rid of the old loop contents and that

means flushing the loop several times. This is not only impractical due to large amount of diluent gas needed for the procedure, but also very undesirable because it will have massive impact on buoyancy and you will have to establish a desired breathing mixture in the loop all over again after the flush. Active cell validation consists of placing the cells in such a position that the diluent gas you add to the loop flows over the cells. It is used today on the Poseidon MK VI rebreather (electronic control) and Pelagian DCCCR (manual control). If the rebreather is electronically controlled, the procedure is also automated. On a manually controlled rebreather, cells are validated by simply activating the ADV at desired depth, your diluent mix content hopefully already known to you. For example, if you use air or 21/35 as diluent and activate the ADV at 20 meters of depth, your cells should read around $3 \times 0.21 = 0.63$. At 40 meters it should be $5 \times 0.21 = 1.05$. This way you can clearly see which cell malfunctions if any anomalies in cell values are detected.

One more advantage with this setup is that fresh diluent flowing over the cell faces can remove any moisture that can (and does) disturb cell readings. However, there is a possible disadvantage of cell validation technology – flow of diluent over the cell faces can both remove the moisture but also force droplets into the cells if the flow is too strong. This can probably be avoided by adjusting the flow angle and strength (in practice, intermediate pressure of the regulator delivering the diluent mix).

Control principles

PO₂ in a rebreather is controlled by either adding oxygen or diluent to the loop. Diluent is usually added automatically through ADV which triggers when there is underpressure in the loop, it is needed only for establishing loop volume. Oxygen is added either manually or automatically depending on the rebreather brand.

Voting logic based controllers

There are automated systems adding oxygen to the breathing loop through a magnetic valve called a solenoid. They base their function on the readouts from the unit's cells most often following the principle known as "voting logic" where two cells decide over the third if all three do not read the same value. Note that there is a probability, quite low, that the two cells show an incorrect readout and the third one – correct. In that situation two malfunctioning cells will vote down the healthy one and a potentially dangerous situation can occur when the solenoid fires based on incorrect information. A



solenoid can also jam in an open or closed position, something that is known to happen sometimes. Quality of the magnetic valves and their components has been an issue for some manufacturers. A problem with solenoids whose operation is based on voting logic is also that we really do not know for sure if the cells read the correct value. If, for example, lime dust from the scrubber dissolved in condensed water forms a soap bubble over the cells or they are all compromised in some other way, we may not be aware of that and the readout will be incorrect.

Manual control systems

A manual addition valve, an orifice with constant flow or a needle valve with variable flow, allows for manual control of oxygen inject. The base flow is usually set to be somewhat lower than the metabolic flow of oxygen. When the monitoring system shows that the PO2 is dropping all we have to do is activate addition with a button and add fresh oxygen. With correct base flow, this usually happens once in every five minutes or more.

Intervening control

Lately, one more type of control system has been introduced to the market. It has really been around for quite some time, but without a name. If the set point of the automatic control system is very low, oxygen is not added until PO2 reaches a value normally too low to be used during dives. In that case, the automatic control system functions as a safeguard. The diver is supposed to run the unit manually but if something happens and PO2 value drops too low, the computer will pick it up and will not allow the value to become hypoxic. Intervening control combines, in a sense, both advantages and drawbacks of both control systems. There is still a risk of solenoid jam and electronic failure and the PO2 profile is uneven through the dive. The safeguard is however, a safety feature that allows for diver error.

CCR gas configuration

A natural rule that would come in mind is to always have enough gas to finish an aborted dive on open circuit if the rebreather fails. A configuration can be equipped with a standard longhose, practice here reminding much of currently existing Halcyon RB-80 procedures, if the bail out gas is carried backmounted. We could carry our bailout gas in stages as well if we establish safe standard procedures for deploying them in an emergency situation.

Backmounted vs. Staged bail-out gas

The largest advantage of backmounting bailout is that there are very established and simple procedures for an emergency situation. It is easier to connect backmounted bailout gas to the BOV and then you convert your CCR unit to an open circuit rig simply by turning one knob. The situation where somebody in the team needs gas becomes much more familiar as well, since you then deploy your longhose more or less in the same manner as on an open circuit rig. There are disadvantages of backmounting the bailout gas. The rig



(bailout doubles and the CCR unit) becomes quite big, heavy and clumsy. We add complexity to the system by having a manifold and an extra isolator valve (or two). We also lose the opportunity to pass bailout gas to the team member who needs it and lose some flexibility. We need to connect an extra tank with oxygen to our CCR – either a separate tank mounted for example on our right side or one of our sling bottles.

If we carry bailout gas in stages we have the advantage of an extremely small unit (moderate amounts of gas are needed to feed the CCR even on very deep dives) where the scrubber usually is mounted between two small 3-4 litre tanks on our back. It then functions as our primary system we rely on. In case of emergency, everybody carries a full bailout in stage cylinders. The disadvantage of such system is more complicated emergency bailout scenarios. We first switch to our BOV, allowing us a couple of breathes from the small diluent bottle on our back and to get attention of our team. We then verify correct bailout stage with the team and switch to it. Alternatively, our BOV can be connected to a stage but then we lose opportunity to donate it if somebody in the team needs the gas. During deep dives, the amount of stages that are needed to accommodate bailout gas can become quite large while the procedure for deploying correct stage in case of emergency still has to be as effective as usual.

There is also a question of how much bailout gas we need. In the case of open circuit diving, we have two independent breathing systems. One, equipped with longhose, is our primary system and the other one is a back-up used in case of emergency. In CCR diving, the unit itself is our primary breathing system (which uses very little gas). Do we then only have to carry minimum gas (the gas that would be left in our doubles after an open circuit dive) as bailout? Or do we have to carry a double amount: one "minimum gas" for a team member and one "minimum gas" for ourselves in case of rebreather failure at the same time as we assist a team member with gas? This would mean that we, in practice, carry one extra emergency gas system compared to open circuit diving. This could, however, be justified due to the added complexity of a CCR and the fact that in an emergency situation some prefer to switch to open circuit mode. This question is still open for debate.

Some challenges

Use of alarms in monitoring the PO2

We do not use depth warnings on our equipment. We have no alarms that start to sound when our maximum planned depth is exceeded. That seems unnecessary and even dangerous as there is an overwhelming risk that the alarm becomes a commodity, with no alarm sounding the immediate need to monitor the depth disappears. It is easy to become complacent. Following the same analogy, one way to monitor the PO2 on a CCR is to monitor the cell readouts directly and continuously. If they are shown on wrist-mounted instruments, it is a matter of discipline to do that, just as we monitor depth and time. Thus, all alarms, HUDs and buzzers become unnecessary only adding complexity to the system and giving the user a reason not to monitor the absolutely critical state of the breathing mix. With continuous monitoring, most of what can happen with the oxygen or diluent addition systems can be discovered at once and corrected. In fact, you learn a lot about the system dynamics by monitoring how the PO2 value changes as you change depth, task load or in other ways deviated from an established pattern. Some CCR instructors say that no one should start diving a electronically controlled rebreather at once, but rather dive a manual CCR through the initial learning curve and observe the PO2 dynamics since you are then forced to monitor the PO2 continuously. One more problem with alarms is that you are only warned when a certain critical value is passed. If you set the critical value too close to the normal operation window, alarms will sound all the time. Set it too far off and you will only get an alarm when the PO2 has been deviating from normal for a considerable amount of time. If you monitor your PO2 continuously, you are able to detect a deviation in the PO2 right away and correct the situation much more efficiently. mCCR rebreathers are designed with manual PO2 monitoring in mind. Obvious advantage of alarms is that they serve as a safeguard and warn us of the dangerous PO2 changes if we are occupied with something else. In a stressful situation that could be a life-saver.

Electronic PO2 control

One advantage of automated PO2 control (i.e. oxygen injection into the breathing loop) is that a much more even PO2 can be maintained in the loop through the dive. In Figure 1, a rebreather is controlled manually (addition of oxygen is done by hand). In figure 2, the same rebreather is on electronic control (oxygen addition is handled by a solenoid). It can be clearly seen that the PO2 value is much more even throughout the dive with electronic control of the unit. Whether it makes any difference for the well-being of the diver is to be debated since our circulatory system absorbs PO2 changes within the normoxic interval. Electronic control of the rebreather also lowers user task load, which is an advantage.

Disadvantage of electronic control lies in the added complexity of the rebreather. The life-support system is now controlled by electronic components and successful operation is much more dependant on the quality of components and thorough maintenance. In almost all aspects of daily life today, electronic control systems have contributed to safer operation. It is, for example, much safer (and now more and more the only possible way) to fly a fighter jet using electronic control systems. The difference when it comes to rebreather components is that most of the CCR units are made on a small scale in mature workshops with no possibility of the same component quality control as for example in aviation industry.

Electronic control of the breathing mixture is also a challenge when it comes to keeping the user awareness on the same level as with manual control. If the control system functions properly, there is little actual need for rebreather diver to monitor the contents of the breathing mixture closely – until the control system malfunctions. The awareness level needs to be maintained even if no direct interference is required.

Bailout configurations

Both staged bailout and backmounted bailout have their advantages and disadvantages. The most important is to establish standard safe procedures for bailout scenarios that everybody in the team are well-familiar with and to carry enough bail-out gas to safely abort the dive. Handling staged bailout can be cumbersome on deep dives requiring a lot of bailout gas.

Balance and trim

If you are a high-level trimix diver that is used to not used to worrying about balance and trim in the water – be prepared to move right back to just before the Fundamentals class! Both balance and trim are vastly different on a CCR compared to an open circuit system. Inhaling or exhaling do not help much to adjust the buoyancy any more and you are forced to use the existing buoyancy compensation systems much more precisely and more often. Considerable time has to be spent perfecting trim and buoyancy before you can proceed further in your rebreather diving. A common mistake by seasoned divers has been to move to advanced diving all too fast and some have paid a very high price for being reckless concerning their basic skills. Provided you know your unit, it is mostly the basic

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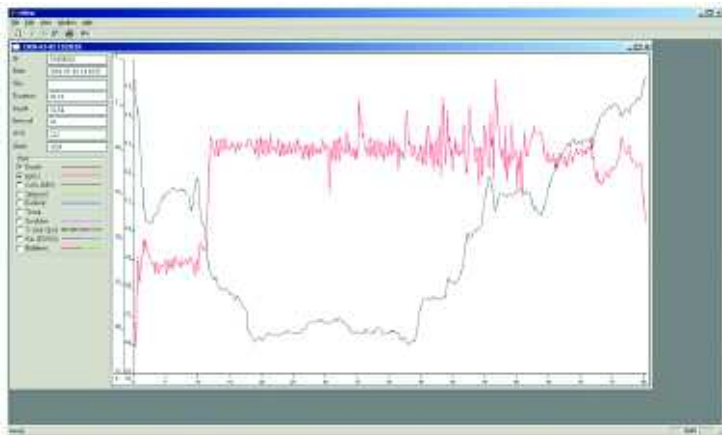


Figure 1, PO2 and depth for a dive with rebreather on manual control

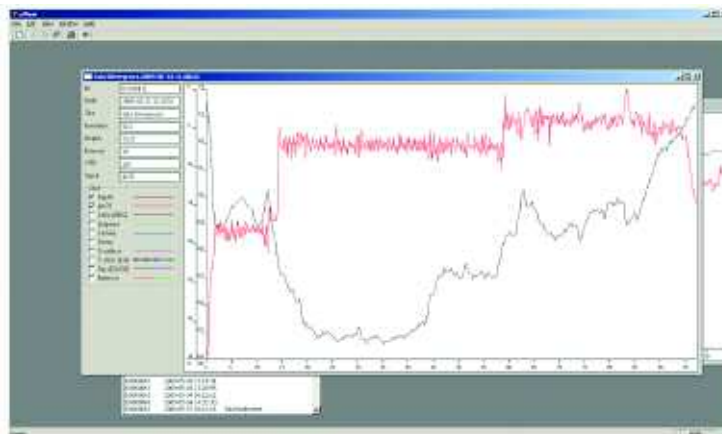


Figure 2, PO2 and depth for a dive with rebreather on electronic control

skills that decide how efficient you are at handling a situation.

Training

Some say that you should start diving on a CCR as fast as you can, already on the open water course. There are agencies teaching just that and units made for the purpose. This can, however, pose a problem since a diver trained on CCR from the beginning is not very familiar with an open circuit system which he is forced to move to in case of an emergency bailout. The same issues with trim and balance OC divers face when converting to a CCR will be faced in an emergency situation without experience – not an optimal approach. Rigorous efforts should be spent on basic skills before any advanced diving on a CCR can be done. Hundreds of dives will probably have to be conducted before trim and buoyancy skills are back on the same level they were before starting to dive with a CCR. Team thinking and awareness, so important for maintaining safety, remains to be of critical importance in teams consisting of rebreathers. Special considerations should be taken when teams consist of mixed rebreather and open circuit divers. All team members must know

how all equipment in the team works – that means open circuit divers being very familiar with rebreather operation or, preferably, be CCR certified themselves. However, CCR still remains only a piece of equipment. With correct mindset its handling is not very challenging. Basic diving techniques and team-thinking should always stay in focus!

Conclusions

A CCR rebreather is a powerful tool for accomplishing challenging dives. Right now, some divers are on the limit of what can be done on open circuit, both when it comes to depth and exposure time. Helium is a non-renewable resource, like oil or gas. It is illogical to think that in today's world that faces shortages of resources, helium will stay cheap and available forever. CCR diving offers a partial solution to the problem and carries a number of advantages with it. However, it also carries disadvantages which should be considered before any use of CCR becomes a standard practice. Problems should be addressed in unit design, diving practice and education – some of those problems are pointed out in this text and solutions to them are suggested. However, it takes a combined effort of our whole team to point out and solve them all before CCR diving can become a standard practice!

Acknowledgements

I would like to thank Jarrod Jablonski for valuable discussions of the manuscript and concepts of CCR diving. Professor Mark Dougherty is acknowledged for all his help with linguistic supervision of the text. Mikael Fridholm is thanked for providing the graphs which compare manual and electronic operation and Wenche Strand for taking images for this article.



CAVE DIVERS ASSOCIATION OF AUSTRALIA Inc.

NOTICE OF 2010 ANNUAL GENERAL MEETING, ELECTION OF OFFICE BEARERS AND VOTING FOR MEMBER MOTIONS AND CONSTITUTIONAL AMENDMENTS

This notice is issued pursuant to Clause 32 of the Constitution and serves to advise members that the Annual General Meeting of the Cave Divers Association of Australia Inc. will be held on Saturday October 2, 2010 at the Barn Palais Conference room, Mt Gambier, SA. The Annual General Meeting will commence at 6:00pm and will conclude no later than 7:00pm.

This notice also serves to call for:

- *Nominations for Standards and Business Director
- *Member motions
- *Amendments to the Constitution

The Returning Officer must receive nominations for the Directorate positions no later than the close of business Friday August 13th, 2010.

Mail to: Returning Officer - PO Box 286, Fairfield VIC 3078

The Business Director must receive member motions and proposals for amendments to the Constitution no later than close of business Friday August 13, 2010. Items received after this date will not be accepted nor will any extensions to this date be granted.

Mail to: Business Director - PO Box 286, Fairfield VIC 3078

Members intending to nominate for an Office Bearer position must be eligible, paid up members of the Association as defined in the Constitution. Nominations should be accompanied by a précis not exceeding two hundred and fifty [250] words detailing skills, experience and achievements relevant to the duties and responsibilities of the nominated position. The responsibilities of Office Bearers are contained in the Constitution of the Association. Nominations must be in writing and be signed by the nominee, the proposer and the seconder all of whom must be eligible, paid up members of the Association.

The polling date close for the election (if required) is Monday September 27, 2010.

The election of Office Bearers and voting on amendments to the Constitution will be conducted entirely by postal ballot.

If you wish to vote you must be an eligible, paid up member of the Association and you must only use the ballot papers to be provided in the next issue of Guidelines (#113) or by special mail out.

The ballot papers must reach the Returning Officer (Geoff Chambers #3484) no later than close of business, Monday September 27, 2010. Detailed voting information will be provided with the ballot papers. Questions may be directed to the Returning Officer.

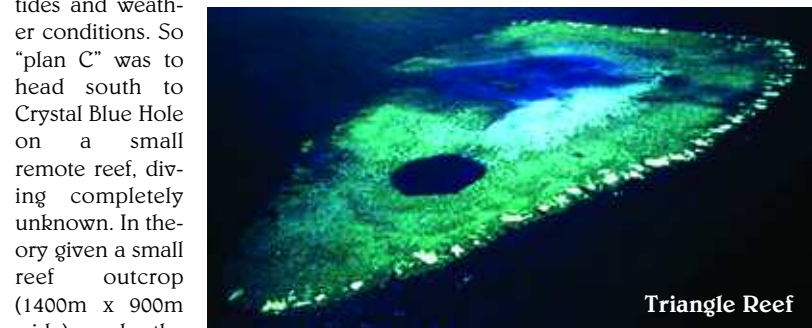
Andrew Cronan, Business Director
business@cavedivers.com.au

Australian Blue Holes Exploration 2009

PART 2 - ... and on to Crystal Blue Hole

Story by Stu McGregor, pictures from video.

Wednesday 6am; Our next nearest deep hole is further north and always was going to be a tricky bugger to dive, deep in a reef complex, no available satellite image leaving it even tricky to find and the shortest approach is via the weather face over the reef. Adding our wind factor still 15 to 25 knots, swell, know shelter for our mother-ship to hide in, not much of a decision to drop the idea... Other alternate sites are on the inner reef and a tad awkward to get too with our current



Triangle Reef

Triangle Reef (U) Crystal Blue hole. Long-way out in the paddock, and a fine looking Blue hole. Arriving late the boat is anchored in the lagoon and there was very little to do but ponder and dream about tomorrows diving and exploration.

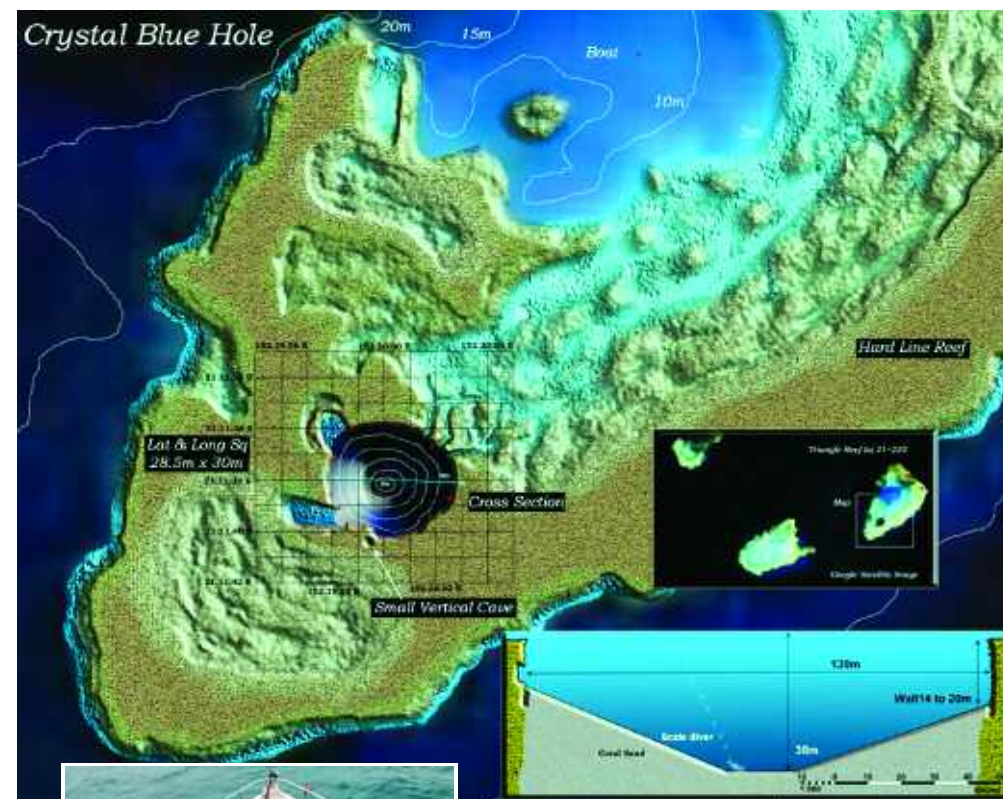
tides and weather conditions. So "plan C" was to head south to Crystal Blue Hole on a small remote reef, diving completely unknown. In theory given a small reef outcrop (1400m x 900m wide) maybe the coral build up in the hole was less, and being way out on the outer reefs, maybe the original hole was deeper.... and it just looked good in any image anyway. In theory the blacker the hole the deeper it is up to around 35 metre deep, after which it doesn't get any blacker. Sun height in the sky and the holes

internal shadow are factors.. With the weather conditions it would be a hard slog into the swell so decided to break the trip down to with a stopover.

10am The Channel... well it looked deep and inviting, 400m at the widest point 3.5km long, the expectation was maybe the channels origin was cave related at the head and after crossing a shallow saddle and going deep again it kinder all fizzled out. Nice place for lunch and that's about it.

The dory was dropped in and we sonar surveyed around right up to the tip. The left hand reef wall is zero to 11 metres and the "Wall" is maintained as it get shallower right to the tip 4 metres deep.

Agnes was the only one who dived other than swirling currents and a nice reef dive not much else to say, a dory picked her up.



Fishing stories, another nice place for lunch chasing rainbows.

Thursday 8am; we find our way from the lagoon in a dory and nearing the hole is a tad tricky to get in during low tide avoiding the shallow bommies. Sonar & GPS the hole and, bugger only 35m Sonar deep.

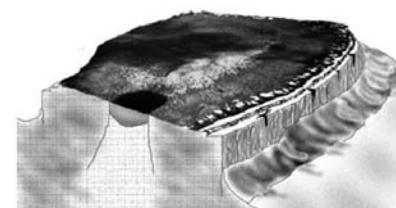
12.15pm; We leave Triangle Reef (U) for a short hour hop further out to the very edge of the Swains GBR in search of a "Deep hole", Quote; drops from 40 metres sea bed to 50 metres, "you can't miss it, it is 150 metres off the inner reef between the outer Ribbon Reef".

We conducted a search found a depression that may match, however with no walls showing up on the sonar abandon the search and any diving around 3pm....

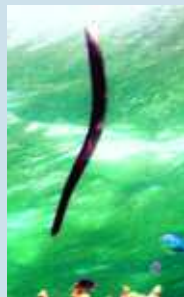
6pm; Arrive Centenary Cay... See next issue!



Dave enters form side looking up the shaft



Crystal Blue Hole is a Tupperware container or soup bowl and just as exciting for cave divers. We had to go there to find that out...Any return visit would best to focus on the outer Reef wall, hole end, none weather side for caves seems well fractured.



Crystal Blue Hole was surprisingly void of reef life with exception to Golden Sea Snakes (common GBR) including the lagoon area while shy has a very healthy population.



A pinky, drop line, dory and a team member are left on site as the other dories shuttle dives back and forth. The view from the boat of anything on the reef is not one of spectacular.



Crystal Blue has a complete wall all the way round varied mostly from 14 to 20 metres deep with only one notable vertical cave "Crystal Cave" (U) is a neat little reef cave starting at the base of the wall under a large overhang with multiple layer entrances going in for 6 to 8 metres and then vertical to single entrance in the hard line.



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Firstly a warm welcome to the rank of Advanced Cave Instructor goes out to Paul Leslie from Victoria, and Ian Taylor from South Australia. I'm sure many of our members are familiar with both, who are very active within the CDAA, and are also keen (ocean) technical divers. As we move toward the use of the new web site, we, as Instructors will be able to use the Instructor forum as a means of communication to relay information about training standards, equipment reviews, course requirements and so on. Teaching forms, applications, Records of Training and eventually, course materials will all be available from the site. The recommendation would be that prior to teaching a program, you log on, in the way you have done in the past, and ensure you are using the most up-to-date materials.

Recently there has been much discussion about certain types of equipment – namely boat snaps, split fins and helmets - and whether they should be banned from use within the CDAA. Although I don't use any of these items myself, I have strong views about what these pieces of equipment can or can't do, and don't recommend my students using them. I don't think we have a right to ban the use of them by members. What we can do however, is to have discussion about the pro's and con's and then make informed decisions about their application to cave diving.

Now that the new financial year is almost upon us, I urge you to renew your membership early to avoid the rush, and to ensure that your new card will be available to you in a timely manner. Please consider that the Records Officer, Rob Lee, will be inundated with renewals toward the end of June, and sometimes members are disappointed when they do not receive their card and cannot dive as a result.

An updated version of the Advanced Cave program will soon be available to all Instructors for comment, prior to its release later this year. The program had a major overhaul during 2009, and the new changes will allow us to move much of the theory to on-line learning, and free up more time for consultation and additional diving at sites.

Once this has been completed, the Cave course will have a major rebuild, something that we know has been long overdue. Comments would be welcomed by all instructors in this area, so please feel free to contact me in advance if you would especially like something added or deleted to this area of training.

For Victorian members, the stage handling (and possibly side-mount use) workshop will take place on Thursday July 22nd at the Melbourne Sports & Aquatic Centre. Kick off will be 7pm for

some discussion, prior to in water work at 8pm for about an hour. Steve Trewavas will discuss and demonstrate rigging of stage systems, handling, use of multiple stages and leash use. More info on side mount use to follow!

The workshop will be free to members but we would like to extend the invitation to non-members who may be interested in becoming cave divers, those who may wish to join the CDAA, or divers who are just interested in different equipment configuration and use. Cost to non members will be \$10.00 per head. BYO gear, including a stage if you have one, and we'll supply the additional cylinders!

Bookings are a must by emailing me at: standards@cavedivers.com.au

Hope to see you all there, either in the water or for a social get together afterwards.

Safe diving, Jane Bowman.

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IN THE HEART OF TIGER'S EYE

TEXT & PHOTOS: AGNES MILOWKA

Ken Smith inside 'For Your Eyes Only'.



I am cold and alone inside the cave. Sitting there at 6m I'm slowly losing all feeling. I am so cold that it hurts. I am desperately craving comfort. To stay put is a mental struggle. It is tempting to shoot up to the surface, to sunlight, to warmth. I know I can't. I know that I have to stay. I know I am stuck in a self-imposed jail cell. I might be wretched and miserable but escape is not an option. The seconds of the clock count down. The more often I look down at the computer, the more frequently I am disappointed. Time, it seems, is standing still. I try to console myself by remembering that the pain is only temporary and will dissipate shortly after I hit the surface. So I wedge myself tighter beneath the rocky ceiling and suffer quietly. In spite of everything not once do I think, 'Why am I here' or 'Why am I doing this?' I take it for granted this is where I want to be. That this is what I love doing. That this is the price I am willing to pay....

Finally 115 minutes tick by and I am free to go. Dizzy from the cold I emerge. I surface disappointed. The cave is sending me home tail in between my legs. The final restriction proved impenetrable. I spent a good 30 minutes at 45m, tanks off, trying to wriggle and wedge myself through. No matter how I approached the hole, what angle I took and what direction I came from, there was no way I was getting through. I felt like a 3-year-old child, left frustrated and confused as they desperately try to fit a circular ball into a square shape to no avail. Eventually, finally, I gave up. Not before the final fleeting thought – I should take the Nomad off too and try again. Luckily common sense prevailed. I stifled my curiosity. A wise move as it turned out. I had enough trouble getting my tanks back on as it was. After the adrenaline died down I realised that feeling and dexterity in my hands were all but gone.

There doesn't seem to be enough adjectives in the dictionary to adequately describe what a couple of hours in 7 degree water feels like. The words 'frigid cold water' do not convey the full extent of the problem; the first invigorating moment the water hits your face, the slow numbing of the extremities that renders them useless, the constant shivering, the exhaustion you feel after the dive, the strength of will power needed to stay focused on the job and resist the urge to get the hell out of the water. Everything seems more difficult in cold water - everything is. After I came out of the restriction I fumbled and fought to get the tanks sorted out and return to a proper sidemount configuration. Finally, admitting defeat, I simply clipped them off to the d-ring and buttplate and got myself moving. I had already clocked up over an hour of deco - it was time to go.

Thus ended my week of diving in the South Western part of Tasmania. Affectionately known as Tassie, the place is a little gem with unspoiled wilderness, spectacular scenery at every turn and some interesting cave diving yet to be done.

The cave diving in Tassie is well famed for being tough and as such it doesn't really attract many cave divers from the mainland. It has all the good stuff: cold water, high flow, low visibility, difficult access to the water's edge and sharp rocks that have a habit of slicing through drysuits like butter.

Undeterred I joined Grant Pearce, Dean Chamberlain, Liz Rogers and Ken Smith at Tiger's Eye as there was some unfinished business to be taken care of. In 2009, during the exploration of Lawrence Rivulet the team came across the hole in the middle of the woods and laid 95m of line. They ran out of time to continue exploration and now, a year later, we were back to discover more of its secrets.

To get to the water's edge we had to bush bash. Tiger's Eye is surrounded by big trees and ferns, moss covered logs, spider webs and leeches. Beneath the canopy it is cool, dark and wet and the mosquitoes are unrelenting, thousands of them descend on any bare skin. Finally a slippery slope leads down to the bottom of the doline and there amidst the forest lies the beautiful azure blue surface of the hole. It looked terribly inviting from afar, but looks can be deceiving. The unusual blue tinge of the water actually meant reduced visibility, we were looking at diving in 2ft vis at best.

The first few dives were in the majority spent cleaning up the line. After a hard winter and heavy rains tie offs had come loose and in a few places the line looked a bit fragile, hanging on by a mere thread. In fact Ken found himself in a spot of bother when the line broke in his hand after he descended down to 8m. He managed to control his beating heart and negotiate his way out without the aid of the line. Like a trooper he then proceeded to go back down to make the necessary repairs.

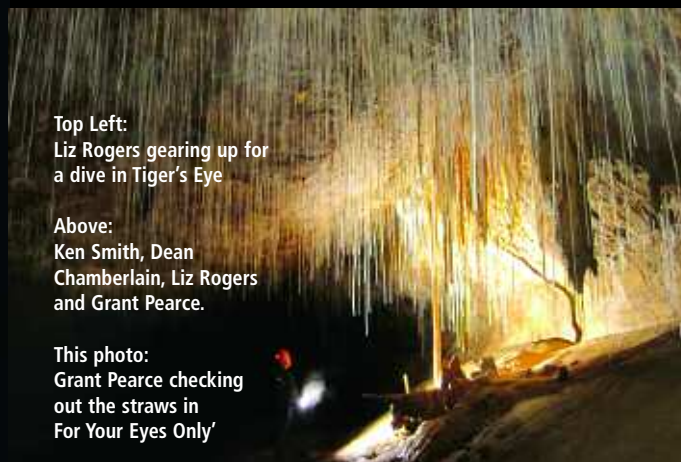
The less than ideal conditions made it very difficult to find leads. It seemed the only option was to tie off the reel and strike out into the unknown. After negotiating the low flattener and popping through the tight vertical restriction it appeared I was in a larger room. The line followed the right wall, so I struck out to the left with the reel for what I hoped would be the other side of



Top Left:
Liz Rogers gearing up for a dive in Tiger's Eye

Above:
Ken Smith, Dean Chamberlain, Liz Rogers and Grant Pearce.

This photo:
Grant Pearce checking out the straws in For Your Eyes Only'



the chamber. Eventually I hit the opposite wall and found myself face to face with a little hole. I went in and enjoyed some Braille diving as the mound of silt rained down and the vis was reduced to zero. I thought I was making progress, things were looking up as the tunnel widened, then I saw the main line... I had found a little loop. While interesting, this was not the way forward. A handful more leads were found off the big chamber throughout the week, which, while providing temporary excitement, in the end didn't go anywhere.

The second day I dived straight down to the end of the line. The cave simply stopped, as did the flow. Yet the flow had to be coming from somewhere. I looked around the end of the line to no avail. Then finally, as I started to head back I saw it - gaping darkness. I dropped my head in for a closer look and felt the ripping flow. Bingo!. I dropped straight in through the fissure crack just big enough to squeeze through in sidemount and dropped straight into a booming phreatic passage. It felt perfect. I reeled out the length of the reel, 50m in one fell swoop and the cave was still going. On the way back I was kicking myself, I should have found this the day before. Easy to blame it on the visibility, but I should have known better. It was obvious something was going on around there, if only I had bothered to stop for long enough to take it all in and reflect. Guess better late than never.

In the end Liz and Dean added another 30m of line, to a grand total of 80m, before the tunnel pinched down to a restriction. You could get into the restriction easily enough with sidemounts, but once through the way forward was blocked. Ahead the roof and ceiling came together and left a space perhaps half a foot high. To the left it looked slightly more promising, there was a chance that with a bit of effort it could go. What made it awkward was the 'tooth', a section of solid rock that struck out in the middle of the already small space. This in the end made the last restriction impassable, even without tanks on. I still hope that in the future I will squeeze my way through with a no mount rig on, but that remains to be seen.

Faced with a formidable foe at Tiger's Eye we needed a distraction and we decided to do a trip to Junee Cave for a bit of variety. Junee Cave is home to a very special place, a dry passage called 'For Your Eyes Only'. It requires a bit of muscle and wholehearted effort to get in there. First there is the walk from the car park to the entrance of the cave. Normally an easy, pleasant walk through the rainforest, it seems more like a death march once you start lugging gear. You then continue to carry the gear for another 100m up the streamway, fighting against the flow, which at any moment threatens to unbalance you. The cave is the main resurgence for the area and water gushes out from the entrance with great force, especially in winter. Finally, exhausted and sweaty you reach the first sump and submerge into the cold 7 degree water.

Compared to Tiger's Eye the vis at 6m was absolutely crackling... well, it was if you were the first one through.



**Grant Pearce
admiring decoration**

Despite the high flow there is an abundance of silt throughout the cave. The dive itself is relatively short, in about 20 minutes you are through. But let's not take anything away from the dive; the cave itself is quite unique and beautiful with interesting rock formations. My favourite part of the dive though where the animals, the place is like a zoo. I have never seen such an abundance of cave critters in an Australian cave - I even caught a couple of them in the act.

Once through the sump, you ditch the gear and prepare to be treated to one of the most incredible dry chambers. The large streamway passage is littered with some of the most incredible formations. The sheer volume of soda straws can easily take your breath away. The place is simply stunning. Visiting here alone made the whole trip to Tassie worth it. Simply walking through this breathtaking passage and enjoying its beauty, almost made me forget about the impenetrable restriction at a cave down the road... almost.

Diving in Tassie is sensational but it comes at a price. You have to be willing to put in the hard yards, to work hard, to shiver and to suffer. In my mind it is worth it, every second of it. I am counting down to my return and I hope that I can rise up to the challenge of the eye of the tiger.

THE END!



It has been an extremely busy few months with the development and launch of the new CDAA website. We have had a few small issues to iron out along the way, which is normal for an undertaking of this magnitude. Thank you to the members for your patience and understanding. Thanks also go to the beta testers for providing valuable feedback during the beta testing phase. Damian Georgiou (4391), our new webmaster has done a terrific job of building the new site and for a guy who has only been a member for just over 12 months I am impressed with how much foresight he has had with the design and systems implementation. Damian is a very busy guy, being a musician, a webmaster for many commercial websites, a cave diver and he also has a full time job in IT Security. He has contributed countless hours to the CDAA and even taken unpaid days off work to develop our new website. The CDAA has previously paid between \$2500 and \$4000 per annum for the upkeep, development and maintenance of the website but Damian has declined many times, to accept any form of payment for his efforts - we have some exceptional people in the CDAA. Our new forums are proving to be popular and are a much better way for members to be able to communicate with other members without having their inboxes filled with the chatter. The forums have a much tighter set of conditions that members need to abide by and these are posted at the top of the forums for all members to clearly see. The new booking system is designed to take a lot of the workload off both the government departments that we work with and also the Site Access Officers. Members are now able to book themselves onto most of these dive sites and the site access officers only need to confirm a booking where there is a booking fee or permit involved. Members and Site Access Officers are sent an automated email at each stage of the booking, confirmation and cancellation process. All membership records are now stored online and this has streamlined the membership updating process for our very busy Records Officer Rob Lee (3980) who has been doing a great job with renewals.

Future developments include a month/year at a glance view for the dive bookings and a move towards all course materials being online. Students will pay a registration fee and then their course materials will be available to download in PDF format. Deep cavern students will be

sent the cordura binder to hold all of their course materials and notes as they move through their future courses. We are always open to new ideas for the website and guidelines, so send me an email if you think of some.

We have had very positive feedback on the new full colour Guidelines and the new printer has done a wonderful job as has Dave Bryant on the creative side. Seanna Cronin (4288) our Copy Editor is continuing to be a valuable member of the Guidelines team and has reduced the errors significantly under very tight working deadlines - thank you Seanna.

Included in this edition is the annual membership renewal form and members still have two ways to renew their memberships, either online or by sending in the completed membership renewal form. Remember that payment and the membership renewal form are both needed before your memberships can be processed. This is the busiest time of the year for the Records Officer, so please don't leave it till the last minute. Memberships are required to be renewed by 31 June and members can renew for as many years as they like. Each year, there is a 2 month period till 31 August before the late fee of \$45 is added for late membership renewals. Members are reminded that they can't dive in CDAA sites during this 2 month amnesty period until they complete their renewals.

I would also like to thank Tara Parkinson (4272) for the excellent way in which she runs and maintains the CDAA Products area.

You may have wondered why I listed the volunteers' CDAA numbers during this report. It is because, it is great to see so many newer members taking an interest in their Association and putting that into action with their volunteer roles. These people are passionate about their cave diving and wish to make a positive difference - without them the CDAA would simply cease to function effectively. These volunteer roles are often thankless tasks and I would like to take this opportunity to pass on my sincere thanks and appreciation for their ongoing efforts.

Dive safe and enjoy, Jason Caldwell #4041

CAVE DIVERS ASSOCIATION OF AUSTRALIA

(INCORPORATED IN SOUTH AUSTRALIA)

Membership Application Form 2010/2011

Mail to: Records Officer, PO Box 840, Beaconsfield VIC. 3807.

Surname: _____

Given Names: _____

Address: _____

_____ P/code _____ Mobile: _____

Phone: (h) (____) _____ Date of Birth: _____ Gender: _____

(w) (____) _____ Email: _____

**Please
email jpg
or attach
1 photo**

In consideration of me being accepted as a member of the Cave Divers Association of Australia Inc. ('CDAI'):

1. I agree to indemnify and keep indemnified the Association, its directors, officers, employees, agents and contractors against any liability, loss, expense, damages, claims, suits, actions, demands, costs or proceedings whether arising out of statute or at common law in respect of personal injury (including illness) or death arising out of or in connection with or caused by any activity, function, event, dive, expedition, training or administrative task or obligation, including but not limited to equipment failure, damage of equipment during transportation, failure to check equipment adequately prior to entering the water, physical loss of equipment, lack of emergency, rescue or medical personnel or equipment at the site of an accident, loss of usable breathing gas, breathing gas contamination, incorrect measurement of oxygen concentration in breathing gas, incorrect measurement of gas fractions in breathing gas, running out of breathing gas, use of inappropriate breathing gas, mask flooding, becoming physically stuck underwater, collision with physical objects, line problems, including line entanglement, cut line, losing the line, line belay failure, line routing failure, lack of line junction, failure in line following, unexpected removal of line, route finding failure, unrecognised destinations, visibility failure, including poor visibility, deterioration of visibility, physical or mental health problems (pre-existing or otherwise), including hypothermia, blocked sinus, unable to clear ears, respiratory illness, physical or mental impairment due to alcohol or other substance, mental impairment due to narcosis caused by breathing gas, lack of diver fitness, sudden medical emergency, pulmonary barotrauma, fatigue, lack of sleep, animal attack (above and below water), lack of food, dehydration, vomiting underwater, psychological disturbance as a result of being present when a diving accident or other related activity occurs, traumatic injury or acute medical condition, weather problems, including underground and underwater flooding, cave problems, including falling natural and unnatural objects above or below water, physical changes in the cave whilst diving, strong currents, falling whilst entering or leaving the water (underwater or otherwise), falling underground whilst beyond a sump, air contamination in confined air spaces above water, nearby use of explosives, procedural problems, including inadequate or incorrect pre-dive planning materials, failure to observe gas margins, failure to interpret decompression tables correctly, inadequate understanding of decompression techniques, failure to observe correct decompression profile, failure to observe correct ascent or descent rates, lack of personal judgment of personal capabilities to execute a planned dive safely, communication failure between divers underwater, confusion over the expected actions of other divers whilst underwater, public interference by a non-diver, failure to locate alternative breathing supply during swapping of breathing supply, obstruction of alternative breathing supply during swapping of breathing supply, loss of above ground communications or lack of or unexpected loss of underground to surface communications.

2. WARNING UNDER THE FAIR TRADING ACT 1999 (Vic). Under the provisions of the Fair Trading Act 1999, several conditions are implied into contracts for the supply of certain goods and services. These conditions mean that the supplier named on this form is required to ensure that the recreational services it supplies to you are:

Rendered with due care and skill; and As fit for the purpose for which they are commonly bought as it is reasonable to expect in the circumstances; and Reasonably fit for any particular purpose or might reasonably be expected to achieve any result you have made known to the supplier. Under section 32N of the Fair Trading Act 1999, the supplier is entitled to ask you to agree that these conditions do not apply to you. If you sign this form, you will be agreeing that your rights to sue the supplier under the Fair Trading Act 1999 if you are killed or injured because the services were not rendered with due care and skill or they were not reasonably fit for their purpose, are excluded, restricted or modified in the way set out in this form. NOTE: The change to your rights, as set out in this form, does not apply if your death or injury is due to gross negligence on the supplier's part. 'Gross negligence' is defined in the Fair Trading (Recreational Services) Regulations 2004.

3. I have read and understand the Constitution and Regulations of the CDAA and am in support thereof. I hereby apply for membership.

Signed: _____ **Date:** _____

Membership Renewal Instructions

- 1) Please print and fill out the Membership Application Form **OR RENEW ON-LINE**
- 2) **Enclose a stamped self-addressed envelope**
- 3) Include **1 Photograph** and please write your name on the back of the photos or email a good quality photo as a **jpeg** (3cm x 2 cm) to **records@cavedivers.com.au**. Please do NOT staple to the form.
- 4) Enclose your payment. Save time, money and hassle, join for more than one year, no limit!
- 5) If you wish to have **Non Active** membership pay **\$35/yr**. You keep your membership going, receive copies of Guidelines, but cannot dive with such a membership and you do not receive a card so don't need a photo.
- 6) **After August 31st any unpaid renewals will incur a \$45 late fee.**
- 7) Anyone wishing to add a Nitrox or Trimix Endorsement will need to include a photocopy of their certification.
- 8) **Memberships cannot be processed until everything is sent in.**
- 9) Please send all questions by **email** only to **records@cavedivers.com.au**

Please tick applicable boxes

- ☐ I wish to pay **\$70** Renewal Fee **2010/2011**.
- ☐ I wish to pay \$ _____ being CDAA Membership for _____ years
- ☐ I wish to pay **\$35/yr** for Non Active Membership (no diving) for **2010/2011**.
- ☐ I wish to pay **\$35/yr** for Associate Membership (non diving) for **2010/2011**.
- ☐ I wish to pay **\$45/yr** being for _____ back fees (max 5 yrs)
- ☐ I wish to pay **\$45** being for late fee (Aug 31st onwards)
- ☐ TOTAL cheque / money order for the amount \$ _____
- ☐ I have electronically transfered \$ _____ on date ____ / ____ / ____ to account:

Bank: NAB BSB = 085-070, Account No. 69-701-2377.

PLEASE INSERT CDAA No. in HEADING

Account Name - CAVE DIVERS ASSOCIATION OF AUSTRALIA INC.

- ☐ Please charge to my credit card for the amount: \$ _____
- ☐ BANKCARD ☐ VISA ☐ MASTERCARD

[illegible]

Expiry Date: _____ Signature: _____

Office use only: Database:

Payment:

Card:

RB SHOW & TELL

With Ken Smith at the helm in SA we have been trying to inspire and ignite the passion of our dedicated cave divers with regular events including workshops and guest speakers. Back in March we were lucky enough to be treated to a day of rebreather show and tell.

by Bradley Dohnt

For myself there has always been a certain allure when it comes to rebreathers, I'm not sure if it's the lack of bubbles, the extended gas time or if it's just that I'm a bit of a gear nut and I love playing with dive toys...sorry tools. Needless to say when Ken and Dr Harry mentioned that SA was going to hold an RB day I was more than happy to help in any way I could. From the beginning the plan was to get a few different units together and try and organise some interesting speaker. Well that's how it started, in the end we finished off with 2 fantastic keynote speakers in addition to multiple unit overviews by owners and around eight units on display including many closed circuit rebreathers as well as a couple of Passive Semi closed rebreathers.

The morning started with a well know rebreather enthusiast amongst the CDAA community Dr Richard Harris, As an anaesthetist by trade Dr Harris is well versed in all thing diving physiology related and also packs a wealth of knowledge on rebreathers, apparently anaesthetist machines are actually big arse extra complicated rebreathers...huh you learn something new every day. Richard endeavored to share some of his knowledge with a bit of a rebreather 101, discussing many things from some of the basic principles and workings of rebreathers to all the different ways they can kill you. Although Richard was not shy about warning of the dangers of rebreathers he also revealed many of the benefits of rebreathers if handled with the appropriate amount of caution and training.



PICTURES:

Top: Dr Harry giving us his RB 101 talk

Middle: Checking out a different sort of rebreather the Halcyon RB80 Passive Semi-closed RB

Bottom: Tony Davis showing of the new and improved Optima Rebreather

After Richard discussed a bit about how they work we were lucky enough to have Bob Ramsay give us a bit of a history lesson on rebreathers. Bob is Director of Hyperbaric System Design for Hyperbaric Health, a company which manufactures and operates recompression chambers. He is a Founding Board Member of DAN and Founding President of HDS SEAP (Historical Diving Society of South East Asia and the Pacific). Many, like me, were extremely surprised about how early people began playing around with

the idea of rebreathers; the first dives on rebreathers may actually have been before open circuit. Bob was also kind enough to discuss some of the early O2 and military rebreathers that have been in use for many years in many locations around the world.

After a fantastic BBQ lunch we had a number of rebreather divers show us and explain some of the ins and outs of their units. I would like to thank Tony Davis from DiveRite for showing us the Optima, Errol Harding with his ABBYSS rebreather, Rob Brennan with his Inspiration and Dean Johnson with his Halcyon RB80 Passive Semi-closed rebreather. I would also like to thank those others who brought their units and displayed them, thanks to Hugh Moore with his Tourill PSCRB, Richard Harris with his MK15.5 RB and Andrew Bowie with hi KISS rebreather.

With a turnout of more than 25 odd people we were happy to see so many attend and hope even more will attend the future events of which we hope to have many, if we can't be diving we may as well get together and chat about it. Keep a lookout on the website for updates on workshops to come including in the near future a rope skills and climbing workshop.

Once again a big thank you to all those who were involved including our organisers Ken Smith and Richard Harris, our guest speakers and to all those who brought and discussed their units. And lastly thank you to Southern Diving Centre for supplying the venue and BBQ facilities and all those who chipped in cooking and organising the delicious food.

We still haven't picked a rebreather for you yet Ken but we all agree you can teach an old dog new tricks.

Hope to see you all at the next event, till then safe diving

Bradley Dohnt #4488



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1979 FOSSIL CAVE BONE RECOVERY EXPEDITIONS

Peter Rogers CDAA #399

Reading Neville Skinner's excellent and very detailed account of the recent fossil bone recovery from Fossil Cave (5L81) in the March 2010 edition of Guidelines (the one with a photo of my anonymous buddy on the front cover, who I can reveal is Cheryl Bass, my wife and diving partner for the past 30 years!) prompted me to go back and reread the articles about the 1979 Fossil Cave bone recovery published in CDAA Occasional Paper No. 2 (published in 1981 and available as a PDF to members on the CDAA website). What we were unable to do back when we wrote those articles 30 years ago was include images of the work, so I have delved back into my photographic library and selected some slides from that trip to illustrate the work that was carried out. I haven't added much text; the 2 articles in CDAA Occasional Paper No. 2 cover the story pretty well.

The dive that started the 1979 excavations occurred in November 1978. At that time I was working at Flinders University and knew Dr Rod Wells through helping him with first year student biology practical classes. At that time Rod was a Lecturer at Flinders and had a major research interest in paleobiology. Following discussion about the bones that were all over the floor of Fossil Cave, I brought a large bone back for him to look at. Rod immediately identified the bone as a significant find (from an extinct *Sthenurus* kangaroo), and as they say in the movies, the rest is history.

Looking through my old logbook, I have records of 9 dives in Fossils on the weekend of 20-21 January 1979, and a further 3 on the 27-29 January, and 11 dives on 3-4 March 2009. Between the 7 divers and 3 main weekends of the project, I estimate about 200 dives were made into Fossil Cave.



Fossil Cave, January 1979. A large tent was pitched next to the waters edge to provide shelter for fossil bone sorting activity.



Dr Rod Wells (seated centre with khaki hat) and fossil recovery team. Divers in picture are Martin Garrad (in blue, bottom left), Clive Mills (standing in wetsuit with steel tank), Robin Garrad (seated, bottom right), Jenny Hiscock (standing in black wetsuit), and Rick Stanton (standing behind tent). Dominic Williams is in a white shirt partially obscured by the tent entrance.



Robin Garrad back at the surface with a collection cage full of fossil bones (and a rock!).



During the march 1979 trip the tent was too small to hold all the fossils that were retrieved so Dominic Williams and Rod Wells extended bone sorting activities onto a nearby tarpaulin.



Recently collected and sorted fossil bones awaiting packing for the trip back to Adelaide.



The puzzle is completed back in Rod's laboratory at Flinders University.



Sthenurus brownii/occidentalis after reassembly.



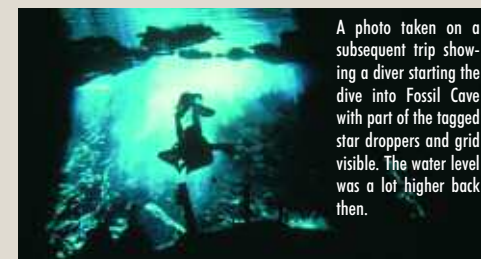
A hand axe and sharpened bone found during the excavation work. These were the only evidence of human presence found in the cave. It is probable that at some time the cave would have been used as a collecting site for volcanic flint nodules found in the limestone and used in making stone cutting implements.



Lower jaw from the giant rat-kangaroo, *Propleopus*. (I hope I have this recorded correctly, could someone let me know if it isn't *Propleopus*?). As I recall, at the time this was the first ever complete set of lower teeth discovered from this extinct animal.



The team. From left seated: Robin Garrad, Rod Wells, Jenny Hiscock, Rick Stanton. Back row from left: Jenny Greigson, Martin Garrad, Keith Evans, Dominic Williams, Peter Rogers. Clive Mills missed the January 1979 trip.



A photo taken on a subsequent trip showing a diver starting the dive into Fossil Cave with part of the tagged star droppers and grid visible. The water level was a lot higher back then.

KARST GEOLOGY

WITH IAN D. LEWIS



Rockpiles, Flatteners and Where They Go

In last issue's article on Englebrecht's Cave, I described some general facts on the geology patterns of caves in the Mt Gambier area. Very few cave divers over the years have been interested in cave geology (nor have taken any notice of me raving about the limestone!) but understanding these rock patterns gives us a direct clue as to where to look for that elusive holy grail - a new tunnel. I'm going to talk more here about some basic geology of rockpiles as they are a feature of local underwater (and dry) caves but are the key to finding cave extensions. There have been several outstanding examples - new passages in the Pines, the initial discovery of Tank Cave, the western tunnel in Englebrecht's etc - all found by worming through rockpiles...

Our Flat limestone is special!

The limestone in the Mount Gambier region is flat-layered and rockpile structures are a direct reflection of this. Most of the world's caves are not in flat limestone but follow steep angles through compressed limestone and marble bands tipped up at all sorts of angles (including vertically) in hilly and mountainous landscapes. There, surface rivers and creeks trickle or pour down them eroding streamway passages like the Jenolan Caves and all the Tasmanian and New Zealand caves. The 6 main regions in the world with outstanding large areas of flat limestone are the Mount Gambier region, the Nullarbor (which is the world's largest flat karst area), Florida, Mexico's Yucatan Peninsula, and a large plateau in Kentucky containing the world's longest cave system - Mammoth Cave 660 kms long (all dry). The Bahamas are a somewhat similar region which in parts has been sliced through by the large Atlantic/Caribbean ocean currents and the remains of that huge limestone sheet stick up as islands full of and surrounded by Blue Holes (more on this in another article).

"Flatteners" (flat tunnels) - how they grow and why you should search for them

Flat limestone started as layers of sea fossils and sands laid down at the bottom of the ocean in the Mount Gambier, Nullarbor and Florida areas around 15-40 million years ago. These layers are called "beds" and cement or compress together under the weight of further layers added by the sea above. Contained within them are thin layers and joining zones that are called "bedding planes". They are a bit like continuous mortar layers a few cms thick between vast wide horizontal rock beds. Although our limestone is reasonably solid stuff, the bedding planes are vulnerable zones which water can weaken when it has been within the limestone for quite a while - say a few hun-

dred years or more at a single water level (averaged throughout the seasons and the year). In Fossil Cave, Pines and a few others if you look at the walls closely you can see and feel these weakened bedding plane layers - the rock is soft and squishy. I call it "custard" - it's crappy rock.

Two things happen in Mount Gambier at these bedding plane levels once water goes to work on them. Bedding plane zones are dissolved easiest by groundwater lakes and pools until a wide flat level span opens up often running along in a single direction - usually NW-SE (like Englebrecht's and most other caves) which is the regional fracture direction. The tunnel then lengthens and widens into what we call a "Flattener" - a wide flat passage system anything from 2-10 metres wide but usually only up to 1 metre high. The linking cross-tunnel in Englebrecht's East is a classic example (C-D section on my map in the last issue). It is really important for exploration to remember that these flatteners are not always restricted to the main NW-SE direction but can under many circumstances widen and head out in any direction. Again, Englebrecht's East flattener is a classic example - it runs at right angles to the regional fracture direction. Murra-elElevyn is a beaut example on the Nullarbor.

Why is this so important to cave divers who are exploring? Because cross-tunnels like these can lead to other hidden major lines of cave development which are nearby and parallel. Tank Cave is full of them - look at its map. Therefore every little low flattener is worth a hell of a close look - ignore the mud as the potential is in every direction in these flatteners. Just remember - the flatteners which lead through to other well known bigger rooms have often been initially squeezed and wriggled through by some devoted cave diver until they are now a highway and comfortable to get through. But this is how Mount Gambier discoveries are made!

Rockpiles - how they grow and why you should know!

Back to the flatteners dissolving and developing wider... after a certain width is reached, the space reaches a stage where the span is too wide to support the rock. Slabs in the roof layers start to peel away, breaking along the horizontal bedding planes. This starts the rockpile process. Most resulting rockpiles in our caves consists of small to medium slabs often with flat surfaces where the breakoff occurred along the bedding plane. As the tunnel roof heightens with more breakage, rocks can fall out of the side walls and these tend to be chunky, more rugged and lumpier. This typically occurs very slowly over time. You can see both rockpile patterns everywhere on a small-

er scale in our underwater caves but on a humungous scale in the sinkholes - same process but heaps bigger (eg in Kilsby's Sinkhole and The Shaft).

So you find rockpiles developing above an earlier flattener passage that is now buried by boulders. Rockpiles are generally circular or long oval shapes on a map and usually occupy the whole width of the passage. If we are lucky they leave enough space at the top to go up a bit and keep going along, possibly down again on the other side and continuing. Englebrecht's West inner air chamber is an example of continuing in a straight line, while the inner Englebrecht's East side room is at this stage a block-off. Cocklebidy Cave on the Nullarbor is just a simple giant example of the same thing.

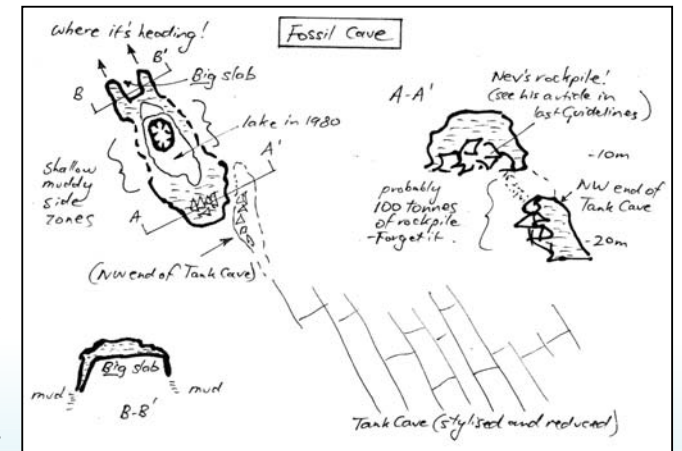
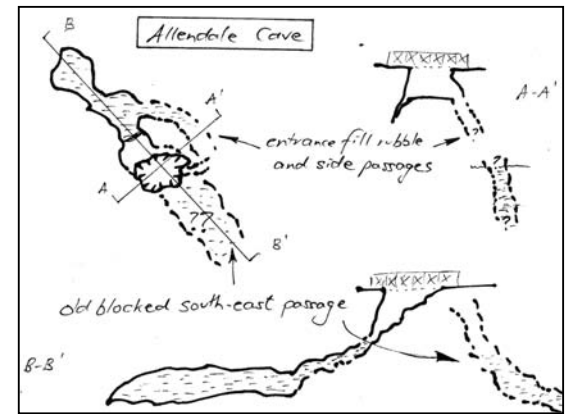
BUT - the really important thing to keep in mind is that the original flat passages at the bottom can dissolve in any direction, so going straight ahead is only one of the options! A circular or long oval rockpile in Mount Gambier can very likely be obscuring tunnels which head out sideways on either side. Or both sides. I can confidently predict that there are a number of low flatteners off the sides of rockpiles which we've all been diving past 'cos we haven't searched the rockpile thoroughly at all, even after years of cave divers going along the main passages. All it takes is behind the right rock, down low...

And why am I quite confident about this? Because apart from the bedding plane weaknesses that start rockpiles in the first place, an even more likley location for rockpiles is where original low flatteners run into each other rather like a cross roads, making the roof even weaker at that spot and starting the collapse process more readily. So whether the main passage you're diving in continues straight on or not, the likelihood of rockpiles concealing multi-direction flatteners is greater than concealing just a single line passage. So keep checking. This is geology with better tote odds! That's why I think of cave geology first and go ferreting around later, with a plan. No doubt about it - for hunting cave extensions, side passages are the real go in this game. They have a much more exciting payoff.

How to search rockpiles

So now you can all start thinking of big and small rockpiles as silent guardians of multiple low-passage connectors to other separate main sections of the cave system you are in, because the Mount Gambier limestone is bristling full of close-spaced fractures side-by-side, often only 20-30 metres apart, right across the region. Again - look at the Tank Cave map for proof of this - it is the geological template for low flat side passages into larger main parallel sections. Sorry, Nullarbor people... your fractures are 20-30 kms apart!

The prime spots to tackle rockpiles are around the outer sides as low down as you can go, aiming for the same level as the original flatteners. Try all sides of the rockpile carefully, whether they have sand, silt or mud on them or not. The second choice is the same approach halfway up the slope of the rockpile but still at the sides, working around and down if possible. Same approach with a passage block-



off. If you can't get over or past the top of a rockpile, try working down the slope of the wall until you can get more horizontal and follow it around. There are plenty of spots in Pines exactly like this which haven't been thoroughly worked.

You can see that the pattern of approach is to find a wall and pursue it - move away from the main rockpile when you can. This is primarily because you can spend all day going around the inside of a rockpile but you'll go nowhere. All you will find is more of the inside! And it's safer working their edges than wasting time inside them. Except for Nev, who finds fossils (see map section). Usually the least efficient and most awkward approach exploring them is directly down the walls from high up. Head horizontally when ever you can. It's easier diving and you increase your chances of working your way through.

Most of the easy cave discoveries were all made 20-30 years ago or more - I mean, how hard is it to drive up to a sinkhole!? Seriously though, there's plenty to be found but you are the next generation of cave divers to do it, with some beaut equipment and technique advantages compared to when my mates and I were grubbing around. There's some hard work ahead of you, but it's your turn. Don't reckon I'd tackle any of the new stuff with my trusty single steelie and Calypso reg, one torch and a stem gauge! If you don't

know what this gear was - ask someone with grey hair... but that's how we all started!

Which ones, then?

So to round off this article - where are some good places to put these rockpile tactics to good use? I've already mentioned Englebrecht's, so here are some others.

Look at the map of Tank Cave and Fossil - where do they both head? We already know that Tank runs virtually under the eastern end of Fossil so what's the point in pushing that? Look where Fossil heads - northwest in the same huge line, with a small lake and a tight rockpile guarding the way. Go look in the smaller lake in Fossil, be prepared for some very hard work, but that's the direction, folks. And also think sideways along those muddy shallow sides in Fossil... same pattern as Tank Cave. Geologically, Fossil is part of Tank Cave (but the join is far too blocked - see fig 2).

Another cave that runs NW is Allendale. Pretty well closed off at the bottom of that chamber without some applied effort. But where else does Allendale go? Off to the side at right angles on the tennis court side halfway up the slope. Just like Pines does, in the same mid-depth water. And what would you be diving around? A rockpile which forms the entrance but here the top part is soil and rubble chucked in by the Highways 50 years ago. Now it is steadily dissolving, sinking and coming away from the natural wall in the entrance on the NE side and around the opposite side to the SE. And a passage heading SE opposite the main tunnel was described by a council worker about 50 years ago before all the soils and gravel went in - so it's there waiting to be found from above, or diving carefully around the side.

Two sinkholes are well worth mentioning - they both have ramps either hand-cut or blasted out about 100 years ago. The rubble was chucked straight into the sinkholes. So where do you reckon all the rubble went? Straight below the ramps in Little Blue and Gouldens, spilling around and blocking off any sloping passages at the bottom that were heading back away underneath the ramp areas. Some divers have looked at these, but how systematically? How much determination? Sinkholes are more simple patterns than the shallower caves but several of them show us that they can extend either side of their entrances - Ten-Eighty (on Barnoolut) and The Shaft prove this.

Why the geology and rock engineering lesson? Because when we understand the pattern of flat-layered limestone rockpiles (and the other regions including the Nullarbor), we can target areas around and within them to explore these smaller spaces which lead past them into the watery unknown and the great prize! The point of knowing how rockpile patterns work in these sites can be applied in other similar caves across the Mount Gambier area. They are there - just use your observations and keep your eyes peeled. A bit of science and some persistence is definitely worth it. Then try it n the Nullarbor. And there's still plenty left in Mexico and the Bahamas Blue Holes when you are ready!

Ian D Lewis CDAA # 258



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Tripod
available
for use!



Well, it's that time again, and I have been kept extremely busy with the day to day running of the sites. I have recently attended a SAR (search and recovery) meeting in Adelaide and a Landowner Liaison committee meeting in Mount Gambier. These meetings have been very productive in the passing of information between bodies.

It is with great regret that I need to inform you all of the passing of one of our members in Kilsbys sinkhole. At this stage, there is very limited information available regarding the tragedy, however, after the coroner's report has been released, then information will become available. This information will be utilised by our training committee to help prevent further incidents occurring. I can advise you that no entanglement on any form of clip was responsible for this incident.

I would like to thank Bruce Bulled for his work in managing access for The Shaft over the years and would like to announce that Terri Allen has agreed to take over in his place. Once again thank you Bruce.

The Hell's Hole cleanup has been placed on the backburner until later in the year because there will be radical changes to the current access to this site that will be completed over the next few months. Once these changes are made it will make the depositing of rubbish much harder. I will be looking for volunteers around October/November to assist in the cleanup of this site.

We are also looking for volunteers for some small projects to be completed in the Mount in the near future, so please contact me on the site director's email with your availability. All levels of divers will be required.

There will be major changes to some of the government controlled sites. This will include new staircases, steps, pontoons and landings to be added.

Lady Nelson is currently converting all access

records to electronic files from the old paper based system and a bar coded card will need to be purchased at the centre. More information regarding this system will be released when it comes to hand. This is hoped to speed up the processing of cards and the passing over of keys, so the divers are not kept waiting for long periods of time while the staff are busy with other duties.

As we all know leases and agreements have a limited life. We are in discussions with landowners regarding leases and access arrangements to keep some of our current sites open.

We are continually getting divers exceeding their certification levels in many sites. This must stop immediately.

Remember access is a privilege, not a right!

Safe diving, Rob Brennan.

PHOTO GEAR 4 SALE

Guidelines designer Dave Bryant has 2 Nikon lenses for sale.



17-55mm F2.8 DX lens
just serviced, complete with Hood and 77mm 1A UV Filter.
VGC \$1,100

20mm F2.8 D lens
GC, complete with 1A Filter - \$275

will include post within Australia!



E: seapicsdavebryant@gmail.com

DEEP CAVERN/SINKHOLE DIVE COURSE JOURNAL

A daily personal record

by Michael Mallis, CDAA #4553

If you'd have asked me more than two years ago would I even contemplate doing a deep cavern course I would have said "No way, what for?" If you had asked me six months ago I would have said "Absolutely". So what has changed? My answer is surprisingly simple, the more I dive the more I realise how much more there is to learn about a sport I care enough about to continually make myself a better diver; it's as simple as that.

This course by its very nature demands you already have good buoyancy and trim skills but it will give you a better appreciation of why this is important especially in overhead environments. It also gives you a heightened awareness of your surroundings and the importance of good buddy contact which will allow you to avoid getting into potentially hazardous situations and what to do in situations when you do find yourself in trouble. I take away from this course far more than I had imagined; along with the obvious ability to confidently dive caverns, sinkholes and do deep penetration wreck diving it has given me more confidence in my abilities to handle stressful situations along with even more careful dive planning, signalling, line work, silt and overhead environments. I now look forward to applying my new skills to all aspects of my diving in the future. The old diving adage Stop, Think, Act has even more relevance and importance to me now after having completed this course.

Prior to leaving for Mt Gambier to complete the on-site components of the course requirements one has to have done and passed three nights of theory and one day of pool work which included a land session of reel work. This was done in the preceding three weeks. I came away from the theory with lots of knowledge but one thing that the instructor said sticks in my mind to this day and that is "If you lose the line, you're dead"; that's as basic and succinct as it gets. Just ensure you don't lose the line.

DAY MINUS ONE - Friday March 5th 2010 - Leave Melbourne for Mt Gambier

Preparation for this trip started weeks ago when I drew up a detailed three page check list of all the things I would require for this course. I packed my tiny car the night before checking off items from my checklist as I went along. I left nothing to chance right down to taking just about two of everything plus equipment spares.

I left Melbourne at 1146 and expected the trip to take about 6.5 hours; in fact it took just under this time with a 30 minutes stop over at Ballarat for lunch and a 15 pit-stop at Hamilton to stretch the legs. I took the Eastern freeway and travelled via Flemington to join up with the Western Freeway. It took about 45 minutes just to clear suburbia despite the traffic accident I passed and the (holiday?) traffic that choked the roads early on. Once on the M8 to Ballarat the road trip was very smooth and I kept up with traffic and the speed limits. I diverted to Hamilton via Singleton but I would learn later that bypassing Ballarat and diverting through Singleton via Beaufort is the better and faster route. The rest of the trip was uneventful and very smooth; I was able to keep a constant 100kph the whole way, only slowing down when passing through towns.

The weather was threatening with some drizzle in the air when I left Melbourne with a very humid temperature of 25C but the closer I got to the border the hotter it got (30C) with the skies becoming clearer. I had expected to see a sign at the border saying something like 'You are now entering South Australia' but there was none to be seen. What you do see is a large sign warning you about the dangers and penalties you will incur if you bring fruit or vegetables into the state.

I was the first of our dive group to arrive at the Just A Bed Lodge dive lodge. This is a new and clean accommodation centre with rooms that sleep up to three peo-



This is how South Australia greets its visitors; not much of a welcome sign is it?

ple, communal lounge and kitchen areas, toilets and separate shower area. There is also an outside undercover drying area and barbeque. I claimed my bunk as divers had pre-assigned rooms with their names on the door then carried the twin set to the Blue Lake Diving dive shop for an air fill which is conveniently located next door to the lodge. Next to arrive was Richard, a very experienced and competent trimix, deep and wreck diver with whom I buddied up during the pool session and I hope to be buddied up during the actual training dives. Richard said that the other six divers would be arriving later in the evening so we decided to go into town for a dinner. We cruised the main streets for a while until we found what looked to be a nice restaurant. As it turned out it was probably the best one in town called Redfins which was right next door to the Mt Gambier Hotel.

After dinner Richard drove us back to the lodge where Andy Higgins our dive instructor had arrived. He advised us that one of our group would not be coming on the course and that Hannah has a bit of a cold. Even Andy himself complained of a slight nasal issue but would persevere somehow; as it turned out both coped well. I was bunking with Andrew (Muz) and my only thought at the time was I hope to hell he doesn't snore. The course participants would be John, Hannah, Muz (Andrew), Richard, Tim, Jimmy and me.



Tank refilling station
at Blue Lake Diving.

DAY ONE - March 6th 2010 - Gouldens and Rope Work

Crap, Muz snores; I swear he can wake the dead with his snoring. If I got three hours sleep that night I'd be surprised. Woke up with the alarm clock at 6:30am, or at least I thought it was 6:30am. Turns out I'd set the wrong time and woke up at 6am instead; caught out by daylight savings time differences. I got up anyway and fixed myself breakfast. Needless to say I was the first one up as I would be every day of my stay. Breakfast consisted of toast and washed down with a nice hot tea. Once I had breakfast it was a priority to pick up the twins and check that they had been filled and assemble my kit. Everyone gets great fills at this place, 240bar was normal. Even though the filling station is located next door to the dive lodge you never hear any compressor noise. The arrangement with fills is to leave them in the dive station next door to the dive lodge with a tag specifying what mix you wanted along with your name and a contact number. Nitrox and Trimix are also available.

The day's two dives were at Goulden's Cavern and consisted of two sessions with a break taken for drinks and a lunch which I had made that morning and consisted of two rolls of ham, cheese and tomato which were quick-

ly demolished as I was ravenous with hunger after the first session. I was with the first group of three divers. Tasks included doing pre-dive checks, reel work with task loading that included mask removal and air sharing scenarios whilst following a line back to the secondary and primary tie-off points. The second session consisted of more of the same plus practicing other skills like dropping down a nine metre shot line and then ascending in one meter increments and holding horizontal trim for about 30 seconds at each stop.

Goulden's is typical of basic caverns in Mt Gambier, with a classic shape in that the cavern extends underneath the above water sides. It is one of the smaller caverns, but is still quite a good dive site that is often used for training students. A CDAA cavern rating is required to dive this site plus a permit system operates through the Department of Environment and Land Management (DELW). At around the 12 metre mark, there is a thermocline that you will notice as the water cuts under the walls of the diff sides but being used to cold water diving in Victorian waters it wasn't a problem for me. It can get quite silty at this site if you're not careful so one has to be very vigilant and not stir up any silt; if you do you'll soon know about it. I'm



John stepping off the lower landing
at Gouldens cavern.

happy to report that no one in our group did this.

After the first dive I brought out post-dive snacks that were shared with everyone. This 'tradition' continued after each dive over the three days we were at Mt Gambier. After our last dive of the day we made our way to Little Blue Lake via a five kilometre detour to a local bottle shop at Bellum for people to stock up on some alcohol. It's a good thing that alcohol consumption isn't a requirement for passing this course as I was the only person not drinking the whole time at Mt Gambier.



Gouldens cavern.
Appropriate warnings
and site information
like this one.



The author getting ready to go over the side for some climbing practice. The last time I did this was 20 years ago in Tasmania with the Tasmanian Search and Rescue Police as part of my Antarctic field training. This style of rope work is useful if you intend doing sinkhole sites like The Shaft.

We were there for about two hours before heading off back to the lodge for a much needed shower and change of clothes and booking the twins in for an air fill. My typical gas usage for each dive session was 80 to 90 bar.

The evening consisted of downloading photos from my (above water) digital camera and updating this journal. I deliberately did not take an underwater camera with me as I did not want to be distracted from the training. At 7:30pm five of us, Rick, Daniel (two very experienced cave divers sharing the lodge with us), Andy, Richard and myself went to the Fasta Pasta food restaurant in Mt Gambier where we met up with two other very experienced cave divers and really friendly guys Scotty and Pete who were very generous in sharing their experiences with me. I ordered a very generous serving of ravioli which I quickly devoured as my body was craving carbohydrates and energy food as the day's activities were already taking a toll on my body.

DAY TWO - March 7th 2010 - Little Blue Lake and Gouldens

Muz continues to snore and last night added a wheeze to his hypno syncopations. Fortunately I was prepared for this and had a tissue ready to stuff into my ears and a set of noise cancelling headphones in bed ready to deploy at the slightest noise Muz might make. Well, the symphonic orchestra was in fully flight last night but I managed to sleep in relative quiet despite his best efforts to keep me awake. My back-up plan was to either sleep on the couch or smother him with a pillow. Muz will never know how close I came to doing the latter.

I was again the first one up at 6:30am and made toast and tea for breakfast. During this time most of the others would surface (pardon the pun) and make their breakfast. After breakfast the filled twins would be collected and the dive kit assembled and made ready for our next dive which was to be Little Blue Lake sinkhole.

Little Blue Lake is much larger than Gouldens and is also used for training purposes. It is deep at 41m with an average of 38m and is usually dark, and it is easy to silt up. It is a circular sinkhole with a diameter of 60m and a water surface depth from ground level of about 20m. At the height of summer it suffers from algae bloom but this had mostly dissipated by the time we dived it. Average visibility at the bottom is normally about 3 metres but on our dive it was about 8 – 10 metres. There are lots of things to look at, including heaps of rubbish, street signs and even a free-standing petrol bowser with a car next to it. Permission is not required to dive this site but your CDA card must be carried.



The pontoon from which you step into Little Blue Lake sinkhole. From L. to R. Muz, John, Hannah and Andy (Instructor) who is carrying a stage that is left on the shot line at 6 metres. The residue of some green algae coagulating on the surface is visible in the background; just don't surface through this muck.

The exercise at Little Blue Lake was to descend on a shot line set at 28m, which was almost touching the very silty bottom, attach a primary tie-off and then run a line as directed by the instructor. I was the leader for our group of four consisting of Richard as my wing-man and buddy followed by Tim and Jimmy. We descended down the shot and reached the end at 28 metres in less than two minutes. Whilst everything that subsequently happened seemed very clear to me at the time others who were there would disagree and so I must bow to their judgment and concede that I was narced off my face as soon as I hit bottom. Suffice to say that I forgot that I was the dive leader and had the task of making the primary tie off and laying line from the reel. I just hung at the bottom of the shot line waiting for something to happen. I remember others making gestures and hand-signals and pointing to something behind me; I turned round thinking there was something I should see behind me. Turns out they were pointing to my reel and gesturing me to deploy it. Apparently Jimmy took my reel and tapped me on the mask to get my attention; I don't remember this at all. All I remember is the reel appearing in my hands and then it dawned on me what I was meant to do. I then proceeded to lay out the line and according to Andy performed perfect tie-offs and wraps. The strange thing is that during this whole time I thought I was corpus mentis and in total control of my mental faculties. I remember even now and at the time thinking am I narced? The answer kept coming back as "No, how could I be?" I rationalized this because I knew where I was, my depth and my runtime. Returning to the surface everyone had a good laugh at my expense saying that I was narced off my tits and that denial was a sure sign that I was narced. The verdict was unanimous and even Andy was adamant and so I concede that

for the first time in my life I now know what narcosis can do to your judgment.

The dive de-brief was done, as it's done after every dive, and it seems most people saw the car at the turn around point except me. I did see the petrol bowser that apparently is right next to the car but not the car itself. In my defence I didn't even know there was a car to be seen on this dive (that's my story and I'm sticking to it). During the surface interval Andy suggested we drive south to Allendale East where we were introduced to Pete and Daniel who run the local dive shop that provides air fills and has a lounge area that welcomes divers to rest between dives and to have someplace to sit down and eat. A short walk down the main road took us to the Allendale cave site which actually bisects the main road. After a bite to eat and some drink we headed back to Gouldens for the day's second dive.

Our first skill test was to deploy a line after making primary and secondary tie-offs with an entanglement situation. We were only told that this could occur at any time during the dive. My surprise was that Andy entangled himself and not one of us as we had expected. I first saw Andy's emergency light signal and raced over to help, gave him the stop signal and held his arm until Richard and I untangled him. Once he was untangled the OK signal was given and I then directed him to the line by physically placing his hand on the line. The next skill test was for Richard and me to deploy a line and at some point in the dive one of our air supply would be removed as well as both our masks by Andy. We then had to sort ourselves before reeling in the line and making our way back to the secondary tie-off for an intended 30 second decompression stop which we had to estimate and then onto the primary tie-off point. Richard had control of the reel so all I had to do was hold onto him. Unfortunately it didn't dawn on me that I had grabbed his left upper arm which prevented him from venting properly as we ascended to shallower depths. To be fair Richard had tried to indicate to me to grab his harness instead but I wasn't perceptive enough to realise this. When we got to the secondary tie-off point we couldn't hold position so we had an uncontrolled ascent from about 3 metres. We quickly realised our mistake and repeated the 30 second deco stop and finished the exercise. A lesson learned and better to do it in a controlled environment like this that in real-life; next time grab hold of a harness or the right arm. A few minutes rest on the surface was followed by another long hard walk back to the



Kilsby site entrance. A ramp with handrail takes you down to two sets of stairs and then onto a pontoon. You actually get to this point by first climbing over a fence that has an A-frame ladder built over it. The building in the background is on the end of the sinkhole and was once used by the Australian Navy for (non-explosive) weapons testing.



This is the only entry and exit point for kilometres of cave system.

platform and those thousand killer steps to the cars; at least it seemed a thousand steps but they were a killer. It's a 15 minute drive back to the lodge where one's first task is to detach the wing, back plate and regulators from the twins and to organise for an air fill in the dive shop. This takes about ten minutes. The next priority is to jump in the shower as soon as it becomes free.

Before dinner Andy suggested that for those who wanted a quick tour of the region's other cave sites for an hour or so before heading off to dinner. We first visited the famous Tank cave followed by Fossil cave, Stinging Nettles and finally the ill-named Death cave; all fascinating dive sites. We were given a potted history of these sites and how they are managed by the CDA.

That night most of our dive group travelled in a few cars to a nearby hotel at Ballum (there's only one) for dinner. We stayed a few hours and enjoyed the company, heard tall tales and had another rather large meal. I've got to say that the quality of the pub food exceeded my expectations and was reasonably priced. I'd certainly be going back for a return feed.

Once again I slept very well and was prepared for the worst that Muz could lash out. At about 3:30am I was awoken once again to the cacophonous sounds of the Insomniacs Symphony by Muz; even the muffling effect of ear plugs and noise cancelling headphones couldn't block out the snoring this time. By about 4:30am I'd had enough and took my sleeping bag to the couch and slept there until about 6:30am. At least I got some rest and sleep.

DAY THREE - 8 March 2010 - Kilsbys and the drive home

After another breakfast of tea and toast (with lashings of Vegemite) we learned what the rest of the day's dives would entail. First, we were to dive Kilsbys sinkhole which would involve a 40 to 35 metre dive with a mask removal and replacement at 30 metres whilst laying a line. This proved to be to be a very easy task but it had to be done. The next dive would be basically an easy dive to at least 30 metres and no more than 35 metres whilst laying and retrieving a line. Both dives were to be planned decompression dives with safety and deco stops. Two groups of four and three dives were to lay a line each and making a tie-off at the bottom of each of the two shot lines that are permanently set up.

We were very fortunate to have two dives at Kilsbys and on the last day because this is a very popular dive site and the best and most impressive sinkhole dived so far. The water was absolutely crystal clear and from the bottom (35 metres) the sky and pontoon were clearly visible.

Kilsby's is an impressive sinkhole situated approximately 12km south

west from Mt Gambier. This is a spectacular dive site where the water surface is about 17m below ground level and in a round pool of approximately 20 metres in diameter. The water is absolutely gin clear. Access is restricted to CDAA members only and only during designated times. Bookings are mandatory. The site contains extremely clear water with visibility in excess of 40 metres, with the site being in excess of 60m deep, with 40m being the maximum depth allowed for divers on air. Average depth is 25m that falls away to one side and under an overhang. There are a few swim throughs, with sculptured and scalloped limestone walls with breathtaking views when looking up towards the pontoon from the back corner of the cavern at 40m makes this one of the best fresh water sites you could ever dive. A cut ramp with stairs and two sets of ladders leads down to a large pontoon at the water. The pontoon is fitted with four fixed plastic chairs, which make for a good spot to sit with your gear after a dive and to rest up before climbing the ladders and ramp.

This dive itself is relatively easy, although twins or redundant air supply are a requirement with a maximum depth of 40m on air. There are some dangers with the site that are easily avoidable once they're understood, thus a minimum of a CDAA sinkhole dive rating is required for entry to this site. Entry to the site has strict protocols that must be adhered to, which can be found when making an online booking through the CDAA website. There are no creature comfort facilities at this dive site so you just have to plan around it. Divers are required to leave the site at the end of the morning's dive and come back at the allotted time in the afternoon. If diving all day you can stay on the site until after the last dive.

I couldn't wait to get in first. We tossed a coin to see which group would go in first; our group had this honour and was made up of Tim, Jimmy, Richard and myself. Descending to the bottom of the shot was awe inspiring because the clarity of the water was the best I had ever experienced and the fact we never have to contend with current or surge was brought home to me when we descended the whole way down right next to the shot line with minimal effort.

Tim led our dive group and had the reel. The primary tie-off point was at about 21 metres. We then followed the contours of the bottom towards the deepest part of the cavern. We ended up at 35 metres before the turn around signal was given and acknowledged. I was the third diver going in and the second coming out. At about the 30 metre mark Richard indicated to me that we were to remove and replace our masks. This was done by everyone without any fuss. We then continued up the line to the bottom of the shot. Richard and I as a buddy pair stayed together and we indicated that we were to proceed to our first deco stop. The others had planned a slightly longer dive than us. We had planned a 22 minute total runtime with deco stops of one minute at the 12, 9 and 6 metre marks. A final two minute safety stop at 3 metres was also done. In fact we didn't have to do so many deco stops but part of the exercise was to see how well we could manage mid-water stops.

Our second dive had an almost identical profile but this time we got to 32 metres and the deco stops were the same except that we made a five minute safety stop at three metres just because we could. I must confess that I was so eager to get in the water for the second dive that I forgot to check that my dry suit zip was closed; it wasn't. I jumped in only to suddenly realise what I had stupidly done. I (very) quickly got out, doffed my kit, zipped up and got in with totally drenched undergarments. Because my boots were flooded to the knees I ditched the canister light to recover some trim and to decrease my weight. My trim wasn't the best but I did finish the dive and



Part of the dive team.
From L. to R. John, Tim, Muz, Jimmy and Andy Higgins (Instructor).

according to our dive plan. I wasn't as cold as I thought I would be but I did feel a chill coming on in the last minute of the dive. Had I aborted the last dive I would have had to do it again at some later time but I was adamant that was not going to happen.

Earlier in the day we left the lodge with the intention of not returning as we had packed away all our gear and paid up before leaving for our first dive. After the last dive and the now obligatory post-dive snacks we arranged to finish off paperwork at Engelbregts Cave centre in Mt Gambier. We signed some official CDAA documentation whereupon Andy issued each one of us our temporary Deep Cavern/Sinkhole membership cards. I'm happy to report that we all passed the course. After this we were invited to visit Engelbregts caves by Andy who arranged with the site manager to allow us entry. We viewed the two caves and diver entry points up close and after 30 minutes underground we said our goodbyes and exchanged some contact details.

I left Mt Gambier proper at about 1315 Victoria time after first filling up with petrol. I arrived home at 1830 without any stops. This was enough time to shower and get a change of clothes before going out with friends and devouring another large meal and learnt about the recent devastating wild storms Melbourne had experienced during my absence. By the way, Mt Gambier had near perfect weather.

POST DIVE REVIEW AND CRITIQUE

To say I was happy to have completed and passed this course would be an understatement. Once again I had personally challenged myself and succeeded. Doing this course proved that once again it reinforced my determination and confidence to complete anything I set myself to do in life. I suppose I can now rightfully call myself a technical diver (shouldn't all Victorian divers who dive Bass Strait and the Heads automatically qualify anyway?) but as with everything in life the theory is one thing but there is no substitute for actual experience.

Our course instructor Andy Higgins was highly recommended to me by my dive buddy Sarah who had completed the course with Andy three months earlier and I can wholeheartedly concur with her verdict. I have no hesitation in personally recommending Andy to anyone seriously wanting to do this course. Thanks again Andy for a thorough and tough course and for making me a better diver. ■



The AGM is coming soon, October the 2nd at the Barn. For members who attended last year I think we'll have a similarly exciting time this year and for members who haven't attended an AGM I encourage you to participate. It's an opportunity to directly participate in the running of the association and opportunity to hear some great speakers. There will be more details regarding dinner and accommodation in the next issue of Guidelines.

There is also the call for nominations for two Director positions, Business and Standards. Please nominate for one of these if you think you have the skills, time and commitment to make a difference. The notice also serves to call for member motions and amendments to the constitution.

Financially we are tracking well to budget. I am working on reducing the cycle of financial reporting. We've had a six month review and I want to have us on a quarterly cycle for the next financial year. I will publish our budget for next financial year in the next issue of Guidelines and will include areas where we have been able to manage cost reductions.

The biggest piece of business is Tank Cave. We are wanting to take a piece of farmland and subdivide it into a non complying size for a non complying use so not surprisingly, there are a number of hurdles that must be cleared. It's not a hugely complex transaction but there are procedures and processes to be navigated with council.

We have decided to create a Tank Cave management committee to devise strategy on:

- How to maximise access and availability to members while minimising damage to the cave
- Development and maintenance for the site
- Financial model for site operations

It will meet fortnightly for 2-3hrs.

I anticipate and hope that there will be a large number of volunteers for this committee but need to stress that we will be looking for people with specific experience and skills. If you think you could assist please contact me at .

Safe Diving, Andrew Cronan, Business Director.
Email: business@cavedivers.com.au

Bauer Junior Compressors

1x BAUER fully serviced 5cf, 1985 model \$4,000 and 3.5cf Junior \$4,500
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I have modified a number of Bauer Junior compressors, the Petrol motor and Electric motors can be changed over for home use in 2 minutes!

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Certificate No. 121206/58

CDAA INSTRUCTORS

NAME	Deep Cavern	Cave	Adv Cave	NAME	Deep Cavern	Cave	Adv Cave
A.C.T.				VICTORIA. cont.			
APPS, Heike (CDAA 2776) BH 02 6249 9170 AH 02 6291 0566 E: heike.apps@ga.gov.au	Yes	Yes	Yes	DALLA-ZUANNA, John (CDAA 236) Penetration instructor Phone: 0407 887 060 Email: jdz@paintandcustom.com.au	Yes	Yes	Yes
SOUTH AUSTRALIA				HARDMAN, Lorraine (CDAA 2824) Mob: 0418 304 120 E: PALdiving@people.net.au	Yes		
COSTELLO, Peter (CDAA 3378) Mob: 0417 494 771 soudiv@southerndiving.com	Yes			HIGGINS, Andrew (CDAA 3329) Mobile: 0413 569164 E: ah3329@gmail.com	Yes	Yes	Yes
SELBACH, Steve (CDAA 3495) Phone: 0413 134 827 Email: steve.selbach@mac.com	Yes			LESLIE, Paul (CDAA 3184) Phone: (03) 9879 2868 Email: info@melbournediving.com.au	Yes	Yes	
TAYLOR, Ian (CDAA 3568) Phone: 0411 118 134 E: ian.taylor4@defence.gov.au	Yes	Yes		McDONALD, Warrick (CDAA 1882) BH: (03) 9579 2600 E: info@abocean.com.au Mobile 0408 374 112	Yes	Yes	Yes
VICTORIA				MONACO, Rubens (CDAA 1731) BH 03 5984-1799 E: info@idcscuba.com.au Mobile: 0413-429-533	Yes	Yes	
ALLEN, Terri (CDAA 3483) Mob: 0419 176 633 E: terri.allen@baker.edu.au	Yes	Yes		QUEENSLAND			
BARCLAY, Gary (CDAA 1735) AH (03) 5565 8793 E: garinda@tpgi.com.au	Yes	Yes	Yes	FEATONBY, Tim (CDAA 3372) Mob: 0402 129 253 E: tim.featonby@defence.gov.au	Yes	Yes	
BOWMAN, Jane (CDAA 1880) BH: (03) 9579 2600 E: info@abocean.com.au www.abocean.com.au	Yes	Yes	Yes	WESTERN AUSTRALIA			
CLARIDGE, Linda (CDAA 2214) Mobile 0408 052 070 E: garinda@tpgi.com.au AH (03) 5565 8793	Yes	Yes	Yes	PAYNTER, Geoff (CDAA 3784) Mob: 0407 445 112 E: gpaynter@geo.net.au	Yes		

INSTRUCTOR ADVOCATE: PAUL LESLIE.

TANK CAVE DATES... & A REMINDER...

A Tank Cave returning diver application form and a \$60 weekend fee will be required before any bookings can be accepted.

Check the new website for current dates!

UPCOMING COURSES

DEEP CAVERN Courses

July 12-25 in Melbourne and Mt Gambier
In Melbourne for theory, land drills and pool session using Option A course. 3 days in Mt Gambier.
Instructor: Terri ALLEN 0419 176633

Thursday 2nd September - Sunday 5th September inclusive
Full time course in Mount Gambier SA. All dives- 4 training, 3 site dives, wire ladder climbing and rope handling workshop included. All specialised equipment supplied. For more info please contact...
Instructor: Linda CLARIDGE 0408 052 070

September 2nd - 27th in Melbourne & Mt. Gambier
Theory, full gear critique and assistance with modification as well as a 4 hour pool session. all completed in Melb. 3 day weekend... complete 3 Cavern Dives and 3 Sinkholes in Mt Gambier. Twin Tanks required for all dives.
If dates don't quite suit, arrange 4 of your dive buddies and I can run a course to suit you.
Instructor: Paul Leslie (3184) - 0407 785 591

Saturday October 30th - Tuesday November 2nd inclusive
Full time course in Mount Gambier SA. All dives- 4 training, 3 site dives, wire ladder climbing and rope handling workshop included. All specialised equipment supplied. For more info please contact...
Instructor: Linda CLARIDGE 0408 052 070

January Tue 4th - Mon 17th in Melbourne & Mt Gambier
Theory, full gear critique and assistance with modification as well as a 4 hour pool session. all completed in Melb. 3 day weekend... complete 3 Cavern Dives and 3 Sinkholes in Mt Gambier. Twin Tanks required for all dives.
If dates don't quite suit, arrange 4 of your dive buddies and I can run a course to suit you.
Instructor: Paul Leslie (3184) - 0407 785 591

CAVE Courses

Friday July 16 - Sunday 18 inclusive
3 day full-time course conducted entirely in Mount Gambier. Includes all theory, 3 training dives and 3 site dives.
For further information please contact... Instructor: Linda Claridge 0408 052 070

July 26 August 31 in Melbourne and Mt Gambier
Theory and exam in Melbourne. 3 Days of diving in Mount Gambier
Instructor: Terri ALLEN 0419 17 66 33

Friday August 13 - Sunday 15 inclusive
3 day full-time course conducted entirely in Mount Gambier. Includes all theory, 3 training dives and 3 site dives.
For further information please contact... Instructor: Linda Claridge 0408 052 070

Saturday September 25 - Monday September 27 inclusive
3 day full-time course conducted entirely in Mount Gambier. Includes all theory, 3 training dives and 3 site dives.
For further information please contact... Instructor: Linda Claridge 0408 052 070

November Mon 22nd - Mon 29th in Melbourne & Mt Gambier
Includes theory, full gear critique and assistance with mods including use of Finger Spools, Arrows and Cookies, all completed in Melbourne. 3 day w'end away where you will complete 6 Dives incl 3 Cave Sites in Mt Gambier. Twin Tanks required for all dives. - Midweek courses will be run over 4 days in Mt Gambier.
Instructor: Paul Leslie (3184) - 0407 785 591

Please download the latest application form off the web page
www.cavedivers.com.au

CDAA SITE ACCESS - www.cavedivers.com.au

Remember: Access is a privilege, not a right. Please be considerate of landowners wishes.

CN = CAVERN S = SINKHOLE C = CAVE P = PENETRATION

SITE	LEVEL	OWNER	ACCESS DETAILS
MOUNT GAMBIER - SOUTH AUSTRALIA			
DEH SITES			
Ewens Ponds	Nil	DEH P.O. Box 1046 Mt Gambier 5290 (08) 8735 1177	Groups of 6 or more, phone/mail to Dept. for Environment & Heritage (DEH) Smaller groups, no need. Fax: (08) 8735 1135
Gouldens	CN	DEH	General Diving: Divers to contact DEH and notify of date and site to be dived. Please make requests by phone or fax only.
2 Sisters	CN	P.O. Box 1046	Divers must have the correct CDAA diving endorsement for the site and carry current
Fossil	C	Mt Gambier 5290 Ph: (08) 8735 1177 Fax: (08) 8735 1135	financial CDAA membership card. The diver must have signed an indemnity with DEH before access is permitted and original copy must be received by DEH prior to diving. Training: The Instructor is to notify DEH of the date the sites are needed and to forward signed indemnities from each student and their temporary card number/ membership number.
Piccaninnie Ponds	S	as above	Permit holders by phone or fax. Be aware of delicate vegetation. \$26/dive or annual Permit \$60. NOTE: Indemnity form to be completed with m'ship renewal & lasts same length as. M'ship. <i>NOTE: Divers should renew their Piccaninnie Ponds indemnities at least 2 weeks prior to their intended dive date.</i>
Horse & Cart	CN	Peter Cunningham	By phone or mail, 1 week prior. Ph: (08) 8738 4003.
Tea Tree	CN	PO Box 2168, Mt Gambier 5290	
Little Blue	S	District Council of Grant	Permission not required - must carry card.
Allendale	C	District Council of Grant	Obtain key from Lady Nelson Tourist Information Centre.
Ela Elap	S	Mr. Peter Norman	Visit the house before diving.
One Tree	S		If no one is home - no dive!

FORESTRY SA SITES

Dave's Cave	C	Maximum 3 divers all weekends between May & November inclusive (check and update on CDAA website).	
Hells Hole	S	At least 4 divers in group - 1 with previous site experience.	
Pines	C/P	Unrestricted days or numbers - Cave rated divers must not enter Penetration sections (stop signs)	
Mud Hole	C	Unrestricted days or numbers.	
Nettle Bed	P	Open every weekend. Maximum of 4 divers per weekend undertaking 1 dive only (check an update on CDAA website)	
Stinging Nettle Cave	P	Open every weekend max 3 divers per day undertaking 1 dive per day (check an update on CDAA website).	
Iddlebidy	P	Open every Saturday max 4 divers, 1 dive only (check an update on CDAA website)	

Owner: Contact Forestry SA by email: conservationandrecreation@forestrysa.com.au. Fax: (08) 8724 2870 or Phone: (08) 8724 2876 or book on-line via the CDAA website to arrange permit. Collect permits from the Forestry Office, RHS of driveway to Carter Holt, Jubilee Hwy, Mt G.

IMPORTANT:

- No diving on Total Fire Ban Days.
- Permit also required to run compressors during fire danger season.
- Keys for Hells Hole, Nettle Bed, Iddlebidy and Stinging Nettle Cave can be obtained from Lady Nelson Visitor Centre on presentation of Forestry SA permits.

Kilsby's	S	Landowner leased to CDAA	Access - Open Weekly. Refer to CDAA website. Twin Tanks - Maximum depth of 40 metres on Air. Meet at gate of property at 8.55am or 12.55pm. Book on-line at www.cavedivers.com or contact Craig at kilsby@cavedivers.com.au No animals, visitors or mid-week diving allowed.
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CDAA SITE ACCESS

SITE	LEVEL	OWNER	ACCESS DETAILS
MOUNT GAMBIER - SOUTH AUSTRALIA (continued)			
BARNOOLUT SITES			
Ten Eighty	S/C	Scotts Agencies P/L	Access: ALL BARNOOLUT SITES ARE TEMPORARILY CLOSED.
Blacks Hole	S/C	Scotts Agencies P/L	Mt
Shaft	S/C	Generally open one weekend a month. Trevor Ashby	For access dates refer to Guidelines or the CDAA web page. Nitrox as a diving mix is not allowed in the Shaft unless a trimix endorsement is held but deco mixes attached to the shot line are permissible. Refer to Shaft access bulletin within CDAA Regulations. Divers applying to dive in the Shaft for the first time must document dive experience with twin tanks Download form off website. Email: shaft@cavedivers.com.au (Terri Allen, Mobile: 0419 176 633) Obtain key from Mt Gambier Tourist Information Centre. Access agreement must be signed prior to diving. 2 divers must sign out keys, all divers must sign in advising which groups they are diving with. Diving should be avoided after heavy rain due to possible water contamination. Diving hours are now restricted to 8am to 8pm CST.
Engelbrechts - East	C	Mt Gambier Council	
- West	P	Lessee Ph: 0418 133 407	
Three Sisters	P	Millicent Council	Download Indemnity from Web Page. Access available for experienced Penetration divers only. Low profile systems advised. Access agreement must be signed prior to diving. Please allow 4 weeks for indemnities to be processed.
McKay's Shaft	S		Contact Email: site@cavedivers.com.au.
Tank Cave	P	Mr. DYCKER	Access Manager: Noel Dillon. Email: noel.dillon@macquarie.com
Baker's Cave	C	Manager: Brad Dibble E: site@cavedivers.com.au	Please write to the Site Access Director to dive in Baker's Cave. Include stamped self-addressed envelope. Climbing equipment required. Only open October to April.

NULLARBOR - WESTERN AUSTRALIA

Cocklebidy	C/P	Apply in writing for permission to dive at least 4 weeks in advance of trip to: District Manager, Department of Environment and Conservation (DEC), PO Box 234, Esperance, W.A. 6450. Phone: (08) 9083 2100 Fax: (08) 9071 3657.	
Murra El Elevyn	P/C		
Tommy Grahams	C		
Weebubbie	S/C	DPI	The Department for Planning and Infrastructure, Midland, State Land Services South East. PO Box 1575, Midland 6936. Contact Kim Allison, Email: kim.allison@dpi.wa.gov.au Phone (08) 9347 5047 Fax (08) 9347 5004

N.S.W. - WELLINGTON CAVES

Limekiln (McCavity)	P/C	Both Penetration and Cave Level are being accepted for this cave depending on its water level at the time. The cave has a restriction at the entrance which is underwater making it a Penetration Dive. During drought, the water level drops to form a small lake below the restriction allowing experienced Cave Divers access to this delicate cave.	
Water (Anticline)	C	Affected by high CO ₂ levels during Summer/Autumn. Access is co-ordinated with the Wellington Caves management by Greg Ryan - greg@cs.usyd.edu.au. Phone (02)97434157	
Rum Jungle Lake	S	Unrestricted access currently exists – Please refer advice Guidelines #68 or check CDAA website.	
Burrinjuck	S/C/P	This is a tri-rated site. Please see details in issue No. 73. There are no specific access arrangements.	

QTY / COL/SIZE		ITEM	UNIT PRICE	TOTAL	
DVD'S	NEW!	A Cave Diver's Story - Steve Bogaerts Venture into the life of cave divers as they map the unknown underwater caves of Mexico. These underwater cave systems in Mexico are more extensive than anywhere else in the world. In fact, 11 three of the planets longest submerged cave systems are found on the Caribbean coastline. Follow Steve Bogaerts through some of the most amazing cave diving footage ever filmed.	\$35.00		
		Australian Cave Diving - A Contrast. By Tony Carlisle. Four short documentary-type videos on Warbla Cave, Three Sisters Cave, The Road to Toad Hall and Tank Cave.	\$25.00		
		Axxis Mundi. A unique expedition into the inner jungles of the Yucatan. For over a decade, explorer Curt Brown and his team of cave explorers have been pushing deeper into the inner jungles of the Yucatan in search of unexplored cenotes.	\$35.00		
		Cave Diving Beneath the Ozark Mountains – DVD - with footage of Ginnie Springs and the Gasconade River in the Ozark Mountains, Missouri. Over four days the team reach 2000 feet in, 200 feet deep, using scooters which they drag through restrictions using ropes. In this DVD they extend the survey of the cave.	\$30.00		
DVD'S		Cave Diving Mount Gambier – DVD - from Novice cavern sites, to the much more intriguing penetration dives, 'Cave Diving Mt Gambier' will take you to places that are only accessible by trained cave divers and rarely seen by others. Featuring 15 of the most popular dive sites in Mt. Gambier.	\$40.00		
		China - Beneath the Wall – DVD - Sichuan Province in central China is home to some of the world's biggest cave systems. This film follows a team of British explorers as they attempt to link together two of the most spectacular caves and complete the tantalizing through trip. But as with so many expeditions into the unknown, things don't quite go as planned... A great film about dry caving exploration.	\$35.00		
		Down Deep Down Under. A spectacular film by Alex Wyschnja. Discover the hidden secrets of Mt Gambier's famous fresh water caves. Tucked away in S.A.'s Sth East are some of the country's best known freshwater caves. The physical challenge of cave diving makes Mount Gambier a diver's mecca.	\$25.00		
		Facing Darkness. Following some of the greatest cave divers in north Florida, Facing Darkness invites you to discover the underwater caves and how divers safely explore them. About the geology, the danger and the passion.	\$35.00		
DVD'S		Wookey Exposed. Filmed and produced by Gavin Newman, this award-winning film looks at the spectacular discoveries made by successive generations of explorers and joins the latest team to take up the challenge. Using specially designed camera systems we follow the divers to the very limits of the exploration as they attempt to push on into the darkness beyond the end of Wookey Hole.	\$35.00		
		WKPP Push for the Connection – DVD - Explorers from GUE's Woodville Karst Plain Project resolve to establish a link between two of the largest underwater cave systems in the world. Following a series of previously unimaginable dives, exploration divers push nearly 7km into the extreme depths of the Wakulla & Leon Sinks cave system	\$35.00		
	POSTERS	NEW!	NEW POSTERS THE SHAFT & TOMMY GRAHAM'S MAPS Both are 45cm x 30cm in size. To view either of these posters visit the online store.	\$12 ea	including postage

	QTY / COL/SIZE	ITEM	SIZE	UNIT PRICE	TOTAL
CLOTHING		• Embroidered Crew Neck T-shirts. Black, Navy and Steel Grey - S, M, L, XL, XXL		\$25.00	
		• Embroidered Polo Shirts. Grey with black trim or black with red trim. Look very smart!		\$35.00	
		• Embroidered Hoodies. Black only - Sizes: S, M, L, XL, XXL		\$70.00	
		• Embroidered Trekka Jackets. Black only - Sizes: S, M, L, XL, XXL		\$135.00	
		• Polar Fleece Jumpers. Colours: Blue, Black. Original logo. Keeps you toasty warm & smart!		\$60.00	
		• Polar Fleece Vests. Blue, Black. Original logo. Great to wear as extra layer under the drysuit!		\$50.00	
		• Ladies Contrast Tee. Ladies stylish cut in Grey with Navy Blue sleeves. Sizes 8, 10, 12, 14.		\$25.00	
		• Beanies. Black only.		\$20.00	
		• Caps. Black only.		\$20.00	
MISC		• CDAA Key Rings. Blue with gold motif. CDAA P.O. Box on back.		\$5.00	
		• Round Sticker. CDAA logo over line arrow.		\$1.00	
		• Bumper Sticker. Featuring photos by Dean Chamberlain.		\$1.00	
		• Log Book Folder. With embroidered CDAA logo on the front cover.		\$35.00	
		• Tank Cave Poster. Full Colour 14.5" x 25" poster of Tank Cave by Peter Rogers. Price includes p&h.		\$8.00	
		• Tank Cave Map. Premium matt or gloss 120g paper \$96.00 (laminated \$22.00 extra, silver back \$132.00)			
		• CD of Guidelines 1-94 All Guidelines as searchable pdfs on CD.		\$10.00	
		• Stubby Holders - high quality 5mm neoprene with CDAA logo		\$8.00	
		• Travel Mugs - great for having a cuppa on the run		\$12.00	
	• Mask Slap Straps - fully embroidered with CDAA logo		\$16.00		

Book Release... Caverns Measureless to Man - \$50

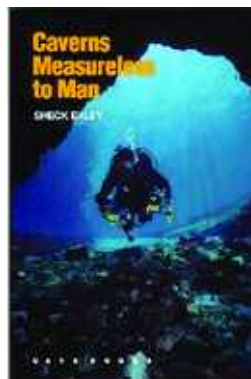
By Sheck Exley

Caverns Measureless to Man is the story of the passion of an extraordinary individual who spent his life exploring underwater caves. For nearly 30 years, Sheck Exley was the leader. He set records, he developed the techniques, and he maintained the highest standards of excellence. Sheck lived a life of adventure, danger, and excitement of a degree that few people can even dream of.

In this book, Sheck tells of his nearly fatal beginnings as a cave diver, of his instant obsession with the sport, of his evolution into master teacher of safety and cave diving techniques, and of the many dives in which he set length and depth records.

Some human beings live and die by convictions so strong that most people cannot even comprehend them. Sheck Exley was one of those who lived and enjoyed life at the knife-edge limit.

This book may terrify you, but it will unquestionably fascinate you, and in the end, Sheck Exley will convince you that his death came to him in the midst of the incredibly intense joy he took in diving into the depths of the earth.



Product of the Month

**Available
on the online store!**

WINTER IS HERE...

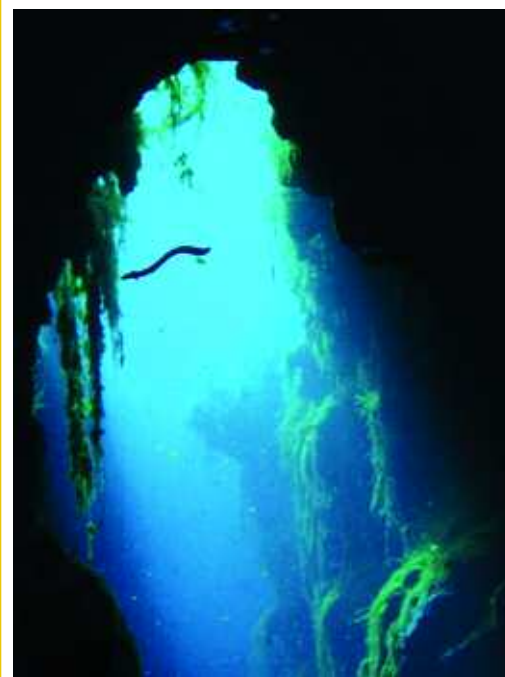
Don't forget we have a full range of winter clothing available from the online store!

- **Embroidered Trekka Jacket with Hood** -
Black with blue embroidery & CDAA logo.
Sizes XS to XXL **\$135**
- **Polar Fleece Vests** - Black & Blue with the CDAA logo.
Great for extra warmth inside your dry suit.
Sizes S to XXL **\$50**
- **Embroidered Hoodie** - Black with blue embroidery & CDAA logo.
Sizes S to XXL **\$70**
- **Polar Fleece Jumpers** - Black & Blue with the CDAA logo.
Sizes S to XXL **\$60**
- **Polar Fleece Beanie** - Black with the CDAA logo. **\$20**

To view or order any of these CDAA Products, please visit the Online Store or complete the mail order form in Guidelines.

Happy Diving, Tara Parkinson, CDAA Products Officer.

MY FAVORITE DIVE SITE



*Hi everyone,
One of my favourite sites is
Piccaninnie Ponds,
over at Mt Gambier.
It's always a beautiful dive,
and on a sunny day it's
spectacular! This pic was
taken just as we were about
to exit the cave. I didn't see
the eel in the pic
until I looked at the camera's
LCD screen later on!*

*Cheers, Nikki Reeves
CDAA #4396*



**Send us your favourite shot and a brief quote about
why it's your favorite dive site...
Contributors will receive an Oceanic Hollis Mask!**

EMAIL YOUR PICS: seapicsdavebryant@gmail.com

• Articles for Guidelines •

- Send articles preferably by email to: publications@cavedivers.com.au
- Email to publications@cavedivers.com.au **and** seapicsdavebryant@gmail.com
- Text files should be saved as Word files or Simple Text and pictures as separate jpeg files.
If mailing please send pics and text on CD. Send to PO Box 2198 Rosebud 3939 Victoria.
- Pictures saved from digital camera or scanned from photos must be at least 200-300 dpi
at 15cm wide, RGB files, and saved as Maximum Quality JPEG's, or Tiffs if mailing.