# Speleo Spiel 369

## November - December 2008

Newsletter of the Southern Tasmanian Caverneers Inc, PO Box 416, Sandy Bay, Tasmania 7006, AUSTRALIA ISSN 1832-6307

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**Front Cover:** Croesus Cave
*Photo by Ric Tunney*

***STC*** was formed in December 1996 by the amalgamation of three former southern Tasmanian clubs: the *Tasmanian Caverneering Club*, the *Southern Caving Society* and the *Tasmanian Cave and Karst Research Group*. ***STC*** is the modern variant of the Oldest Caving Club in Australia.

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*Newsletter of the*
***Southern Tasmanian Caverneers Incorporated***
*PO Box 416, Sandy Bay, Tasmania 7006*
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## Issue No. 369, Nov. - Dec. 2008

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## Editorial

Welcome to the Bio-Speleologist Special Edition. The bug nerds have come out of hiding for this one. I was thinking it could do with a centrefold of a scantily clad harvest(wo)man but my ISP must be running bio-porn filters as I'm having trouble finding one. It would appear Stefan is rallying the troops for a war on trechine beetles. Bloody humans; if we're not waging war in the name of religion then it's science. How many more invertebrates must die before we are satisfied with the number of ethanol soaked corpses on our shelves?

I guess it is customary to partake of Christmas/New Year salutations and wish all and sundry a happy one there of. With the Global Financial Crisis taking its toll, maybe 2009 is a good year to re-embrace the comfort and safety of a dark hole in the ground.

So many things to do in 2009. Every year the list grows at three times the rate old items can be crossed off. I really don't understand why there aren't more cavers. I guess we have a skills shortage like the rest of the workforce. Kev and Swanny will work it out.

Alan Jackson

## Stuff 'n Stuff

**ERRATUM –** I'm afraid I made a bit of a mistake in the last *Spiel* [I like to throw them in occasionally to make me appear more human-like]. The headers incorrectly listed the issue number as 367. I've corrected this in the version that Ric has in the electronic archive, but the handful of hard copies will be forever wrong. Those people with hard copies will have to go through with a pen and correct each page if they're really anal. The issue numbers on the cover and on the contents page are correct though. – AJ

**CHRISTMAS BBQ –** Wednesday 17th December. Taroona Beach from 5 pm.

**JANUARY BUSINESS MEETING –** please remember that there isn't one! But get yourselves primed for the February one (4th).

**REQUEST FOR COLLECTION OF TASMANIAN CAVE BEETLES –** Unlike most of temperate zone Australia, Tasmania has a rich fauna of cave adapted beetles belonging to the family Carabidae. A research project is underway to describe several new species, document their distribution patterns, and seek to understand their evolutionary history. This research is being undertaken by Prof. Pier Mauro Giachino (Italy) and Stefan Eberhard (www.subterraneanecology.com.au). The research has revealed a higher than expected diversity of species, and some intriguing distribution patterns which may have been influenced by Pleistocene glaciations (see poster on page 17 recently presented at the 19th International Symposium of Subterranean Biology held in Fremantle, Western Australia in September 2008). Several new species of cave trechine beetles have been collected from Growling Swallet, Niggly Cave, Cauldron Pot, JF-341, Khazad Dum, Kubla Khan, Little Trimmer, and Thylacine Lair. In addition, several new surface dwelling species have been collected in forest, subalpine, and ground litter habitats across Tasmania.

To complete the taxonomic descriptions of some of the new species requires male specimens from several caves, in particular:

Niggly Cave, *Goedetrechus* n. sp. 3

Damper Cave, Precipitous Bluff, *Goedetrechus* n. sp. 4

Elephant Farm Cave (Gray), *Idacarabus* n. sp.

Philrod Cave, Mount Cripps, *Tasmanorites* n. sp.

Growling Swallet, Junee-Florentine (Windy Rift) for *Tasmanorites* n. sp.

Additional male specimens are required from:

Cauldron Pot, for another male of *Goedetrechus* n. sp. 2

Kubla Khan, Mole Creek for another male of *Tasmanotrechus moorei* n. sp.

It is likely that collections of cave beetles from other caves at Junee-Florentine and Mole Creek, and other karst areas will turn up additional new species.

To complete this first stage of the research we are especially seeking collections of **male** cave beetle specimens from Elephant Farm Cave (Gray), Damper Cave, Niggly Cave, Philrod Cave, or any other caves in these karst areas. It is not possible to distinguish male from female in the field, so it is suggested that collection of around six specimens per cave will provide a reasonable probability of obtaining a male and not adversely impact the genetic viability of populations.

**To provide an incentive to collectors we will recognise the first collector of each new species (remember need male to describe!) by naming the species after the collector!**

We aim to complete the descriptions of specimens for submission to a journal by early 2009.

Anyone interested in helping with this project please contact me to organise a collecting permit through DPIW. Note collectors must have a permit!

Beetles should not be placed alive in preservative, but killed first by placing in freezer for 2 to 3 hours then preserved in 100% ethanol for possible DNA analysis (preferably Analytical Reagent AR grade - available from DPIW). Vials must contain a label (pencil on paper) with cave name and latitude/longitude, location in cave, collector's name and date. Specimens should be lodged with Liz Turner at the Tasmanian Museum in Hobart, who will arrange for sending them to Pier Mauro in Italy.

For further information on likely beetle habitats to search in caves, collecting methods, and delivery of specimens, please contact:

Stefan Eberhard

stefan@subterraneanecology.com.au

08 9203 9551

0401 436 968

# Trip Reports

## Eddy Creek Karst

***Matt Cracknell***

**March 2008**

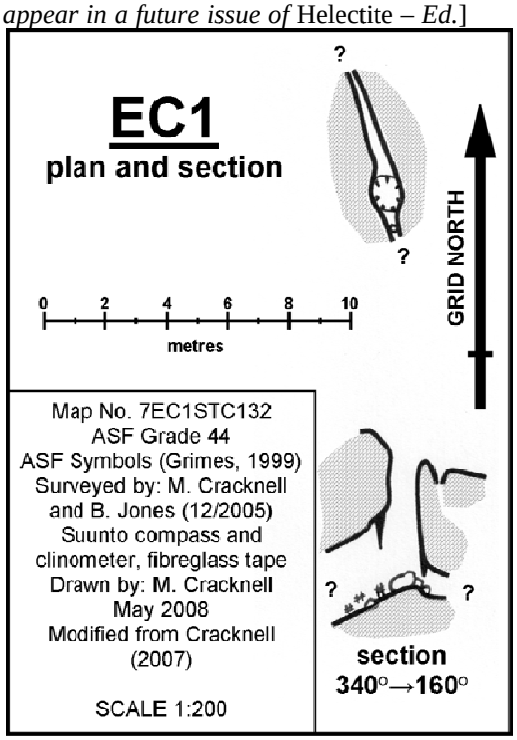
**Party:** Matt Cracknell, Sarah Gilbert, Warwick Jordan

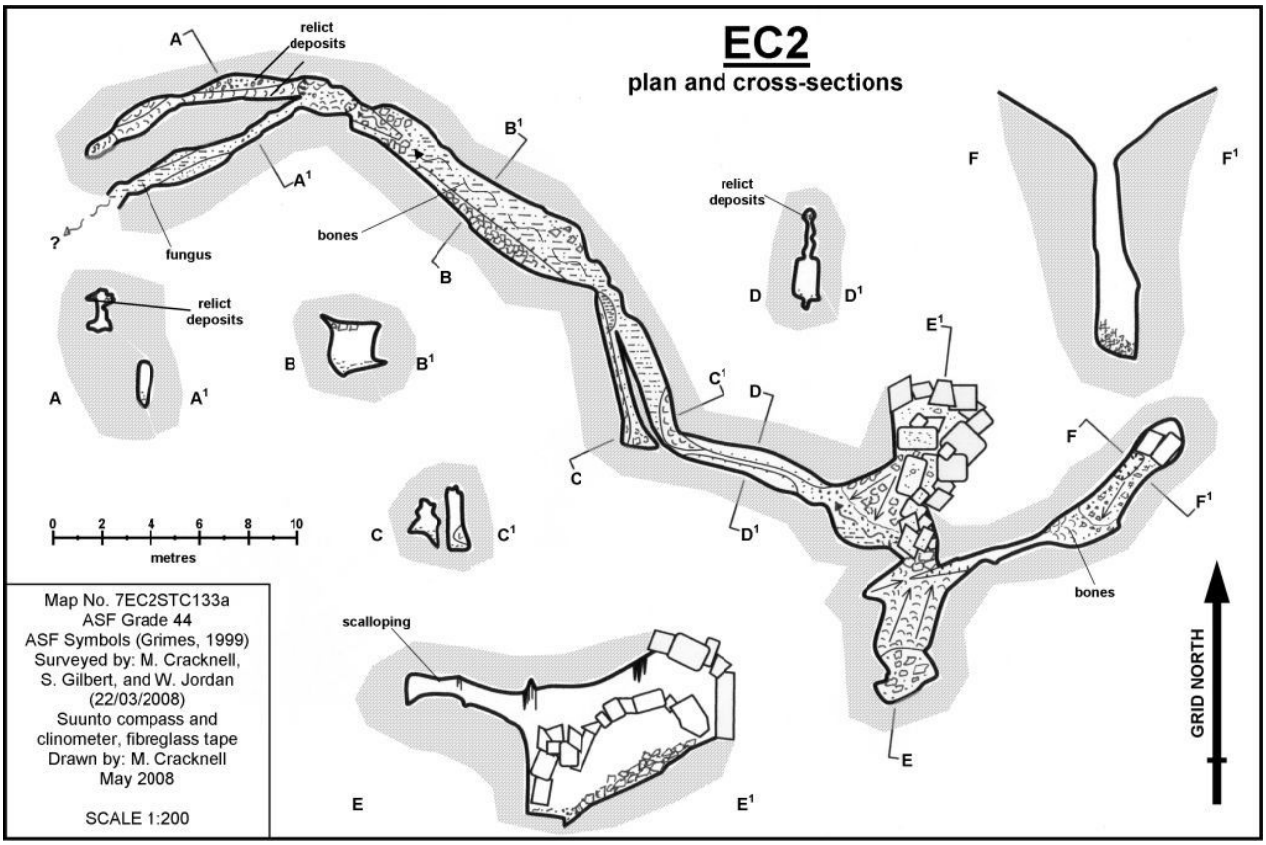
This trip was the field component of Matt's 3rd year research project. The project aim was to go out and map the existence, or non-existence of karst features in the Eddy Creek area. Eddy Creek is a small tributary of the Weld River. The karst has formed in marbleised dolomite bedrock, a pretty unusual occurrence in Tasmania. Also the area is the focus of several mining and quarrying exploration licences. All good reasons to go and have a look, find caves where none have been found before and give land managers something to think about.

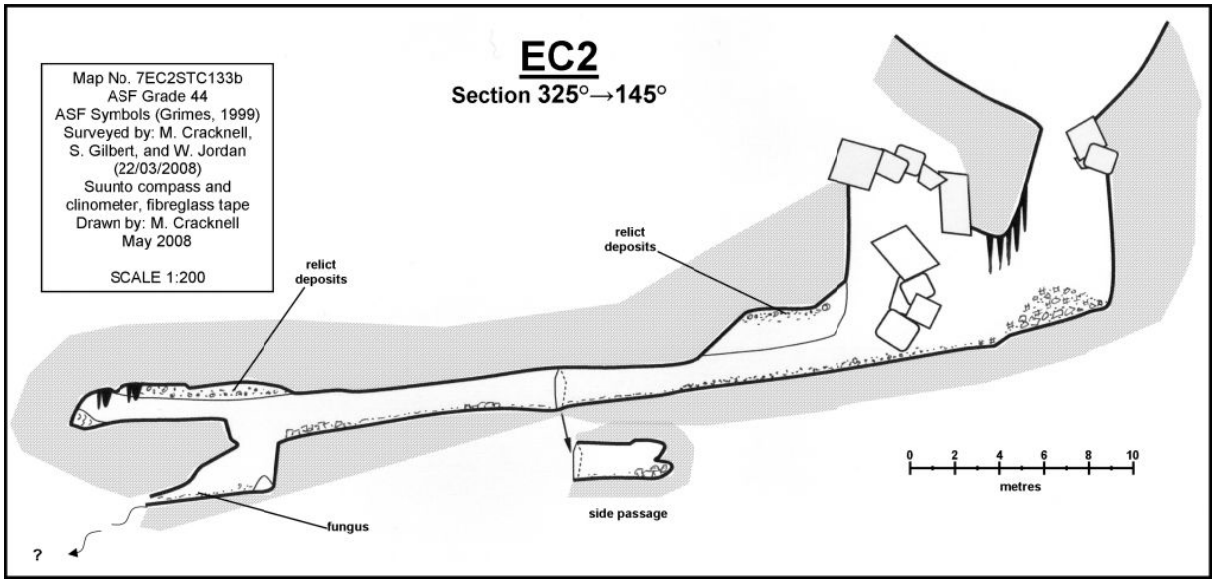
The three of us spent four days scratching around in the dogwood scrub and cutting grass looking for caves and karst features. A few were found (see the surveys) and a lot that were not are probably covered by the copious amount of soil and organic matter that fills most of the depressions and dry gullies in the area. The biggest cave found was EC2. It is about 80 m long and 20 m deep. Strange things like fungus, mammal droppings and birds nest were found in the twilight and dark zones of this cave.

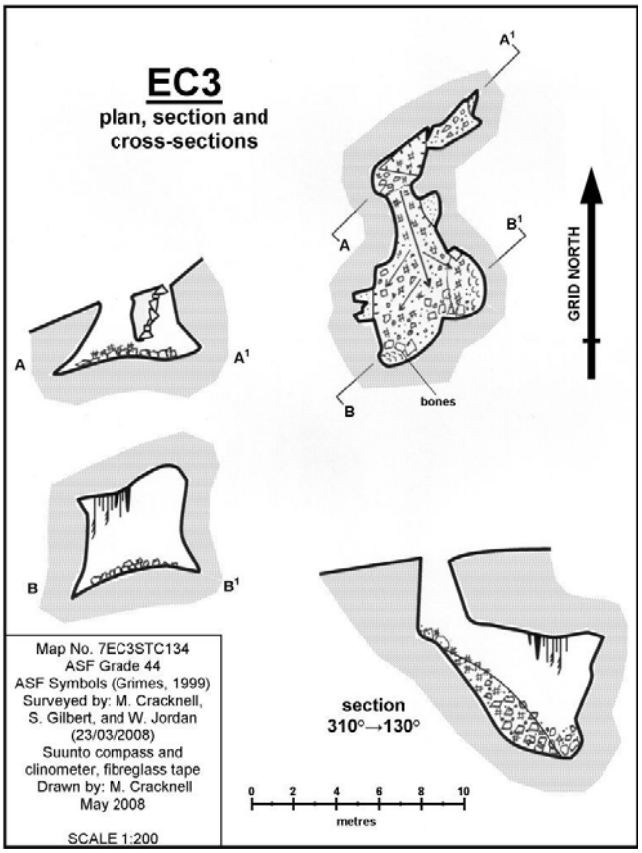
A few small entrances (one inside a big doline) had a fair bit of cold cave air blasting out of them, suggesting that the cave systems in the area are a bit bigger than what could be mapped. Unfortunately there was not a lot of water around on the surface to help us get an idea of sinks and springs. However, a couple of dry springs were found, one with a liberal coating of tufa (algal mats with calcite binding structures). The biggest discovery made during the week was the inaccuracies of the geology maps. These had only been drawn up a few years before (1999) and had missed the dolerite dolomite contact by almost 300 m in one case!

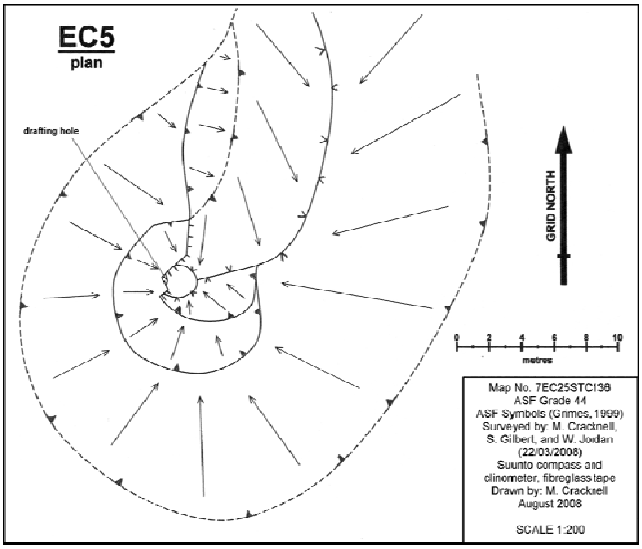
In the end Matt got some kind of dataset to make a few maps and discuss the implications of quarrying and mining on unique karst environments in a report that ended up being way too long. Next time he might even go out and put some tags on these caves so that no-one has to do it again. [*The long version of Matt's findings are likely to appear in a future issue of* Helectite – *Ed.*]

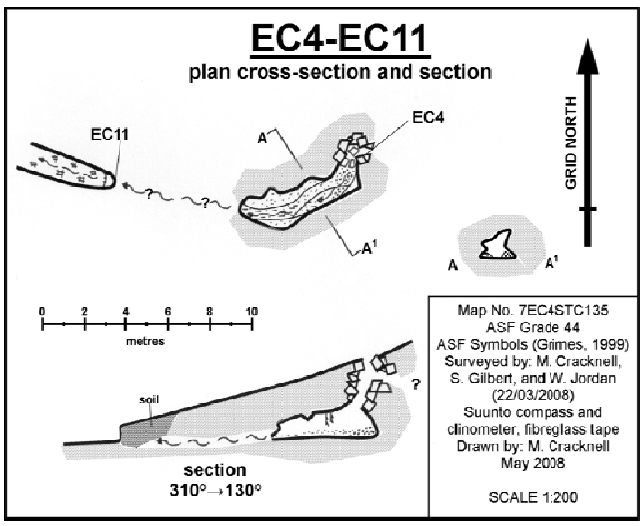


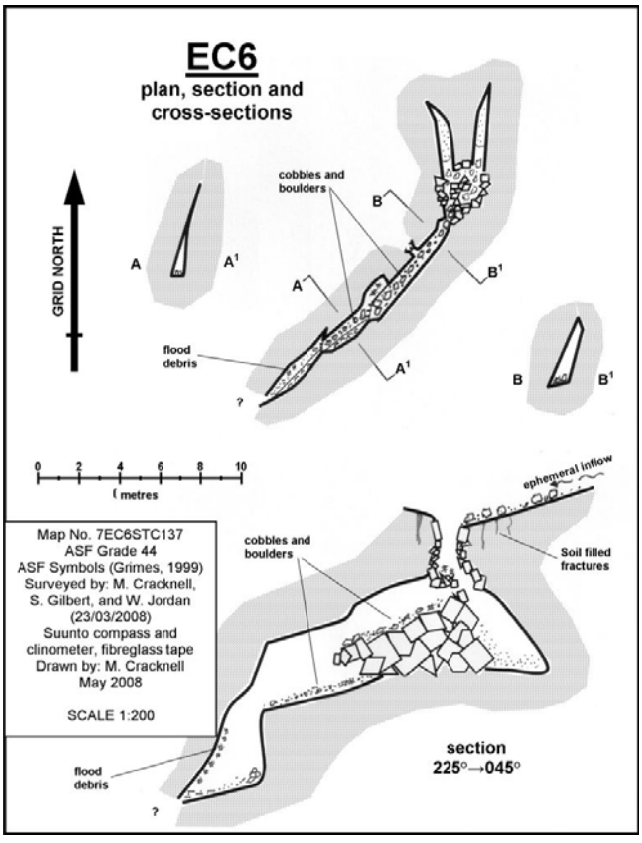




EC2
Section 325°→145°
Map No. 7EC2STC133b
ASF Grade 44
ASF Symbols (Grimes, 1999)
Surveyed by: M. Cracknell, S. Gilbert, and W. Jordan (22/03/2008)
Suunto compass and clinometer, fibreglass tape
Drawn by: M. Cracknell
May 2008
SCALE 1:200
relict deposits
relict deposits
fungus
side passage
0 2 4 6 8 10
metres
?


EC3
plan, section and cross-sections
A
A¹
B
B¹
bones
GRID NORTH
Map No. 7EC3STC134
ASF Grade 44
ASF Symbols (Grimes, 1999)
Surveyed by: M. Cracknell, S. Gilbert, and W. Jordan (23/03/2008)
Suunto compass and clinometer, fibreglass tape
Drawn by: M. Cracknell
May 2008
SCALE 1:200
section
310°→130°
0 2 4 6 8 10
metres


EC5
plan
drafting hole
GRID NORTH
0 2 4 6 8 10
metres
Map No. 7EC25STC136
ASF Grade 44
ASF Symbols (Grimes, 1999)
Surveyed by: M. Cracknell, S. Gilbert, and W. Jordan (22/03/2008)
Suunto compass and clinometer, fibreglass tape
Drawn by: M. Cracknell
August 2008
SCALE 1:200


EC4-EC11
plan cross-section and section
EC11
EC4
A
A¹
GRID NORTH
0 2 4 6 8 10
metres
soil
?
section
310°→130°
Map No. 7EC4STC135
ASF Grade 44
ASF Symbols (Grimes, 1999)
Surveyed by: M. Cracknell, S. Gilbert, and W. Jordan (22/03/2008)
Suunto compass and clinometer, fibreglass tape
Drawn by: M. Cracknell
May 2008
SCALE 1:200


EC6
plan, section and cross-sections
GRID NORTH
A
A¹
B
B¹
cobbles and boulders
flood debris
?
0 2 4 6 8 10
metres
Map No. 7EC6STC137
ASF Grade 44
ASF Symbols (Grimes, 1999)
Surveyed by: M. Cracknell, S. Gilbert, and W. Jordan (23/03/2008)
Suunto compass and clinometer, fibreglass tape
Drawn by: M. Cracknell
May 2008
SCALE 1:200
ephemeral inflow
Soil filled fractures
flood debris
section
225°→045°

## Sunshine Road – surface surveying

***Alan Jackson***

**12 October 2008**

**Party:** Stephen Bunton, Alan Jackson

I'd been putting off the surface surveying in this area until I owned a Disto as I knew how horrible it would be threading a tape measure through the impenetrable maze of dogwoods up there. It was October and the sun was shining sufficiently (and I had a Disto) so off we went.

Forestry must be preparing for thinning or harvesting in the area as the road has been seriously upgraded to about 400 m past the saddle with Nichols Spur. A lot of the side scrub has been removed and the grass, juncus, ferns etc down the centre of the road have all been cleared back to the original gravel underneath. The last km or so is still overgrown and scratchy though.

We started our task at JF-424 Dead Heat, the eastern most cave we've found up there. We tied in JF-432 Pig Pen, JF-431 and JF-425. We then headed back to JF-431 and ran a side branch to JF-426 Canis Horribilus. After some scrub bashing we located the elusive entrance to JF-430 Gordon Bennett and tied it back into JF-425. Next was the fun bit – the dogwood mirror-maze traverse to JF-427 Big Block. Even with the Disto it was difficult to get legs greater than 10 m and morale was plummeting. Upon reaching Big Block we changed tack slightly; instead of continuing surveying we decided we'd head straight to JF-429 and do some cave exploration as a reward for our efforts thus far.

There was quite a nice little trickle running down the back wall of the entrance, then cascading down the slope and pitch. I assessed the pitch and decided it was possibly a climb – if it wasn't then Bunty could always rig it for me so I could get out again. The short 'climb' (read 'jump') landed me in a small but roomy chamber full of water spray. The stream (and passage) continued down the dip of the limestone for about 8 m before it narrowed a bit. I squeezed thru into more roomy 'down-dip' passage which terminated another 8 or so metres on. The cave had a good vibe and was heading due north (towards the master drainage line), so it was disappointing to see it close down. Bunty came as far as the constriction and passed the surveying instruments through (note: he would have fitted but there was no need to– so this cave does not need to be added to the "Bunty doesn't fit" list). We surveyed out. Bunty tried scrambling over a ~300 kg boulder on his way out but in return it tried rolling through him. He has a nastily bruised lower leg to show for the altercation.

Back on the surface we decided to have a go at getting JF-429 linked back in with JF-427 (picking up JF-428 on the way). It was a little over 200 m and it was getting late in the day but we managed it. All up we surveyed just over 1.1 km on the surface – not a bad effort. Now we just need to continue round from JF-429 to Satans Lair and also head east from JF-424 Dead Heat and tie our work into the holes west of Splash Pot. At the moment the traverse is floating in space. Some other sunny day perhaps.

## IB-11 Midnight Hole

***Alan Jackson***

**31 October 2008**

**Party:** Rolan Eberhard (for a little while), Alan Jackson, Janine McKinnon, Jane Pulford, Ric Tunney

The final (hopefully) chapter in the Midnight Hole bolt saga. Rolan and I secured some more Wildcare funding and based on recommendations made by Tim Chappell (PWS engineer), we ordered some chain/ring assemblies for the six pitch heads in Midnight Hole. This trip would see the six chainsets installed and three new bolts installed to replace the one wiggly one on the second pitch and the two really wiggly ones on the sixth pitch.

Rolan needed an early escape so he only tagged along as far as the top of the third pitch and then SRTed out, leaving us to it. We installed all the chains (all 316 stainless steel) and placed the new bolts. The two condemned bolts on the sixth pitch were drilled out and removed but not so the one on the second pitch. At that early stage I wasn't 100% confident we'd have enough battery power to install three and remove three, so I placed priority on installing. Sometimes removing the old p-hangers can be a surprisingly protracted affair. In the end we only used one battery, so could have removed the other bolt too, but it was out of our reach by the end of the trip. It has a "condemned" tag on it. All the other bolts were tagged indicating when they were last formally tested/passed.

On the walk in we bumped into Rob Wass and another Parks employee who had just finished installing the new signage at Mystery Creek Cave and the walker registration booth. Mystery Creek Cave is now officially opened again, as is Midnight Hole now that we've fixed the bolt problem. Rolan mentioned to Rob that the old sign (that refers to the stream level gauge right at the entrance to MCC) is redundant and confusing and that it should be removed. Rob gave us his blessing to have a go at getting it off on our way out. This we did successfully.

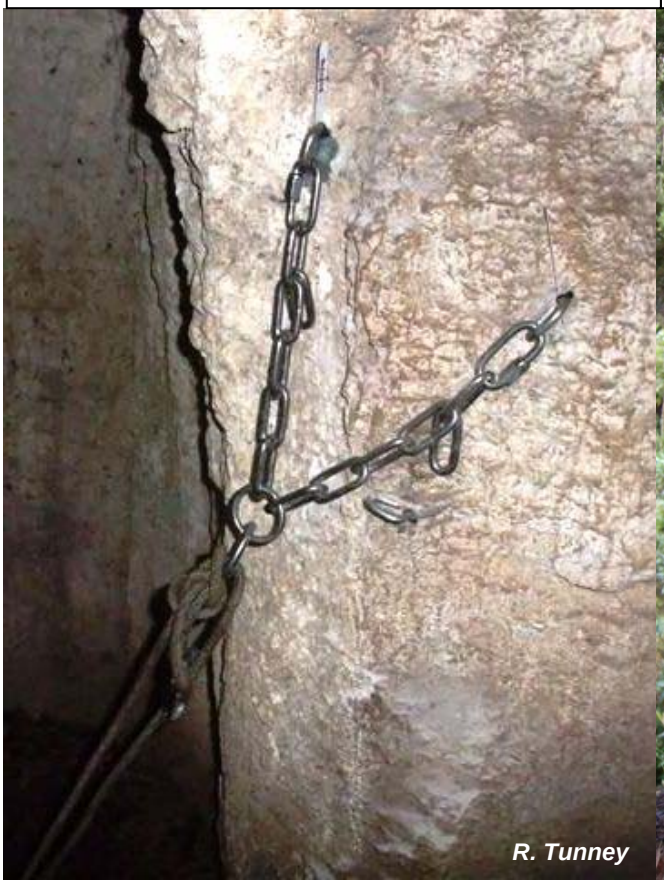
So, MCC and Midnight Hole are open again. The rigging in Midnight is pretty self explanatory but it is worth noting that due to the relatively large diameter of the new rings it is necessary to pay careful attention to the size of the 'jamming' knot that you use on your pull-down setup. A small knot would pose some risk of slipping through, so use a big fat one and it is also recommended that a well placed karabiner would make it all that much safer also.


*A quick tribute to Bono at pitch 2.*


*Pitch 6 after installation of new bolts (top) but before removal of old, condemned bolts (bottom).*


*Pitch 6 after chain installation and removal of old bolts. The ultimate rope hang is near identical to the old hang.*

*Pitch 2 with new bolt (top left) and chain installed. The condemned bolt is still in place (just below the right hand chain).*




*The new sign at Mystery Creek Cave entrance. An identical sign is placed at the registration booth in the carpark.*

## Mole Creek Long Weekend

***Janine McKinnon***

**7-10 November 2008**

***MC-120 Marakoopa Cave***

**Friday 7/11/08**

**Party:** Serena Benjamin, Janine McKinnon, Ric Tunney

We drove up on Friday morning, arriving at the NPWS office around 11 am. After getting acquainted with the (yet another) new ranger (Linda Overton - hopefully she'll stay at Mole Creek longer than the last few) we collected all the keys for the weekend and headed off to get organised for a few hours photographing pretties in the Short Creek section of Marakoopa Cave. This area is accessed up Short Creek from the balcony at the end of the tourist section on the first turn on the right after the entrance.

After an hour and a half taking photos we had a quick look around the rest of this section of the cave again. Ric dug out (with his feet) a short section of sand near the sump and we all crawled through to a small chamber that I don't recall being in before (but I could be wrong!) There was a very slight draught coming from a tight, sand filled passage heading (roughly) in the direction of Devils Pot. We had tried several years ago to make a connection from the Devil's Pot side, after a period of heavy rain and flooding, but been unsuccessful. Maybe a dig from the Marakoopa side would be worthwhile.


*Helectites in the Short Creek section of Marakoopa.*

We then headed back to the main drag, and continued upstream to the top entrance of Marakoopa 1. Hitherto we have always continued through Marakoopa II and out its top entrance. We have never tried to go cross-country from the top entrance of Marakoopa I and now seemed a good time to try (I have no idea why). Ric was very confident he knew the way to the Devils Pot track and luckily it proved to be a very straightforward and short walk up hill.

As it was still only 3:30 pm when we arrived back at the car, and the promised rain hadn't arrived yet (it was only drizzling), we decided to save some time for tomorrow's Kubla trip and rig the lower entrance now. This proved to be a good plan as we were back at the Caravan Park by 5 pm, having completed the task.

Half an hour later the rain set in seriously - Mole Creek serious. It poured for 12 hours (63 mm in Sheffield). The roof of the on-site caravan leaked and we had to move the mattress to keep almost dry. (The new caravan park owner was very understanding about this and gave us a refund for the night. He is in the process of replacing this ancient caravan with a cabin).

***MC-1, MC-29 Kubla Khan***

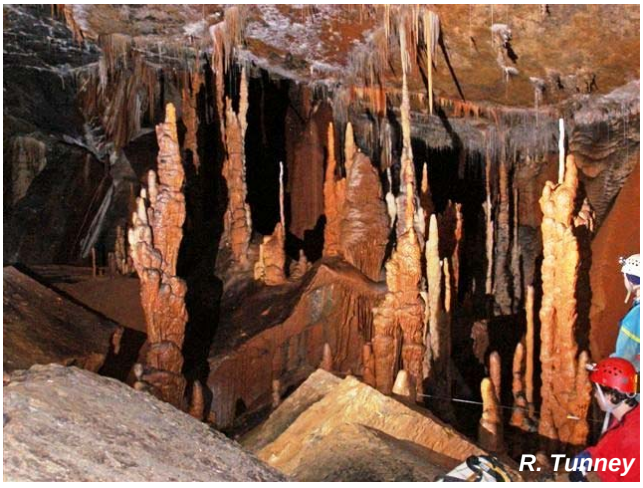
**Saturday 8/11/08**

**Party:** Serena Benjamin, Sarah Gilbert, Janine McKinnon, Ric Tunney

Sarah had arrived around 8 pm the previous evening and was the only other taker on this year's trip. We were up at 6:30 am, all tired as none of us had slept well due to our concerns about staying dry in the caravan we had rented and were all sharing.

We started underground at 8:45 am and had an enjoyable and undramatic trip through to, and including, the Pleasure Dome. We stopped at the usual places of interest for photography – Opium Den, Silk Shop, Forbidden City, Khan, Pleasure Dome. The clarity of the air was noteworthy, as distinct from the high levels of mist in the air we usually encounter. This seemed a bit odd after all the rain the previous night, but October had been unusually dry (12 mm in Sheffield), so maybe that was a factor. As a result of this, we did get some excellent photos for a change. Not having any camera gear malfunctions, something we seem to be cursed with on Kubla trips, helped.

The inflow for the Pleasure Dome was running (lightly) and the top few gour pools were filled/filling but the rest of the flowstone, and pools, were dry. As there had been 200 mm rain in August and September (for Sheffield, 121 mm & 87 mm) one wonders how long the pools stay filled once the water flow stops.




*The Forbidden City, Kubla Khan.*

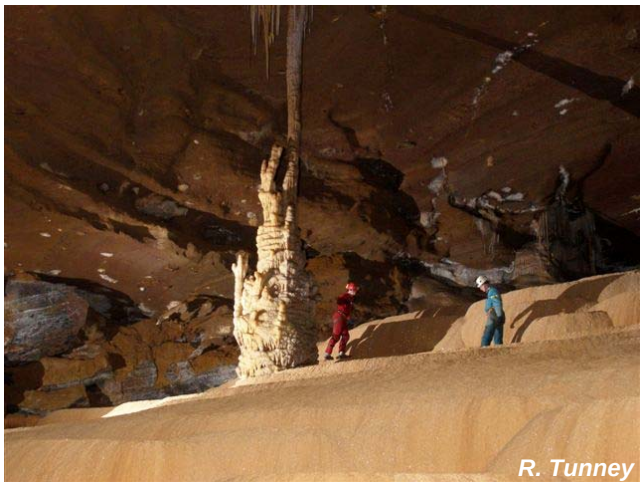
We had wondered what all the rain would do to the stream for the trip out. The level was definitely high, but not impassable. We could see where it had been a couple of feet higher very recently, so obviously the water level drops quickly when the rain stops.

Our progress upstream was slow but uneventful. The water was as tannin stained and dark as I've ever seen it. There was lots of foam about.

When we got to the pool with the waterfall, just before the climb out of the stream to the gate, I got ready for my customary role of first person across. I had been a bit


*The Forbidden City from the Silk Shop, Kubla Khan.*

concerned about this all day as it involves a lunge, mad swim and frantic attempt to get purchase on the other side before being pushed back by the current to the waiting others. More water means stronger current. There are no hand or foot holds near the waterfall that I have ever found. It is a little easier in a wetsuit but we hadn't bothered with them this trip. It was heavy, wet clothes all the way. I made my first lunge, flailed about a bit, and arrived back at the waiting group. Oh well, it usually takes 3 or 4 tries, with the added incentive of desperation, to stick on the other side.




*Pleasure Dome, Kubla Khan.*

As I was getting ready to go again Ric said he'd have a look up high. As he's never done this before I'm guessing he had little confidence in my actually managing to stay on the other side of the pool. I'd only had my "warm-up" try so far and wasn't intending to start worrying until I'd failed at least 3 more times, so I felt his lack of faith was sadly disappointing. He scrambled about 5 metres up and found a way around the pool and down to the upstream side. Now it was just embarrassing that we hadn't looked before! My starring role has been axed. I do have a vague memory that Alan might have done this climb on a trip a few years ago. [*It's called the Stal Shuffle and people have been doing it for about 40 years … - Ed.*]

We used a hand line to get back down to the stream, and left it in place. I'm not sure how necessary it was and we'll have a closer look on the next trip to see if it is really worthwhile leaving it there. We were all very wet and cold at this point and were happier with its added security.

We had all put on our SRT gear before starting along the streamway, to speed up the prusik. This proved to be a much more efficient way to get out of the cave than everyone standing around at the bottom of the pitch all trying to put on gear with shaking bodies and chattering teeth.

Were all back at the car by 6:30 pm.

**Sunday 9/11/08**

**Party:** Serena Benjamin, Janine McKinnon, Ric Tunney

We had a permit for MC-38 Genghis Khan but as we had all been there a couple of times before we opted for an alternative. This proved to be Sarah going home to Hobart early, via a visit with a friend in Launceston, and the rest of us going for a walk up the Little Fisher River, after a

very civilised gear sorting and cleaning session at the Caravan Park and a coffee in Mole Creek.

***MC-13 Croesus Cave***

**Monday 10/11/08**

**Party:** Serena Benjamin, Janine McKinnon, Ric Tunney

A photography trip. We had discovered that despite quite a few trips into Croesus, we had very few photos, and only a handful of good ones.

We were underground before nine. The air was again very clear and so we had an enjoyable and productive few hours taking photos up the streamway to the rockfall. We were back at the car before 12:30 pm for lunch before the drive home.

**Some notes from Kubla Khan. (*Ric Tunney*)**

1. Currently the top gate (which was stolen a few months ago) is a chain which is run, spider web-like, across the opening with a padlock at each end. Unfortunately the previous party had not locked one of the padlocks, so the cave was unprotected.
2. Since my last visit, someone visiting the Pleasure Dome has slid down the flowstone climb with something hard on their bum and has left bad scratch marks over the rock.
3. Also since my last visit to the Pleasure Dome, someone has worn dirty shoes and left muck in spots across the gours.
4. As mentioned above, we left a handline down the climb around the top pool in the streamway. It probably isn't really needed and I probably should have climbed back up and removed it.
5. Some of the permanent rigging has been set up using karabiners. These need to be replaced with stainless steel maillons before the karabiners turn into oxide.
6. Each time I go to do this cave, I have forgotten what rope lengths are really needed. The notes from Parks have some strange figures like 70 m (doubled) for P3 and Cairn Hall. So we re-measured the pitches:

    - P1 12 m.
    - P2 15 m
    - P3 24 m
    - Rift Traverse abseil 9 m
    - Cairn Hall 22 m
    - Bottom Entrance 6 m to go around tree, handline to ledge 18 m, pitch 20 m.

    None of these figures include knots.

    This means the cave can be done with a 50 m rope for the bottom entrance. (Actually we used a 6 m tape around the tree, a 20 m rope for the handline, a short tape for the rebelay, and a ridiculously long rope for the drop.) The pull-through can be done with two 25 m ropes or one 50 m. A bit of redundancy is useful, so maybe a third 25 m rope in case there is a hung rope; actually. We took two 25 m ropes and a light haul line so one rope never left the pack.
7. Sometimes, on the Bottom Entrance, I have gone over the far side of the ledge as I thought it was easier. This time we went down the "normal", near side of the ledge. Although it's still a grotty prussic, I think it's simpler. It needs IRT techniques, though, as there are some nasty rubs. (But so does the other side!) [*It would appear that our Font of Knowledge (a.k.a. Ric) seems to have forgotten that since late 2004 the 'Bottom Entrance' (MC-1) has had two p-hangers installed for the final drop. They are located on the far side of the huge limestone block situated at the old tree rebelay spot. Old dogs, new tricks, one would assume – Ed.*]

## JF-36 Growling Swallet – scrubbing off the pink bits

***Alan Jackson***

**13 November 2008**

**Party:** Rolan Eberhard, Jeremy Hood (PWS), Alan Jackson

Way back in May sometime I noticed some pink route-marking arrows in the Dry Bypass in Growling on the way out from an Ice Tube thru-trip. It took us this long to hatch a plan and execute it. We invited Jeremy Hood along (Mt Field ranger) to show him the problems that can arise when less desirable members of society go caving (don't worry, I was on my best behaviour). Pushing the case for discouraging tourist development at the site was the main aim of the day, as well as cleaning the arrows off if possible.

In total we located five arrows, which we removed using a wire brush. It will now be interesting to see if they reappear again.


*1. Here's pointing at you, kid.*

*2. Now you see it.*

*3. Now you don't.*



## Garths Creek (kind of …)

***Janine McKinnon***

**15 November 2008**

**Party:** Serena Benjamin, Rohan Hutchison (HWC), Janine McKinnon, Ric Tunney

Garths Creek is the stream that flows into Growling Swallet. It rises on the Mt Field Massif and can be seen flowing down from the plateau as you drive up the F8 Road. Ric and I have wanted to follow it down from the top for years and this was our attempt to finally do it. It involves different start and finish points and we wanted to organise enough starters for the two cars needed for the car shuffle.

This walk was also advertised as a Hobart Walking Club trip (of which we are also members) to maximise the chances of getting enough takers.

Alas, it was not to be. We had one taker from HWC (out of a membership of some 1400!) and 1 from STC (the ever reliable starter, Serena).

The bright point was that we had an offer from two (to remain nameless) people to drive up later and do the car shuffling for us. Great, the trip was on. We were all organised for the early Saturday morning start when we got a call Friday night to say one of the car people had pulled out and the other (quite reasonably) didn't want to drive up there alone just to move cars and have a solitary picnic. Also, that person could not do a car shuffle for us, alone.

It was too late to think of another way to organise the circuit so we changed plans to a walk that would start and end at the same place. Thus our circuit of the valleys of Serendipity, Niggly and Ice Tube was born, which pretty well explains where we went.

It was forecast a miserable day, so a walk all in forest was not going to be a bad thing really.

The walk up past Serendipity and the Benson & Hedges series was straightforward and familiar. Then it was on to the new stuff. We have never crossed over the saddle from the top of the Serendipity valley to the Niggly valley and the route finding wasn't as straightforward as we had expected (interestingly, our Garmin 12XL didn't get a single fix all day but Rohan's eTrex worked well). After a somewhat indirect meander (through some horizontal and other scrub at times) we did arrive at Niggly, 3.5 hours after starting from the car. Admittedly, this included a half hour lunch break. I had forgotten what a beautiful location the cave is in. The stream canyon leading to the entrance is unique in the Florentine, I think.

We then took a slightly alternate (and much more efficient and less scrubby) route back to the saddle and then dropped into the Ice Tube valley. We had a very easy stroll down through rainforest all the way to the Ice Tube doline. We decided this was a good place for a nibble break and, as we were there, we took Rohan in to the top of the first pitch (start of the traverse really). Our Kathmandu headlamps were a very poor substitute for Stenlights. For Serena it was a nostalgia trip to her pre-Stenlight caving days, when every cave looked the same; i.e. the tops of her boots moving through blackness. This was Rohan's first (and probably last?) trip into a "wild" cave.

Then it was onward and downward back to the car for a total trip time of 7 hours.

## Weld Arch (not)

***Janine McKinnon***

**29 November 2008**

**Party:** Serena Benjamin, Matt Cracknell and girlfriend (Naomi ?), Sarah Gilbert, Janine McKinnon, Ric Tunney

This will be short and sweet. A blessing some of you may be thinking.

What is it with me and gates? All was going well until we got to the turn off from the Styx Road onto the Mueller Road and ran (not quite literally) into a brand, spanking new (to us anyway), forestry gate.

What is it with Forestry and gates these days?

The Mueller Road was built for access to the power line for the Gordon Dam. That means it was constructed when the dam was built in the 1960s. It has never had a gate on it. We last went there in 2001. No gate. Now gate. New plan. We went for a walk to Mt Wedge.

Lesson: Don't go anywhere in Forestry territory without checking current access situation first.

We will return …

(small print_ subject to forestry co-operating with a key)

## JF-293 Whistler

***Alan Jackson***

**30 November 2008**

**Party:** Serena Benjamin, Matt Cracknell, Alan Jackson

The original plan had been to derig the Mystery Creek extensions but Rolan chucked a sickie at the last minute. We selected an equally muddy and disgusting cave to visit instead. I'd been meaning to get back to this cave for many months (more to retrieve the rotting gear than to push the leads).

Forestry have been doing lots of road maintenance in the last few weeks (the Sunshine Road has been cleared open and the Florentine Road has been regraded) Now the Eight Road has been slashed all the way to the end of the road/start of the track. Unfortunately all the slashed vegetation has been left on the road and it's a bit of an obstacle course – many large saplings and branches up to 100 mm diameter strewn over the road. It all looked very recent, so hopefully they plan to clear it off in the near future. Also on the way in we noticed a new mega-tree that has come down over the McCullums Track between Growling Swallet and Serendipity. The hole it has left in the ground would make mainlanders weak at the knees. The race is on for the first people to fully explore and survey it. Despite these distractions we made it to the cave.

The traverse was as manky as hell, the series of steps down were worse and the nice open ~15 m pitch was delightful. The most inviting lead was selected first (the ~8 m pitch that we'd not had enough rope to descend fully last time). Despite the encouraging noises generated by rock throwing on the previous trip, this pitch crapped out at the bottom. We ascended again. Matt took numerous 'rock-nerd' notes on the faulting and other geological parameters, Serena pursued the tight rift at the other end of the chamber while I prepared the alternative lead (under the big slab at the base of the previous pitch). A redirect a couple of metres down saw me down this ~7 m pitch. At its base it crapped out in a rock-filled choke (with three or four very large leg bones in it) but halfway back up the pitch a tight rift could be seen to open up again to drop away further than the deepest point just gained. With SRT gear off I thought I was probably a chance but it was looking nightmarish – there was no floor and I was going to need to put my gear back on after negotiating the ~3 m tight section to drop to the floor once it widened out in excess of bridging width. The squeeze itself looked marginal even with gear off. The pin was pulled.

Serena and I discussed the merits of surveying the cave but I had forgotten to pick up a tape-measure from the gearstore and there was no way I was getting the disto out in this vile, mud-caked shit-hole. We decided a memory sketch would suffice and headed out.

The derig was a protracted affair, as you shuffle up in a group to avoid killing each other with debris. The final straw came when the rope used to affect the traverse and the steps down to the first proper pitch became snagged well down below. I partially descended the entrance pitch and start of the traverse to try to flick it free but it was duly wedged. The only option for retrieval was to reinstall the traverse, descend the steps, bridge past the main pitch and then hope you could remove the snag. Despite copious amounts of swearing and abuse the rope refused to budge so we left it behind for the next generation. The rope was D2 – 35 m (status: MIA).

So in the end a bit of a crap day – we didn't push the cave as hard as we should have, we didn't survey it and we left a rope behind. Add this to the 'Bunty doesn't fit' and the dropped hammer incident on a previous trip and it would be reasonable to say that this cave is cursed.

## JF-382 Dissidence

***Alan Jackson***

**7 December 2008**

**Party:** Alan Jackson, Andreas Klocker

A trip to push the lower reaches of the streamway below the big pitch in early January was planned. To save time on that trip I figured I should get it rigged beforehand. Despite her seemingly boundless enthusiasm for all things caving, Serena bailed at the last minute so it was just to be Andreas and me.

The Eight Road was still covered in crap following Forestry's clearing efforts, the walk in was invigorating and the entrance was inviting and full of bad memories of Andy. We used a ladder at the entrance and a 15 m rope on the next pitch (which was probably 3 m too much). I had brought a single 60 m rope for the next four consecutive pitches. With some Jeff Butt-style rigging and the use of long tapes rather than long knots I managed to make it stretch the whole way. In the end it was about 2 m short on the last pitch but there is a convenient ledge that allowed us to get away with that minor indiscretion. 70m would be a safer bet in the future!

I had taken a similar approach to the next (last) three pitches (the gearstore was looking rather bare the night before, so options were thin on the ground). I was hoping that a single 107 m rope would cover them all. In the end the end of the rope reached the bottom of the last pitch perfectly, but a slight compromise had to be made between it and Vertical Euphoria. It was difficult to grab the rope at the normal reattachment point at the bottom of VE as it was pulled sideways towards the next pitch. Andreas bottomed the last pitch just to have a look at how annoying the ensuing streamway is while I started back up the amazing 55 m. It was very misty and the rope just disappeared into a misty void with no end in sight.

Once Andreas gained the top of Battery Point pitch I asked him where his bag was. He'd left it behind, along with his muffin and choc-hazelnut slice, at the bottom of VE. He was tempted to go back for it (the muffins are very good from Jackman) but the thought of the 55 m pitch again was too much. We cut our losses and headed out, getting back to the car at 4:30 pm.

# Other Exciting Stuff

## The Cave Dwelling Symphylan: the new "mystery" invertebrate from Ida Bay

***Arthur Clarke***


The photographed cave "beastie" recently found by Gavin Brett and Alan Jackson is a symphylan; it was discovered during exploration of the new upper reaches of *Mystery Creek Cave* at Ida Bay. Sometimes referred to as "false centipedes", these species are generally classified to the Order Symphyla. This particular specimen represents the first record for this cave at Ida Bay and may possibly be a "new" species. The cave-dwelling species are quite small animals and are not commonly seen by most cavers, but when observed are often mistaken to be millipedes (with long antennae). The symphylans are one of the numerous groups of many-legged organisms with elongated bodies such as millipedes, centipedes and onychophorans (velvet worms) that are generally lumped into the category of "Multipedes". For further detail of their natural history, ecology, morphology and classification, check out Bob Mesibov's website titled: "*Tasmanian Multipedes*" (see reference below).

There are a number of records for collections and/ or observations of these symphylans, particularly from caves in southern Tasmania. These cave species have all been determined as belonging to the Family Scutigerellidae. Although not formally determined to genus and/ or species level, symphylans have been previously recorded from caves on the southern and northern side of Marble Hill. Most of the previous records are from *Exit Cave* and other associated caves that form part of this southern draining subterranean hydrological system at Ida Bay; however, symphylans have also been recorded from northern draining caves near the South Lune Road.

The "new" specimen from *Mystery Creek Cave* is likely to be similar to another locally known cave species: *Hanseniella magna* described from its Type Locality in the entrance chamber of *King George V Cave* at Hastings, but also recorded from the nearby *Wolf Hole*. When originally described in 1996 by Ulf Scheller, this particular troglobitic species from Hastings, which is up to 12 mm head-to-tail and 15-20 mm when you include antennae, was rated as being one of the largest known symphylans, hence the derivation of its species name as "magna". It is estimated that this new cave dwelling specimen from Ida Bay is also about "15 to 20 mm long" according to Gavin Brett, who photographed the specimen in *Mystery Creek Cave*. As recently confirmed by Bob Mesibov, there are no experienced taxonomists currently working with Symphyla, so the chances of getting a positive ID (identification) are very low.

**References (or further reading):**

SCHELLER, U. (1996). A new troglobitic species of *Hanseniella* Bagnall (Symphyla: Scutigerellidae) from Tasmania. *Aust. Jnl. Entomology*, 35: 203-207.

Tasmanian Multipedes: Tasmanian Symphyla (website designed and managed by Bob Mesibov):

http://www.qvmag.tas.gov.au/zoology/multipedes/tassymph/symintro.html

## Caves and Karst in Thailand and Laos

***Serena Benjamin***

**Thailand**

**Friday, February 29 - March 1, 2008**

Travelling into the northwest of Thailand, the size of the towns I visited gradually dwindled until I found myself on a bus from the town of Pai to Soppong. A helpful Aussie sipping iced coffee at the bus stop cafe directed me to a motorcycle taxi and I was soon zipping along to Cave Lodge in Ban Tham. Perched above the river amongst the forest, Cave Lodge turned out to be a very quiet and laid-back retreat. Contentedly I sat down to enjoy the peace and tranquility of the countryside. The gentle sound of the breeze through the trees, birds and the soft tingle of bells around cows necks at the river down below. Ah … just what I needed after all the hustle and bustle of getting there. No sooner had I eased into a meditative contemplation than 12 students from Utah and their three teachers arrived to break the peace.

This proved to be very fortunate as I was able to join them for the next few days and go on some tours that I might not otherwise have done. That very night I joined them on their tour of Tham Lod Cave. Basically it is a massive passage with a river that goes through the hill for several hundred metres. We travelled by bamboo raft through this bit, occasionally getting off to explore the side passages, one of which contained teak coffins that the local tribes used to use to bury their dead. Apparently it's quite a common practice in the area. Continuing out of the cave we sat at the exit and watched as the swallets that roost in the ceiling returned for the night. Several thousand of them whirled and danced overhead, chattering away before settling in for the night.


*Modern agricultural and forestry practices in a karst landscape near Cave Lodge.*


*Tham Lod*

The next day I again joined some of the kids for a cave and karst trip. The group ranged in age from 14 to 18 and came from a school with a total of 40 students. The school had basically been set up for kids that have had trouble integrating into more mainstream schools. For example, with one guy his issue was that he couldn't read, yet he was talking about fission and fusion and was very proficient in maths. Another had been institutionalised by his parents for 18 months because they couldn't cope with him. Like brat camp but worse he described it, not being allowed out at all, and put in alongside people with genuine mental illnesses. For a month each year they would shut down the entire school and groups would travel to countries like Ecuador, Thailand, and Columbia for a range of different focuses (i.e. culture, aid work) to provide a more enriched learning experience. That a school like this exists is a good thing if only it weren't for the select few.

So on this day the teachers had taken me for a responsible looking adult and asked if I would accompany half the group on a walk around the karst. Happy to oblige we walked an hour and a half through some amazing tower karst discussing subjects as diverse as Mozart to meditation. The first cave we visited was Coffin Cave. Not unsurprisingly it contained a coffin but also had spiders, centipedes, crickets and some formation. We then continued around to Waterfall Cave which contained several hundred metres of low squatty stream passage that terminated in a 30 m waterfall pitch that looked very inviting. There is supposed to be more passage down there. It's also the site of Cave Lodges' only tourist death when a bloke stumbled and fell off backwards. After lunch we headed to Fossil Cave (it contained fossils) and finally Christmas Cave (found on Christmas Day). Then it was a long walk back, making it a big loop, through some more stunning karst and past temporarily abandoned tribal villages.

On the last day I again went out, this time with only half the group and one teacher (the less active ones had headed back to Chiang Mai for more of a focus on culture). We spent a fairly relaxing morning kayaking through Tham Lod Cave then further down the river stopping off at Tortoise Cave and Hair Cave. Both of these were fairly small, quite nicely decorated (though well trogged) and one even had a snake in it. At the point where we got out of the river I left the others and headed back to the Lodge before setting out to what they call Big Knob [*Ric should go there – Ed.*] on the mud map. This was quite a fun way to spend a couple of hours though, sweating up and down a hill. The route I chose got a bit vertical on the way up but with the advantage of high ground I was able to find a better way down. The goat track I found eventually ended up rejoining the main track though it was through someone's banana plantation so I skirted around that seeing what I would have thought to be a bandicoot if I were back home. I'll admit that at one or two points on this walk it occurred to me that wandering around alone like this might not be the best idea. I'd been told stories of one Norwegian lady who had disappeared without trace and also of an Australian lady who had been found having being raped and murdered near the exit to Tham Lod Cave. I guess even in this remote region you can't escape humanity.

**Laos**

**Thursday March 13 – Sunday 16 2008**

Equally entranced and disgusted is how I'll remember Phonsovan. Entranced that is by the sublime beauty of the Plain of Jars and disgusted by the legacy left by an illegal war waged against the Laos people. Curiosity to explore is tempered by knowledge that unexploded ordnance can still be found in the area. Departing from Phonsovan my next destination was Vang Vieng, a small riverside town set among spectacular karst mountains. I was immediately taken by the beauty of the place though a less appealing aspect were the bars that line the main street playing endless reruns of Friends to spaced out backpackers. Come on guys you're in a foreign country.

For the first day that I was there I hired a bike and rode to Kieo (Amazing) Cave and Phad Thao Cave. The first one was a large phreatic tunnel barrelling off into the mountain with some nice formation in places and a pool with some crayfish in it. Getting to a second pool after around 500

metres I left my $10 Thai tevas and pack behind to just investigate around the next corner. A couple of hundred metres later I decided to head back. I later found out from the guide at the entrance that the full length of the cave is a kilometre or so. After being grilled on some finer points of English grammar by this same guide I headed to the next cave. This also had some nice formation but was of a more mazy development. The best feature of this cave was a large passage up the back which had a 20 m section of arched ceiling with a 5 m wide beautifully cracked clay floor.


*Vang Vieng, Laos.*


*Spider webs in the entrance of Phad Thao Cave.*

The second day I decided to walk as I didn't know how well the bike would handle the dirt road across the river. Seven kilometres later (give or take 5 km - the map's a bit dodge) I arrived at Poukam Cave. This had several very large chambers with one containing some beautiful columns. Standing like silent sentinels amid the mud caked formation below. Amusingly I also encountered a tour group coming out of the cave that had three lights for about nine people.

As the temperature rose so my plans dwindled. Of the ten caves and mountain climb I'd thought about for on the way back I managed just the last. With a small boy as guide, who looked at me as if I were crazy, we made our way to the top. I was sweating like a pig and felt like puking most of the time but when I got there I was well rewarded by the views. I even got to have a poke around a small cave near the base of this mountain. So for the next couple of days I poked around several of the tourist caves, before I headed out of town continuing through Laos back to Thailand.

I eventually ended up in Kanchanaburi, south-west of Bangkok, and it was here that I found an unexpectedly lovely little town, though tinged with the memories of war. With a large Allied War Cemetery near my hostel a poignant reminder of the region's past, this is of course the setting of the infamous Bridge on the River Kwai. On a day long tour of the area near the Burmese border I was able to see some of the historical and natural features on offer. The beautiful tufa deposits of Erawan Falls were a definite highlight. This was followed by a rather rushed visit to Hellfire Pass and its museum. The final stop on the tour was a point along the Death Railway at which a cave is located. Sited about 20 metres above the river the cave extends some 50-100 metres into the cliffs and was used as a hospital for the people who were forced to build the railway. This chapter of my journey drew to a close when on April 11th I boarded my flight out of Bangkok. Next destination – London.


*Tufa deposit at Erawan Falls.*

## Exit Cave Mapping Project 2009 – ??

***Matt Cracknell***

The Exit Cave System is one of the most significant karst drainage networks in Australia. There have been several Exit Cave mapping projects in the past but as yet no maps have been produced to reasonable standards. Current maps of the system are incomplete and inadequate for navigation (including emergency response) and conservation management purposes. STC is collaborating with Tasmanian Parks and Wildlife Service (PWS) and the Department of Primary Industries and Water (DPIW) to undertake another Exit Cave mapping project.

The project is being divided up into manageable stages. The first of which is a scoping phase that aims to:

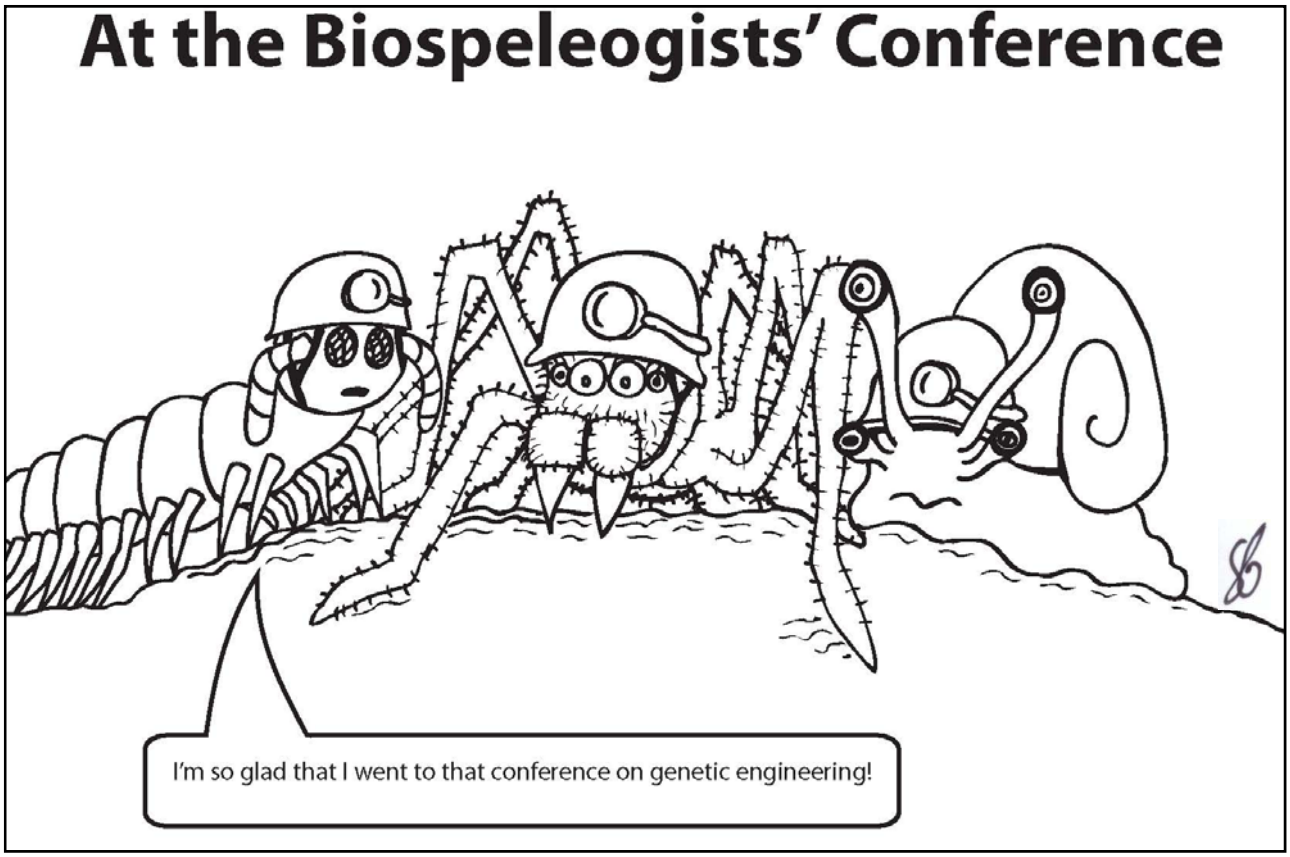
- Collate existing data and information from various sources and institutions (i.e. STC Archive, ASF, PWS and UTas).
- Establish a database to efficiently store and retrieve data.
- Develop surveying and mapping standards for future studies.
- Define priority areas for the next phase(s) of the project.
- Formulate an approach and expected time frame for a long term (3-5 years) data acquisition and map production phase.

Much of this ground work had been initiated by Madphil (Rowsell) several years ago. Hopefully we do not have to reinvent the wheel!

The scoping phase is expected to take ~6 months. At the end of this period a short report of our findings and recommendations for the next phase(s) of the project will be presented. Essentially we want to get a taste of what we can expect in the future if we decide to proceed.

A project of this size and duration needs a manager. I have been nominated/volunteered to take on such a role. I aim to coordinate willing helpers and liaise with PWS/DPIW etc. Hopefully the pieces of the puzzle can fit together smoothly and efficiently, without burning people out. So far, I have had a great response from STC members wanting to be included in an email group that will keep people informed of the projects progress and look for volunteers to take on small jobs.

At the moment we are looking for data. So search your old bits and pieces or contact an old caving buddy. Most of the cave has probably been surveyed and all we want to do is get that data together in one place and make a map. Please do not hesitate to contact me if you have any queries or ideas.



# New species of cave and forest litter dwelling Trechini (Coleoptera Carabidae): emerging patterns in morphology, distribution and evolution of Tasmanian cave beetles

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Dove Lake and Cradle Mountain glaciated in Pleistocene. Subalpine/alpine vegetation above treeline, near collection locality for *Tasmanotrechus n. sp. 2*. Photo Peter Bell.

## ABSTRACT

Nine new morpho-species of Tasmanian cave and forest litter dwelling Trechinae are identified from the closely related genera *Tasmanotrechus* Moore 1972 and *Goedetrechus* Moore 1972 (Coleoptera: Carabidae). In both genera the identified new species, as well as those species previously described, exhibit differing degrees of troglomorphy, however *Tasmanotrechus* spp. are less troglomorphic than *Goedetrechus* spp. Typical troglomorphisms include progressive elongation of legs and antennae, and progressive reduction in eye size. Other modifications are related to the shape of the pronotum, and changes in body size.

It is proposed that present day troglobitic trechines are derived from troglophilic progenitors that colonised subterranean habitats from adjacent forest litter habitats during Pleistocene interglacial periods, while retreat of forests during glacial periods isolated subterranean populations from surface populations facilitating troglogenesis. Distribution patterns in the troglomorphic species exhibit characteristic short range endemism coinciding with discrete karst areas, or even discrete caves within a single karst area. At regional scale, the most highly troglomorphic species are found in southern karsts, while central and northern karsts appear to be characterised by less troglomorphic species.

The Pre-Last Glaciation, which was more extreme than the Last Glaciation, involved extensive ice cover with associated hydrologic, geomorphic and vegetation changes to karsts located in northern and central inland settings, while karsts in southern near-coastal settings were less affected by glaciation. It is hypothesised that the highly troglomorphic species group (*Goedetrechus mendumae* group) found in southern karsts represent an earlier phase of subterranean colonisation, while the less troglomorphic species groups (*Goedetrechus parallelus* and *Tasmanotrechus cockerilli* groups) found in the central and northern karsts represent more recent colonisation(s). Extinction of older troglobites may have occurred in the central and northern karsts that lay proximal to, or were overridden, by glacial ice during the Pre-Last Glaciation.

## INTRODUCTION

In most temperate regions of Australia the cave dwelling beetle fauna is dominated by troglophiles that are not highly specialized for subterranean existence. The exception is Tasmania where a diverse fauna of troglobitic carabids (Trechini and Zolini) was described by Moore (1964, 1972, 1983, 1994). Moore (1964) postulated that the distribution of troglobitic beetles in Tasmania suggested a linkage with Quaternary climate changes and glaciations, presumably analogous to the situation in the northern hemisphere where troglobitic beetle distributions dovetailed with limits of maximal Pleistocene glaciation. In the northern hemisphere, troglobite distribution patterns concordant with ice limits were explained by the 'Pleistocene effect' or 'Climatic Relict' model (e.g. Holsinger 2000). This model assumes that climatic and associated environmental changes (e.g. altitudinal or latitudinal retreat or expansion of forest versus alpine vegetation) causes local extirpation of surface populations and the genetic isolation of troglophile populations in subterranean habitats thus facilitating troglogenesis. Underground isolation of troglophilic species normally associated with alpine environments could occur during altitudinal retreat of the alpine zone (with concomitant expansion of the forest zone) in interglacial periods. Conversely, isolation of troglophilic species normally associated with moist forest habitats would be more likely during glacial periods when the treeline retreats and the alpine zone expands.

While Tasmania was known to be extensively glaciated in the Pleistocene, the rugged mountainous topography with strong altitudinal and longitudinal gradients in climate and vegetation have resulted in a complex glacial history. The chronologies and finer scale complexities of ice extent and associated vegetation changes, and the geomorphic impacts of glaciation on karst, have been better elucidated in the last few years (e.g. Augustinus and Macphail 1997; Colhoun, et al. 1996, Eberhard, R. 1997; Kiernan et al. 2001; Kirkpatrick & Fowler 1998). This information, combined with our collections of additional species of cave and surface Trechinae, enable a preliminary reappraisal of

the 'Pleistocene effect' in attempting to understand the present day distribution of Tasmanian cave beetles.

## STUDY AREA

Tasmania is the southernmost extent of the Australian continental landmass lying between 41 and 43.5° South. The climate is cool temperate, maritime and moist, and broadly controlled by the 'Roaring Forties' westerly air circulation. Annual rainfall ranges from more than 2000 mm in the wetter western parts to about 600 mm in the drier eastern parts. The island is mountainous and densely vegetated in the western parts, with rainforest and wet eucalypt forest occupying 71% (Kirkpatrick & Fowler 1998). Tasmania is well endowed with karst and caves, which are developed predominantly in Ordovician limestones and Precambrian dolomites. Some 300 discrete karst areas and more than 1000 caves ranging up to about 15 km in length and 375 m in depth are recorded (fig. 1). A diverse terrestrial cave fauna has been documented (Eberhard, Richardson & Swain 1991).

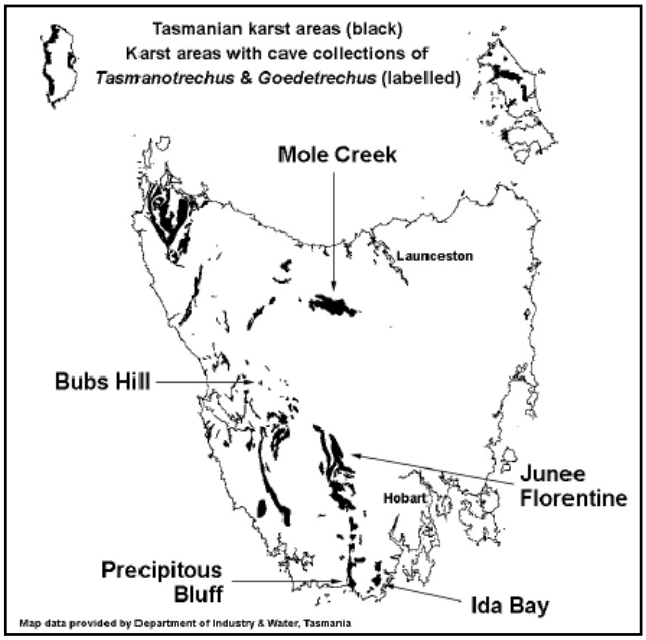


**Figure 1.** Tasmanian karst areas and karst areas with cave collections of *Tasmanotrechus* and *Goedetrechus*. Map data provided by Department of Primary Industry & Water, Tasmania.

## QUATERNARY HISTORY

Tasmania had a complex history of multiple glaciation, with at least four pre-last Interglacial glaciations (Augustinus & Macphail 1997). During lowered sea levels of glacial periods Tasmania was a peninsula connected to the Australian mainland. The Last Glaciation was smaller than middle and early Pleistocene glaciations (=Pre-Last Glaciations) (fig. 2).

The Last Glaciation commenced after 26-25 ka BP, peaked at 19 ka BP and all known ice had decayed by 10 ka BP (Colhoun et al. 1996). The snowline was lowered by about 1000 m, and mean temperature was depressed by about 6-6.5$^0$ C from present. Icecaps and associated outlet valley glaciers developed on the Central Plateau and West Coast Range, and isolated cirque glaciers formed leeward of mountain ranges in the east (Colhoun et al. 1996).

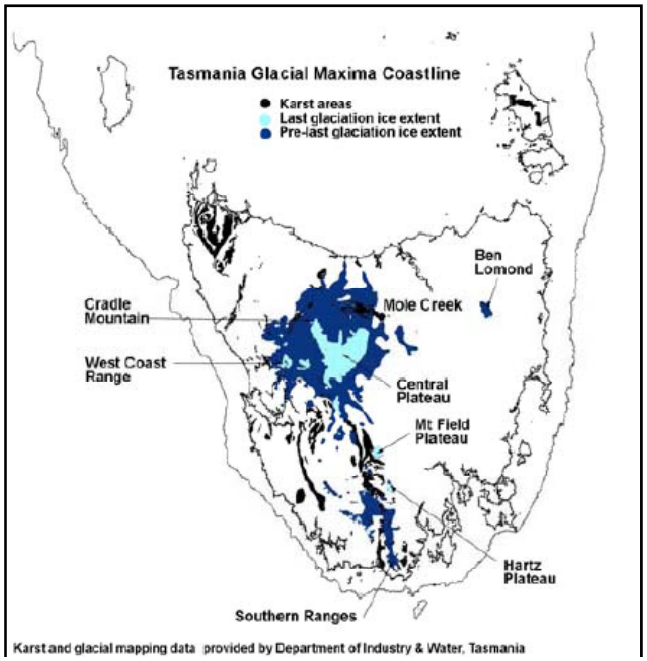


**Figure 2.** Tasmania coastline during glacial maxima connected to Australian mainland. Map data provided by Department of Primary Industry & Water, Tasmania.

Pre-Last glaciations were more extensive than the Last Glaciation, and involved a much more extensive icecap covering the Central Plateau and major valley outflow glaciers that extended nearly to the present northern coastline. Mountain ranges in the south were also extensively ice covered, as well as Ben Lomond Plateau in the northeast. Differentiating the ice limits and chronologies of Pre-Last glaciations remains less well resolved than for the Last Glaciation, however the most extensive glacial event, the Bulgobac Glaciation, is early Pleistocene to latest Pliocene in age (Augustinus and Macphail 1997). Other glacial event(s) occurred in the middle Pleistocene.

Glacial/interglacial cycles involved profound changes in climate and vegetation. Interglacial climates were warmer with more effective precipitation and forest cover increased as the treeline advanced upslope. Glacial climates were colder and drier, and forest cover decreased as the treeline retreated and alpine vegetation expanded. Kirkpatrick and Fowler (1998) modelled vegetation changes at the height of the Last Glacial, which indicated that rainforest/wet eucalypt forest covered 7.2% compared with 71.3% at present. Conversely, alpine and grassland/grassy woodland covered 45.5 % and 32.5 % compared with 0.1 and 8.7% at present (figs. 3 – 4).

Kirkpatrick & Fowler's (1998) model of the vegetation changes suggested that at the height of the Last Glacial, Tasmania was largely covered by alpine vegetation, grassland and grassy woodland, while rainforest was restricted to valleys near the present coast, some deep continental inland western valleys, and to tiny refugia in the east (fig. 4).

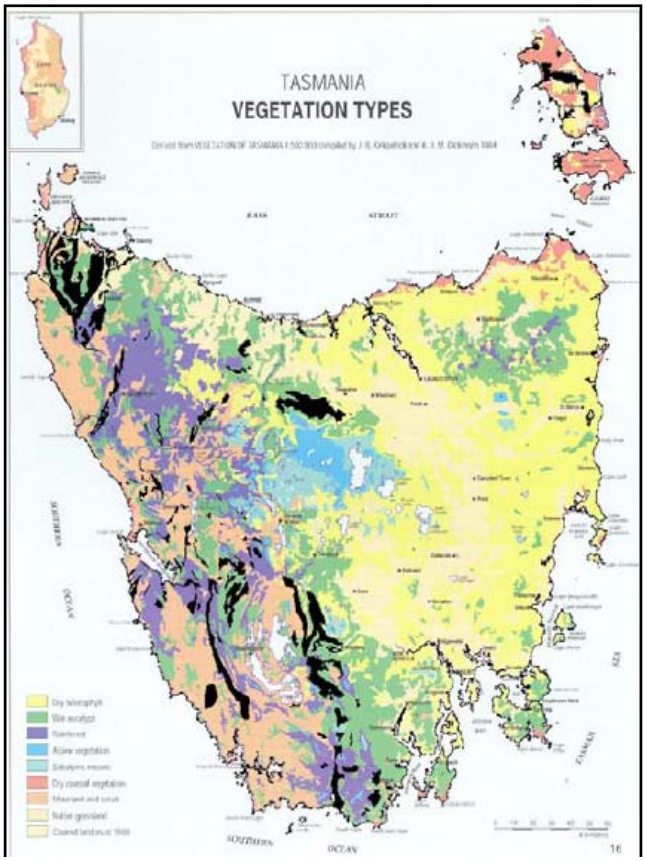


**Figure 3.** Tasmania showing present day vegetation types and karst areas. Reproduced and modified from Reid et al. Karst data by Department of Primary Industry and Water, Tasmania.

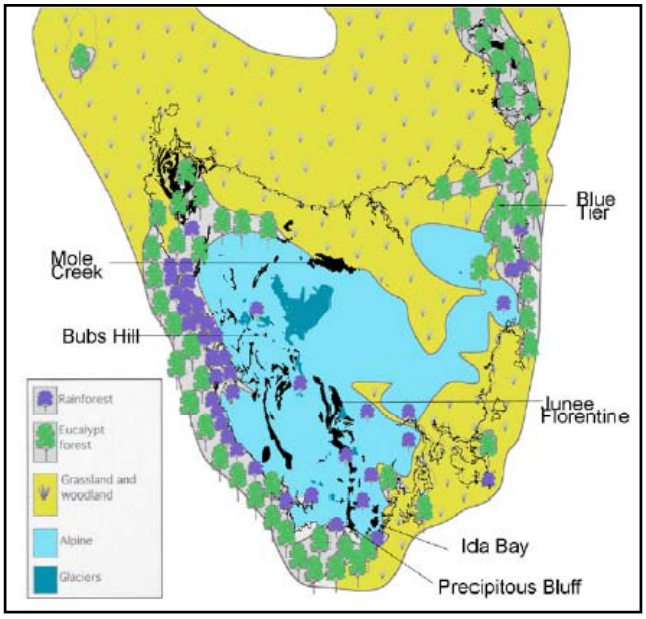


**Figure 4.** Tasmania showing modelled distribution of vegetation types at the height of Last Glacial (based on Kirkpatrick & Fowler 1998) and karst areas. Modified from map prepared by Dr Greg Jordan (University of Tasmania). Karst data by Department of Primary Industry and Water, Tasmania.

## GLACIAL IMPACTS ON KARST

Probably upwards of one dozen Tasmanian karsts were overridden by glaciers during the Pleistocene, while others lay marginal to ice (Kiernan 1982). Some karsts were overridden during pre Last Glacial times but assumed marginal peri-glacial locations during the Last Glaciation.

The Mole Creek karst was overridden by ice during the Pre-Last Glaciation (fig. 2). The centrally located karsts (Junee-Florentine and Bubs Hill) may not have been completely overridden by ice during any of the Pleistocene glaciations (fig. 2), however they were certainly profoundly affected by periglacial conditions and processes. The Junee-Florentine and Bubs Hill karsts lay immediately marginal to glaciated massifs and would have been subjected to major changes in thermal, hydrological, sediment and vegetation regimes during cold climate episodes.

In the Junee-Florentine (and other glaci-proximal karsts) for example, the caves received inflows of proglacial meltwater laden with sediment which in-filled the caves, which were then partially re-excavated after return to milder conditions with lower clastic load (figs. 5-7) (Goede 1973; Kiernan 1982). Speleothem dates indicate multiple episodes of sediment aggradation correlating with Last Glaciation and Pre-Last Glaciation, including > 350 ka (Eberhard, R. 1997; Kiernan et al. 2001).

**Figure 5.** Glaciated massif of the Mount Field Plateau. Junee-Florentine karst occupies the lower forested slopes. Locality for *Goedetrechus parallelus* group. Photo Stefan Eberhard.

**Figure 6.** Cool temperate rainforest and stream draining Mount Field massif into Growling Swallet in the Junee-Florentine karst. Photo Stefan Eberhard.

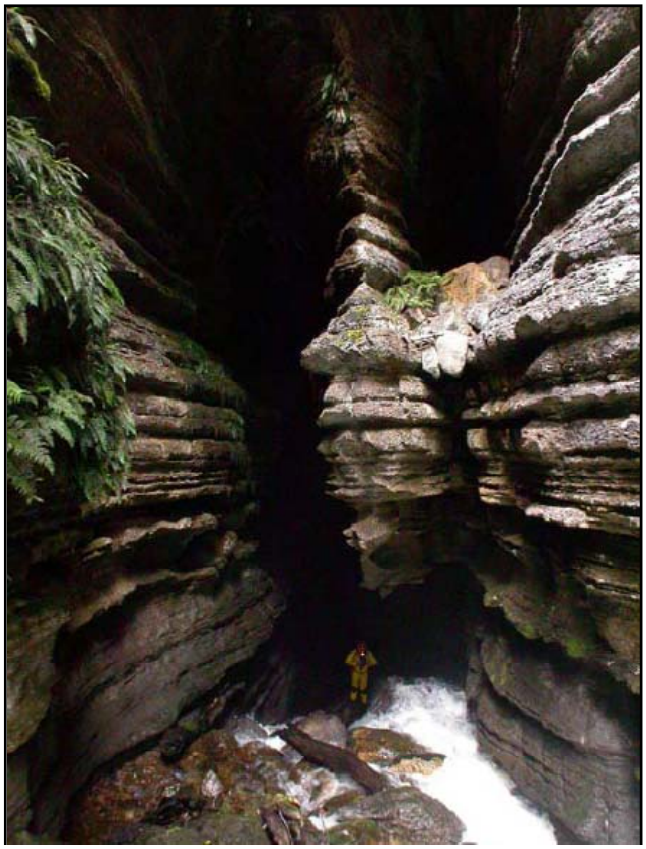

**Figure 7.** Growling Swallet in the Junee-Florentine karst. Locality for *Goedetrechus* n. sp. 1. Note remnant deposit of glaciogenic sedimentary infill boulders perched upper right. Photo Stefan Eberhard.

## MORPHOLOGY

Nine new morpho-species of cave and forest litter dwelling *Tasmanotrechus* and *Goedetrechus* are identified. In both genera the identified new species, as well as those previously described by Moore (1972, 1994), exhibit differing degrees of morphological specialization. However cave dwelling *Tasmanotrechus* spp. are overall less troglomorphic than cave dwelling *Goedetrechus* spp (figs. 8-11).

In both *Tasmanotrechus* and *Goedetrechus*, typical troglomorphisms include progressive elongation of legs and antennae, and progressive reduction in body pigmentation and eye size. Other modifications are contrastingly different between genera, and are related to the shape of the pronotum, changes in body size, and degree of eye regression.

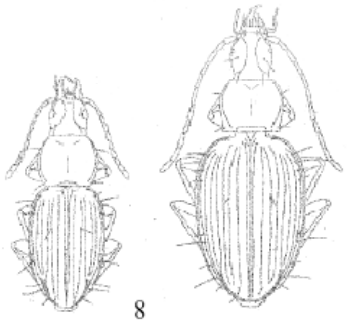


**Figure 8.** *Tasmanotrechus* n. sp. 1 from Gordon River.

**Figure 9.** Tasmanotrechus n. sp. 5 from Little Trimmer Cave, Mole Creek.

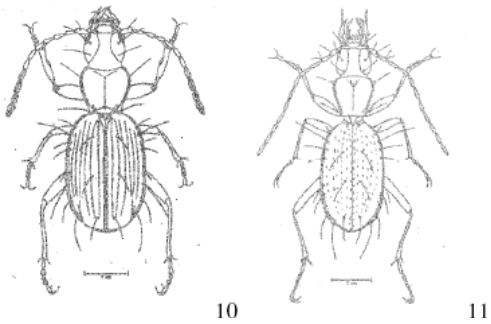


**Figure 10.** *Goedetrechus paralleus* Moore. Reproduced from Moore 1972

**Figure 11.** *Goedetrechus mendumae* Moore. Reproduced from Moore 1972

### Differences between genera

Taxonomic differences between these two genera (beyond the shape of male genitalia) are in the number of setae on the elytral disc: 2 in *Tasmanotrechus* 3 in *Goedetrechus.*

***Tasmanotrechus***

In *Tasmanotrechus* from less to more specialized species (figs. 10-11) we find:

- increase in body size and in particular, wider elytra with more evident humeri;
- pronotum not elongate but more or less transverse with lateral side (near to posterior angles) from regular rounded to more or less sinuate;
- progressive reduction of ocular size but no totally blind species.

***Goedetrechus***

In *Goedetrechus* from less to more specialized species (figs. 8-9) we find:

- reduction (or no increase) in body size, elytra elongate with rounded humeri;
- pronotum always elongate, not transverse, with lateral side (near to posterior angles) more or less sinuate;
- some species totally blind.

### Differences within each genus

Taxonomic study of species in *Tasmanotrechus* and *Goedetrechus* revealed two distinct species groups in *Tasmanotrechus* and three distinct groups in *Goedetrechus*. The species 'groups', defined on morphology of the aedeagus, showed concordance with geographic distributions, and/or with habitat and ecology (epigean, endogean, hypogean).

### *Tasmanotrechus* species groups

**1) *T. leai* group (Surface & troglophiles):**

All species belonging to this group are less specialized forest litter dwelling (including troglophiles), with less ocular reduction and rounded pronotum. All are morphologically well differentiated.

- *T. leai* Moore from Great Lake, Waratah, Bubs Hill.
- *T. concolor* Moore from Lune River.
- *T. elongatus* Moore from Bubs Hill.

- *T. compactus* Moore from Southwest National Park.
- *T.* n. sp. 1 from Gordon River
- *T.* n. sp. 2 from Cradle Mountain
- *T.* n. sp. 3 from Lake Osborne.

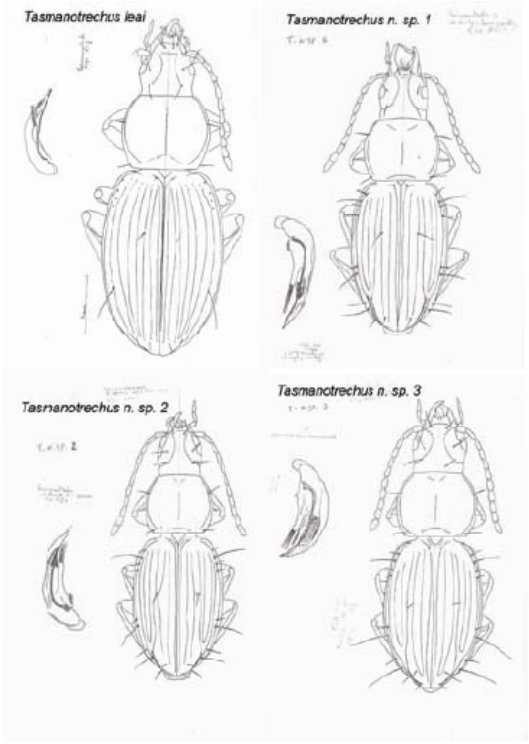


**Figure 12.** *T. leai*, *T. concolor, T.* n. sp. 1 from Heritage Landing Walking and *T.* n. sp. 2 from Cradle Plateau seems more closely related. *T. compactus* and *T.* n. sp. 3 from Lake Osborne seem more closely related.

**2) *T. cockerilli* group (Troglobites)**

All species belonging to this group are morphologically well differentiated and troglobites from the Mole Creek karst.

- *T. cockerilli* from Georgies Hall Cave, Scotts Cave, Herberts Pot and Baldocks Cave.
- *T.* n. sp. 4 from Kubla Khan Cave.
- *T.* n. sp. 5 from Little Trimmer Cave, Kubla Khan Cave and Genghis Khan Cave.

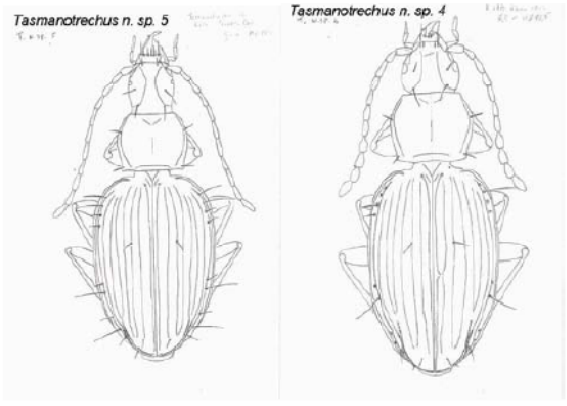


**Figure 13.** *T.* n. sp. 4 from Kubla Khan cave is the less specialized species of the group. *T.* n. sp. 4 and *T.* n. sp. 5 are sympatric in Kubla Khan cave.

***Goedetrechus* species groups**

**1) *G. talpinus* group ('Endogean'):**

- *G. talpinus* Moore from Blue Tier

This 'endogean' species (Moore 1972) collected from soil and humus is less specialized, with vestigial eyes, from north eastern Tasmania.

***2) G. parallelus* group (Troglobites):**

All species belonging to this group are troglobites from caves in the Junee-Florentine karst, but they retain vestigial eyes. All are morphologically less differentiated and taxonomically very close to each other.

- *G. parallelus* Moore from Cashion Creek Cave and Frankcombe Cave.
- *G.* n. sp. 1 from Pendant Pot, Growling Swallet Cave, Wherretts Cave, Threefortyone Cave.
- *G.* n. sp. 2 from Cauldron Pot.
- *G.* n. sp. 3 from Niggly Cave.

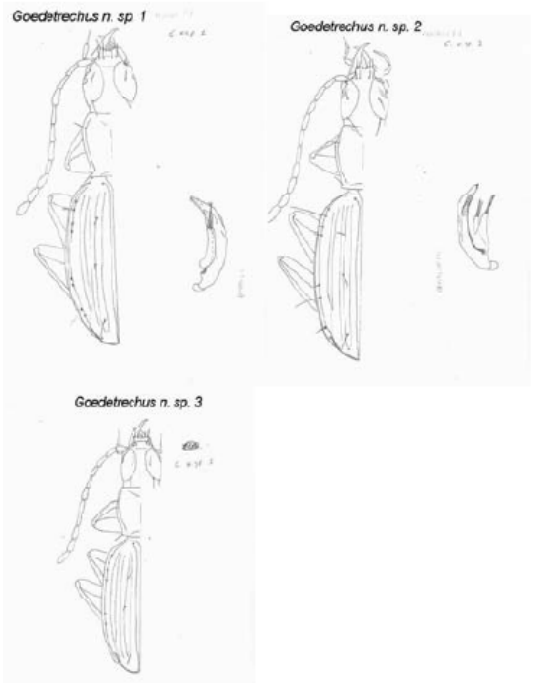


**Figure 14.** *G. parallelus* group.

**3) *G. mendumae* group (Troglobites):**

All species belonging to this group are the most specialized troglobites and totally blind, from caves in far southern karst areas. All are taxonomically well differentiated.

- *G. mendumae* from Ida Bay (fig. 15).
- *G.* n. sp. 4 from Precipitous Bluff.

**Figure 15.** *Goedetrechus mendumae* from Ida Bay karst. Photo Stefan Eberhard.

## DISTRIBUTION PATTERNS

Distribution patterns in the troglomorphic species exhibit characteristic short range endemism coinciding with discrete karst areas, or even discrete caves within a single karst area. At regional scale, the most highly troglomorphic species are found in southern karsts, while central and northern karsts appear to be characterised by less troglomorphic species (figs. 16-17).

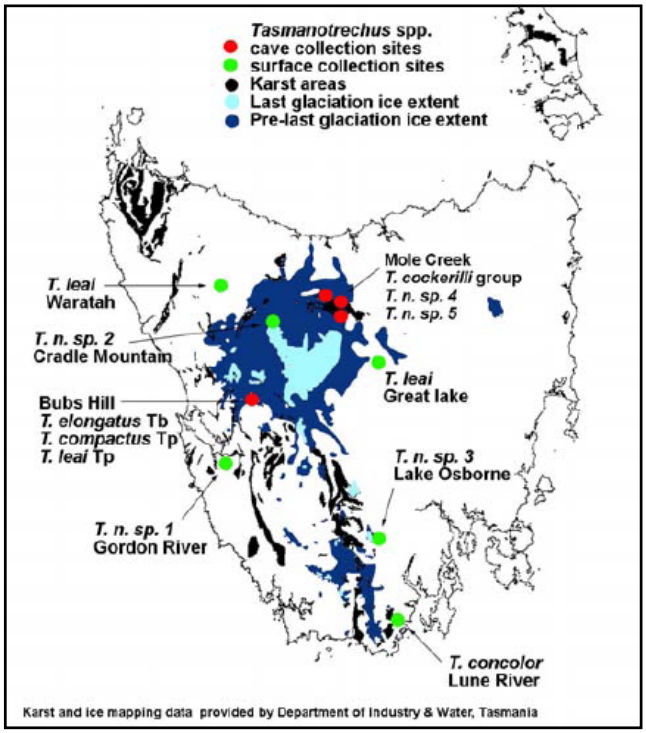


**Figure 16.** *Tasmanotrechus* spp. cave and and surface collection sites, karst areas and ice extent in Last glaciation and Pre-Last glaciation.

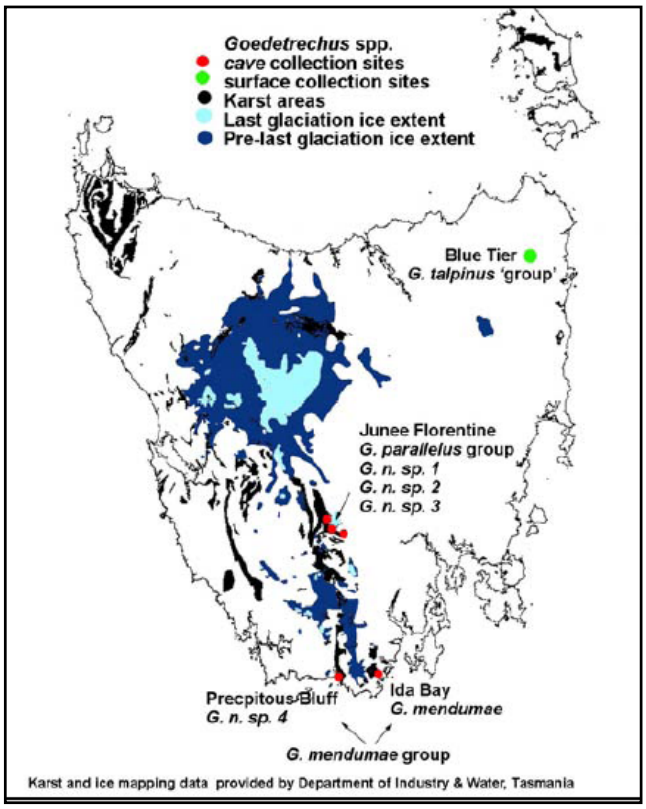


**Figure 17.** *Goedetrechus* spp. cave and and surface collection sites, karst areas and ice extent in Last glaciation and Pre-Last glaciation.

## DISCUSSION

It is proposed that present day troglobitic trechines are derived from troglophilic progenitors that colonised subterranean habitats from adjacent forest ground litter habitats during Pleistocene interglacial periods, while retreat of forests during glacial periods isolated subterranean populations from surface populations facilitating troglogenesis.

Assuming that the degree of troglomorphy equates to time of isolation underground, it is hypothesised that the highly troglomorphic species group (*Goedetrechus mendumae* group) found in southern karsts (Ida Bay, Precipitous Bluff) represent an earlier phase of cave colonisation, while the less troglomorphic species groups (*Goedetrechus parallelus* and *Tasmanotrechus cockerilli* groups) found in the central (Junee-Florentine, Bubs Hill) and northern karsts (Mole Creek) represent more recent colonisation(s).

The Mole Creek karst was overridden by ice during the Pre-Last Glaciation (fig. 16) and presumably not inhabitable by subterranean beetles. It is therefore predicted that the *Tasmanotrechus cockerilli* group colonised the Mole Creek karst after the Pre-Last Glaciation, possibly during the Last Glaciation when forest cover retreated from the karst and isolated the putative troglophilic progenitors of the *Tasmanotrechus cockerilli* group.

How periglacial conditions and processes in the glaci-proximal karsts affected the subterranean habitat for subterranean beetles remains speculative, however it may help in explaining the absence of more highly troglomorphic, presumably older, subterranean colonists in the glaci-proximal karsts. If older troglobites had existed in these karsts, it seems more probable they were extinguished during the more extreme Pre-Last Glaciations. Extinction of earlier faunas during glacial periods would have provided unoccupied niches in subterranean habitats for new colonists during interglacials when forests and epigean forest fauna recolonized the karsts.

We have to hand only limited collection localities for epigean *Tasmanotrechus* spp., which constrains our interpretation accordingly, however *Tasmanotrechus* sp. n. 2 at Cradle Mountain Plateau is presumed to be a post Pre-Last Glacial colonist because this area was overridden by ice during the Pre-Last Glaciation, and was near the northern limit of ice extent during the Last Glaciation (fig. 16).

The distribution patterns for *Goedetrechus* spp. appear to best fit a climatic relict model. All known species in this genus are hypogean, except for *G. talpinus*, which is described by Moore (1972) as endogean. This species has very reduced eyes and was collected from soil and humus at 600 m altitude on Blue Tier in northeast Tasmania. Parts of northeast Tasmania seem to have maintained climates suitable for rainforest and wet eucalypt forest from the height of the Last Glacial to the present, and the Blue Tier refugium is almost certainly the source for recolonization of the northeastern highlands that now support large tracts of rainforest (Kirkpatrick and Fowler 1998).

Rainforest and wet eucalypt forest also persisted in far southern near coastal areas during the height of the Last Glacial, including in the vicinity of Ida Bay and Precipitous Bluff karsts where the highly troglomorphic

*Goedetrechus mendumae* group is found. These karsts abut the Southern Ranges which remained ice-free during the Last Glaciation (fig. 17). The Southern Ranges were glaciated during Pre-Last Glaciations when proglacial streams deposited extensive gravels in base level stream passages at Ida Bay, although higher level sections of this karst remained unaffected by sedimentation. Glacial and periglacial effects on Precipitous Bluff were comparatively mild compared to all other Tasmanian karsts, as evidenced by the paucity of sediment infilling in the caves there, and comparatively little evidence of cold climate freeze-thaw weathering processes such as dolerite talus slopes which characterise other dolerite-capped mountains in Tasmania. The occurrence of more highly troglomorphic representatives in southern karsts compared with central and northern karsts appears to be mirrored in several other genera of troglobites, including zoline beetles (*Idacarabus*), millipedes (*Atalopharetra*), harvestmen (*Hickmanoxyomma*, *Lomanella*), and hydrobiid molluscs (*Pseudotricula*) (S. Eberhard unpublished). Future research will focus on elucidating the phylogeographic patterns in selected taxa to test how the observed distributions fit with the processes and chronology of Pleistocene glacial/interglacial cycles, or if other mechanisms for troglogenesis may be involved.

**ACKNOWLEDGEMENTS**

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Great Western Tiers, view north from Devils Gullet on edge of the Central Plateau and Mersey River Valley. During Pre-Last Glaciation, ice poured over edge of the Central Plateau and covered the Mole Creek karst lying on the lower forested slopes. A valley glacier filled the Mersey Valley and extended nearly to the present coastline. Photo Peter Bell.

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