

CAVE MANAGEMENT AT MAMMOTH CAVE, U. S. A.

- Mia Thurgate and Rick Olson

Booths Amphitheatre in Mammoth Cave, showing a section of the entrance passage near the saltpetre mining site. Photo: M. Thurgate.



Introduction

Mammoth Cave is a globally significant karst site with many important cultural, biological and geological values. This has been recognised by a listing in 1981 as a World Heritage area and in 1990 it became the focal point of an International Biosphere Reserve. The values of Mammoth Cave are summarised below.

- **Indigenous culture:** Archaeological sites dating back to 4000 years before present are found within Mammoth Cave. These sites provide information about the use of the caves as a source of minerals by American Indians. Artefacts such as fragments of reed torches, gourds, sandals and even a 2500 year old wooden scaling pole are preserved deep in the cave system.
- **European culture:** Inside the caves are the remains of a mining operation which produced saltpetre for gunpowder supplies for the War of 1812. At the end of the war, saltpetre prices plummeted, and the mining operation was replaced by cave tourism. Nearby is an extensive display of historic signatures – many dating back to the cave visitors and explorers of the mid 1800s. Ruins of an experimental underground Tuberculosis Hospital from 1842 are also present.
- **Biodiversity:** Over 130 species, which are regular inhabitants of park caves, have been identified that are partially or wholly cave-dependent. These include cave fish, many crustaceans (amphipods, isopods, and crayfish), spiders, cave crickets, beetles, millipedes and

flatworms. One special species is the Kentucky Cave Shrimp, which is endemic to the Mammoth Cave area and listed as endangered. Bats utilise caves within the National Park including two endangered species, which are the Indiana and Gray bats.

Surface environments are support a rich diversity of animals and plants. The Green River which runs through the park contains over 80 species of fish and 50 species of freshwater mussels, six of which are listed as endangered.

- **Geology/geomorphology:** Mammoth Cave is the longest known cave in the world (over 580 kilometres of passage and still going). There are up to six different levels of cave passage in four main ridges. Important fossil and other cave deposits and many areas of unusual mineral deposits have been found in different parts of the system.

Mammoth Cave National Park is managed by the US National Park Service. The park covers an area of over 21 000 hectares. Nearly 2 million people visit the caves each year, and many of these experience at least one of the 13 guided cave tours. These tours provide access to over 16 kilometres of passage. Not surprisingly, the National Park is also a focal point for caving groups who are involved in exploration, mapping and conservation projects. The park is popular for a range of outdoor recreational pursuits including fishing, canoeing, hiking and camping.

The area surrounding the park has been largely cleared and land uses include agriculture, tourism and rural, industrial and urban development. A number of private commercial cave operations are also found in the area.



*A blind crayfish in Mammoth Cave Gothic Avenue in Mammoth Cave, showing an experiment using a plastic curtain to reduce condensation drips
Photo: M. Thurgate.*

Mia Thurgate (centre) with Rick Olsen and Peggy Palmer (Peggy is well-known cave explorer who has done a lot of research at Mammoth). Photo: M. Thurgate.



All of this adds up to a very complex management situation. This article focuses on the management issues currently being addressed within the National Park.

Changes to the entrance passage

The original entrance passage to Mammoth Cave, known as Houchins Narrows, has been periodically modified over the past 180 years. The entrance passage has been excavated, so that in places it is more than double its original height. The cave floor has been smoothed and altered to make way for paths. Masonry walls and gates that restricted airflow were installed to protect the cave from unauthorized entry, and to moderate the temperature within during winter.

While these changes have made access to the cave easier for tour groups, they have caused a change in cave air flows and climatic conditions. Most notably there had been an increase of cold air into the cave in winter in some sections, while in other areas natural airflows have been restricted by infrastructure. As a result:

- The millions of bats that once used the cave as an over-wintering site have abandoned the cave. Disturbance from cave tour groups and unsuitable gating (prior to 1990) have compounded this problem. Woodrats that once lived in the loose rocks on the floor of the entrance passage have also abandoned the cave. Some terrestrial invertebrate communities have also been displaced.
- Increased moisture due to condensation is now found in places it did not naturally occur. In periods of colder than average weather this has allowed moisture to freeze between bedding planes causing localised rock falls. Fallout of fine sulphate salts from the roof in some sections of the cave has also increased.
- Increased moisture levels have allowed fungal growth to develop on wooden artefacts from the

indigenous archaeological sites, threatening their long-term survival. This problem was observed over two kilometers into the cave from the Historic Entrance.

- Since 1989 cold winter air entering through the Historic Entrance has mixed with warmer moist air flowing from Gothic Avenue. A cloud forms at the ceiling level and water collects on all surfaces in contact with the cloud. This condensation drips onto War of 1812 saltpetre leaching vats below, and has promoted active fungal growth. Restriction of airflow through the gate by application of plexiglass panels in 1996 has significantly reduced this problem.

Work is now underway at Mammoth Cave to restore air flows and climate to original conditions. A major hurdle to be overcome in this restoration process has been the lack of historical data about what conditions in the cave were like before entrance modifications commenced. Paleontological information is being used to develop a more detailed history of changes to the entrance passage.

Bat deposits are being investigated to find out which species used the cave as an over-wintering site, and how many bats were involved. Current research suggests that six species of bats used the cave in the past.

At least 9-13 million bats (mostly Gray and Indiana bats) hibernated in areas that are now used as main tour routes. This figure is a conservative estimate. The two main bat species have very narrow temperature range preferences. This provides the staff at Mammoth Cave with target temperature range for climate restoration work.

Other measures to make the cave more attractive to bats include:

- Restriction of access to the cave by visitors at the critical times of dusk and dawn
- Reconfiguration of entrance lighting to be less intrusive
- Rerouting of cave tours to leave some areas free of disturbance

Plexiglass baffles were installed on the entrance gate in March of 1996. Winter cave temperatures can be manipulated by the use of these baffles so that temperatures are approaching the range required by the endangered Indiana bats.

Three additional management issues have been improved by controlling winter cave temperatures. First, the rock fall rate has been dramatically reduced. From 1994-95, six rock falls were recorded in the cave.

Since the baffles were installed, only one rock fall has occurred. Secondly, fungal growth on indigenous artefacts has become dormant. Finally, based upon field observations, condensation dripping on the saltpetre leaching vats at Booth's Amphitheater has been greatly reduced.

Park staff is now working to eliminate condensation completely. During the winter of 2002, a section of passage was blocked to prevent the mixing of warm and cold air flows above the saltpetre mining site. The passage was blocked using plastic sheeting attached to a timber frame. The frame was custom made to fit the narrowest part of the passage and was wedged into place to prevent damage to the limestone. This structure can be easily dismantled and removed. The barrier was effective in reducing condensation levels to extremely low levels. Further refinement of the technique along with other restoration activities should eliminate the problem in the near future.

Dust and Lint

Historically, paths in Mammoth Cave were built of cave sediment which was mined from the cave. The historic paths were vulnerable to drying in winter, and dust raised by tours was suspended in the air, mixed with lint from visitors, and then settled on features near the paths.

In 1960s and 1970s water was applied to the paths to control dust and calcium chloride and ammonium nitrate were added to retain the moisture. The effect of these chemicals on the cave environment is unknown, but it is likely that there were impacts on water quality and cave invertebrates.

These management practises are no longer in use at Mammoth Cave, but the legacy of the past needs to be repaired. New paths are being installed that are made of concrete or recycled plastic lumbar. Lint curbs have been added to capture low-level dust and lint. (Chemical residues from the surface of historic paths are being manually collected and removed from the cave - nope). Finally, the surfaces of many formations are being hand cleaned with brushes to remove lint and dust.

Cave infrastructure

Sections of the historic paths near the River Styx include raised wooden boardwalks and platforms. These are also being colonised by fungal communities, and may have introduced an unnatural food supply into the cave, upsetting the ecological balance of invertebrate populations. Of greater concern is the fact that the wood was treated with creosote, which was leaching into the underground stream.

A lighting system from the 1960s also started to corrode and was polluting waterways. These pollutants have probably impacted on aquatic ecosystems which support the endangered Kentucky Cave Shrimp.

To prevent further decline in water quality, the wooden pilings and decking and old lighting system are being manually dismantled and are being carried out of the cave. This has been a massive operation and has relied on volunteer efforts coordinated by the National Speleological Society. As an example of the effort involved, over 300 meters of boardwalk has been dismantled and removed to date.

Conclusion

The goal of management efforts at Mammoth Cave is to realize a long-term, holistic management strategy that truly protects the world-class natural and cultural resources.

There have already been a number of positive outcomes, and major achievements can be recognised. However this is a long-term process with many difficult problems still to be solved.

ON A PERSONAL NOTE...

I had a wonderful time during my visit to the Central Kentucky Karstlands. Yes folks, southern hospitality is as generous as the rumours say. At the risk of putting some of my readers to sleep, I would like to acknowledge the many people that made my visit so memorable.

Rick Olson and his wife Colleen took me under their wing for the week I was in the area. They provided me with a place to stay, great meals and hospitality, showed me around the area, introduced me to people and places, and were great company. Thanks to you both for everything, including smores and walks with Kitty. My Kentucky Cave Shrimp giant mug (which happens to hold half a plunger of coffee or a whole can of beer) is a constant reminder to come back.

Thanks also to: Bruce Powell for starting the ball rolling; Kurt Helf for the White Cave biospeleology extravaganza; Ted and Cheryl Messenger for Kentucky moonshine and gourmet jelly beans; and all the other Mammoth Cave staff that made me feel welcome; Gary Berdeaux for the tour of Diamond Caverns and cave photography; Art and Peggy Palmer for our road trip and visit to the famous Crystal Cave; Judy and Bill Austin and staff for your extra special attention and for showing me around Kentucky Down Under and Kentucky Caverns; David Foster and staff for the friendly welcome at the American Cave Museum and Hidden River Cave; the wonderful and friendly cavers of the Cave Research Foundation for letting me hang out on a cave survey trip. And for anyone else that I may have forgotten to mention, thanks a bunch.

Mia Thurgate

2001 A CAVE ODYSSEY

FIVE MONTHS OF CAVES AND KARST

PART 2 – HUNGARY TO TURKEY

- Armstrong and Penney Osborne

Penney and friend in the Castle Labyrinth, Budapest



From July to December 2001, Armstrong took study leave from the University of Sydney. During this time Armstrong and Penney attended the International Speleological Congress in Brasilia and spent four months in Europe working with colleagues on palaeokarst and non-meteoritic caves.

During the journey we both visited numerous show caves, tourist mines, conservation areas and museums etc. and saw much of interest relating to conservation and management. This report tells of the second part of our journey from Hungary to Turkey. In addition, some issues of interest to cave managers that we observed during the whole of our trip will be discussed.

HUNGARY

We made four visits to Hungary during the trip, two were only for one day and two were for a much longer period. Australians are one of the very few nationalities that require visas for Hungary, and multiple entry visas are not cheap.

Since our last visit in 1997 there has been very significant economic and political progress in Hungary, making it a very interesting country to visit as it is now well on the way to joining the EU.

Aggtelek National Park

We visited Baralda Cave, the main cave in Aggtelek National Park in August from Slovakia with our colleagues from the Czech Geological Institute. Aggtelek National Park is the Hungarian section of the Aggtelek and Slovak Karst World Heritage Area located in the Hungarian-Slovakian border region.

Baralda Cave in Hungary and Domica Cave in Slovakia are two sections of the same very large cave system. While Domica Cave attracts approximately 30 000 visitors annually, Baralda receives 170,000, this appears to be partly due to the better tourist facilities and accommodation at Baralda.

Baralda has two entrances; we took an extended tour between them beyond the fixed lighting of approximately 5 km. This is a very long tour mainly following the stream, but also traversing large breakdown piles. The main passage is approximately 50 m across and is quite impressive.

The very large spaces are illuminated using giant old-fashioned floodlights with 500 to 1000 watt normal filament bulbs. Wiring is to mine standards and a particular effort has been made to hide the giant iron-clad switchboards. New lighting and stainless steel handrails are being installed. An outstanding sound and light show is presented in a large breakdown chamber near the main office.

Friendly staff and excellent colour printed, multilingual, brochures, videos and high-quality souvenirs are important features of Aggtelek National Park

Buda Hills

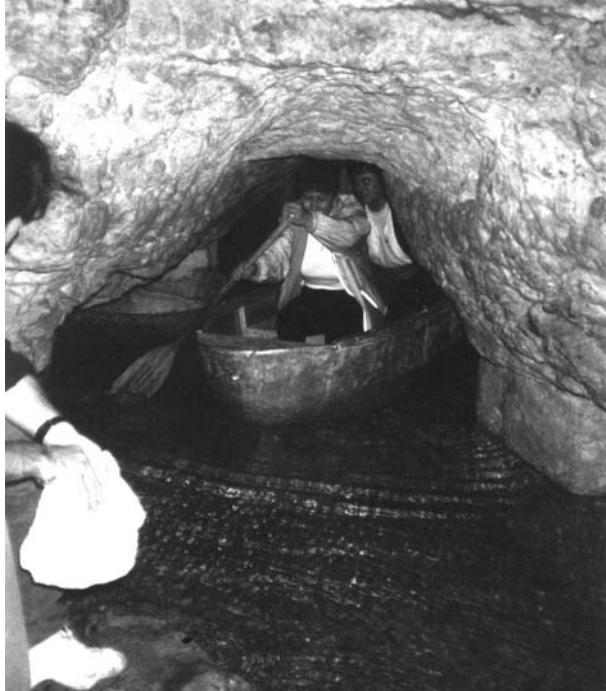
Our first long stay in Hungary was for two weeks in September and our second was for one week in October. We stayed in a cheap hotel in Budapest near the castle, which has now been converted into a computer college. Our host in Hungary was Dr Szabolcs Leel Ossy of the Eotvos University. During our stay the university was moving from its historic buildings in the Museum Quarter to an out-of-town site. As is often the case the historic buildings were being occupied by bureaucrats.

The main aim of this visit to Hungary was to take a detailed look at the thermal caves of the Transdanubian Mountains. An important group of these caves are in the Buda Hills, which includes the old castle-city of Buda and the exclusive residential and diplomatic suburbs of Budapest. Most of these caves do not have natural entrances. Interestingly, caves are legally protected in Hungary, whether they are discovered or not. This means that if a cave is discovered during excavations it must be assessed by specialists.

There are several unusual outcomes from this situation: -

- Szabolcs can do field work only a few minutes drive from home
- There are extensive caves under exclusive residential land
- Caves are frequently intersected in building site excavations

There is work for cave geologists and cavers exploring the newly discovered caves and assisting builders and civil engineers in devising foundations that will both support the building and protect the caves.



The tour boat return, Tapolca Lake Cave

We inspected three show caves in the Buda Hills, Castle Labyrinth, Pal-volgyi Cave and Szemlo-hegyi Cave. One unusual feature of Castle Cave and Szemlo-hegyi Cave is that they have a street address. Castle Labyrinth is a series of artificial tunnels and segments of natural cave located under Castle Hill. It is entered through a shopfront. It is an amazing tourist feature well worth visiting. A range of sculptures and rather strange display items are spread throughout the tunnels. These include “fossils” of a computer, auto teller (bankomat) and a sand shoe print and a fountain that runs with red wine. The displays are interpreted as representing a history of Hungary. There is another section of the Labyrinth open to tourists, but it was out of season during our visit.

Pal-volgyi cave was intersected by a quarry. It is a complex network cave, a small section of which is used as a show cave. The show cave receives approximately 40 000 visitors per year and has recently been refurbished at a cost of \$300 000 USD! Pal-volgyi Cave is a good example of the thermal caves of the Buda Hills. Cave development is

guided by joints and features rift-like cavities, outlet cupolas and significant deposits of cemented cave rafts.

Szemlo-hegyi Cave is the largest show cave at Budapest. It is located in a suburban street and has an imposing entrance building with an impressive museum and cave model as well as a separate entrance for speleotherapy patients. The cave is a series of large rifts decorated with thick deposits of cave coral and small amounts of conventional speleothem.

Many of the features seen in the Show Caves of Budapest will be familiar to our colleagues at Wellington (New South Wales), in fact Szemlo-hegyi Cave is somewhat like a giant version of Gaden-Coral Cave!

Jozsef-hegyi Cave

Armstrong was privileged to visit Jozsef-hegyi Cave, one of the most important non-tourist caves in the Buda Hills. The cave was discovered during a building excavation in 1984 and our host Szabolcs was one of the original discoverers. After much amazing communist era politicking the cave was protected and a cave house built near the entrance. Jozsef-hegyi Cave is another unusual Budapest locality, a “wild” cave with a house, letterbox and street address.

The cave is entered through a concrete bunker. Then it descends about 30 metres through a series of narrow squeezes and climbs that took the original explorers 60 days of digging to penetrate. At the base of the narrow climb there is a large cylindrical chamber 70 m long, 20 m wide and 10 m high.

The main chamber is electrically lit and has a narrow marked path through it. The cave wall, ceiling and floor are covered with amazing deposits of aragonite, gypsum and calcite coral and crystals. These deposits are white or cream and are offset by younger deposits of red flowstone.

It is thought that thermal waters excavated the cave and that these deposited the gypsum and aragonite. The “normal” speleotheims were deposited by seepage water after the thermal waters had departed.

Satorkopuszta Cave

Satorkopuszta Cave near Estergon on the Danube Bend is one of the most important textbook examples of a thermal cave. We took the bus from Budapest to Estergon and met up with Thomas and Melinda, two cavers in their 20s with excellent English and a very positive outlook.

Satorkopuszta Cave is about 30 m deep and in cross-section consists of a large irregular basal chamber sitting below a series of cavities taking the form of an upside-down bunch of grapes.

Each “grape” is a spherical cavity 2.4-2.6 m in diameter called a “spherical wall niche”. The opening in the spheres is neither vertical nor horizontal but lies between the 3 o’ clock and 6 o’ clock position.

The upper part of the cave consists of larger spheres and cupolas, and in the top of the hill above the cave there are several very large unroofed cupolas forming an arch-like structure called Angel Gate.

Satorkopuszta Cave is now in a national park and is managed by a local caving club who have a built a wooden floor in one of the upper cupolas for sleeping and installed a quite scary fixed ladder on the pitch into the main chamber.

Small groups of the public are taken on "adventure" tours on Sundays. This cave is not as impressively decorated as Jozsef Cave, but for anyone interested in speleogenesis or speleogens it is essential to crawl through the spherical niches, if only to see how some of the textbook diagrams have got it wrong.

Lake Balaton

Lake Balaton, south of Budapest is Europe's largest freshwater lake and an important tourist area for fishing, swimming, sailing and thermal waters. The limestone hills along its western shore contain a number of caves as well as economically significant karst bauxite deposits.

We made a very short, 3 days and 2 nights, visit to the area but would recommend taking more time. Take the train from Budapest to Topolca and stay as we did at the Szent Goyrgy Panzio (Pension St George).

This accommodation is located directly above the largest show cave, (the cave and the pension have the same street address) and serves great grilled trout for dinner.

Topolca Lake Cave (under the Pension St George) was intersected by excavation of cellars and was largely inaccessible until pumping of water from the bauxite mine lowered the local water table. For Australians the cave has two very unusual characteristics:

- 1 Like the Buda Hill caves it is located in the centre of town
- 2 It is operated by a mining company. The Bauxite Mining Company Head Office is located across the street from the cave entrance.

The first part of the Topolca Lake Cave tour is through a series of large cupolas. They are formed in quite rubbly limestone. In places brickwork appears in the cave ceiling where cellars of the buildings above have been sealed off from the cave. The really interesting part of the tour is the boat trip. Visitors are helped into small aluminium boats in groups of three or four and one of them is given a paddle. They then paddle around a circular passage that is electrically lit and return to the starting point. This takes about 15 minutes and is a real highlight.

The other show cave in the area is Loczy Cave, located in the hill behind Balatonfured, one of the main towns on the lake. We took the local train from Topolca to Balatonfured and a taxi to the cave. This is a very small cave with an elderly guide who did

not speak one word of English. He instructed his dog to sit at the cave entrance and took us on the tour. The tour was excellent. He was enthusiastic and very proud of his cave and soon worked out that we were really interested. He showed us his precious aragonite deposit and the other main features of the cave.

When we returned to the entrance the dog was waiting for us. Loczy Cave is small and difficult to find. It is not well decorated, but the tour with the old guide and his dog was one of the highlights of our trip.

A narrow headland with a hill at its end sticks out into Lake Balaton from Balatonfured. Sitting on the top of this hill is the church town of Tihany next to a small high-level (possibly volcanic) lake. This is a real tourist trap but it has two features of speleological interest.

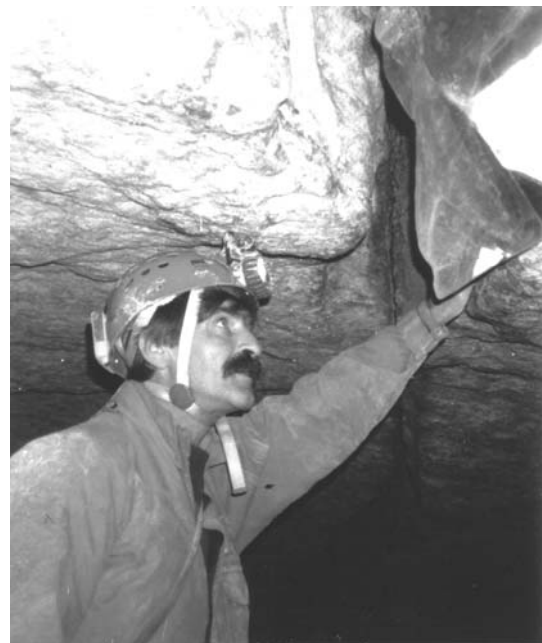
The hill with the historic church has an old geyser mound on it, and in the mound a small cave is developed. Around the lake and over the hill is Aranyhaz gejztrupk a set of old geyser mounds also with caves. Hungary has many features of interest to cave managers and cave scientists and is well worth a visit.

UKRAINE

For two weeks in late September we left Budapest and travelled east to the Ukraine. The visit to the Ukraine required lots of preparation. Tourist visas to the Ukraine are very restrictive and require you to follow an approved itinerary and stay in particular hotels.

Our host, Professor Alexander Klimchouk arranged an official letter of invitation for us from the Ukraine Academy of Science and we were issued with private visas.

Professor Alexander Klimchouk in Gypsum Cave



We travelled by train from Budapest to Kiev. We left Budapest a 5 pm on Friday and arrived in Kiev at 6 pm on Saturday. Travelling on the Tiser Express is quite an experience.

The nice lady at Budapest Keleti Station assured us that we would travel in a Hungarian carriage, this turned out to be a great blessing as the Hungarian carriage had 2-berth compartments, while the Russian carriage was all 6-berth.

The train moves quite slowly and goes through a bogie exchange for wide gauge just after crossing the Hungarian-Ukrainian Border. The most scenic part of the journey, crossing the Carpathians, always occurs in the middle of the night.

On reaching Kiev we stayed with Alexander, his wife Natalie and their grandson Klim in their house in a village outside Kiev. The purpose of the visit was to have discussions with Alexander, use his extensive personal library and visit the great gypsum caves of western Ukraine.

Great Gypsum Caves

The gypsum caves are located in western Ukraine, so we had to retrace our steps by car for ten and a half hours west from Kiev to reach the gypsum region. Since we don't have gypsum strata or caves in Australia (please someone prove us wrong!) a few words of explanation may help.

Gypsum is a very light grey coloured rock, it is considerably more soluble than limestone and unlike limestone dissolves by simple solution (no acid required and no mixing corrosion). Alexander has shown that the gypsum caves of Ukraine (including the world's second longest cave) formed by artesian water rising up through the gypsum and dissolving it.

Armstrong inspected two wild caves and we both visited Crystal Cave, a gypsum maze cave that is developed as a show cave. The caves are extensive rectilinear mazes of narrow tubes and rifts, sometimes on multiple levels.

While we don't have caves of this type, or of this scale in Australia, there are some features of these caves which appeared remarkably familiar and should make us think about the origin of Australian network caves.

CROATIA

After returning from the Ukraine to Budapest we took the train to Slovenia in early October. We arrived in Postojna about a week before our accommodation in the flat at the Karst Research Institute was available.

So what to do for a few days? We had always talked about visiting Plitvice Lakes in Croatia and a colleague at the institute suggested that we should visit the lakes, continue to Split and see the karst landscapes along the Adriatic coast between Split and Rijeka.

Plitvice Lakes

Plitvice Lakes are a series of very large tufa dams developed in a limestone gorge close to the border between Croatia and Bosnia. Plitvice Lakes National Park, on the World Heritage List, is about 2 hours by bus south of Zagreb. Accommodation is in 1960s style socialist tourist hotels that have been completely restored following the "troubles" of the 1990s.

We spent two nights and a day and a half at Plitvice, but it would be possible to spend much more time and still not see everything. On the afternoon of our arrival we took the tractor train to the upper lakes. The tractor train is in reality a unimog bus towing enclosed trailer cars with very fancy hydraulic steering.

This takes you up the hill, then there is a long walk back on well-constructed paths and boardwalks past numerous large tufa dams, caves in the tufa and lots of small-scale features. This is a must for anyone interested in karst processes.

On our only full day at Plitvice we took the long boat trip to the lower lake. The boats on the lake are large punts and are electrically powered. Petrol power and fishing is strictly prohibited on the lakes. After crossing the lake a path takes you down stream through the limestone gorge and past more constructive cascades and waterfalls, caves in the bedrock and small lakes. This is also a must-do trip.

Plitvice Lakes really are one of the world's most significant karst features and are also an outstanding example of conservation and tourism working together. We were both very impressed and would recommend a visit by anyone interested in karst or karst management.

Split

From Plitvice we took a 6-hour bus journey overland to Zadar and then down the coast to Split. On the way we passed through amazing plateau and alpine karst and numerous poljes. We passed lots of shot-up and deserted buildings and some abandoned UN compounds.

Split is surrounded by a large modern industrial city, but the centre looks like an ancient walled town. It takes a while to realise that rather than the Palace of the Roman Emperor Diocletian being in the town, the town actually *is* Diocletian's Palace and the town walls are the old palace walls.

The Palace, another World Heritage Property, has survived for 2 000 years because people turned it into a living town, all the rest of the Roman city is gone.

This is the most amazing example of preservation through adaptive re-use. It should be compulsory for heritage architects to have a coffee at the Cafe Luxor (walls built between the columns of the peristyle) and look across at the cathedral (Diocletian's Mausoleum).

Paklencia National Park

From Split we took the bus north along the Adriatic coast. The view is extraordinary. On the east are limestone hills and mountains and on the west is the sea. The road travels through karst plains, mostly abandoned olive groves, to Zadar and then around the extremely steep hillsides with sheer limestone drops to the sea. The scenery is stunning, the karst is amazing and in places the journey is hair-raising. (The sight of burnt-out coach bodies at the base of cliffs also doesn't do much to help).

We stopped for the night at Starigrad-Paklencia where two huge karst gorges run down to the sea from the Velebit Mountains. These gorges and the mountains immediately east of them make up the Paklencia National Park. We booked into a pension and took a walk to the park entrance. We began to communicate with the ranger in the office, but were welcomed in English with an Australian accent. The ranger has been born in Sydney and returned to Croatia with his parents at age 12!

Next morning we walked up the path in the northern gorge, Velika Paklencia which is a bit like Bungonia Gorge on steroids with a sloping floor. The high limestone walls of the gorge are used for rock climbing, which is encouraged by the management! There are marked routes, some fixed aids and an official climb-master.

Our aim was Manita Pec a small show cave located in the side of the gorge about 50 m from the top of the plateau. The path to the cave was very steep and in places quite exposed. From the topo map we calculated that it rose 320 m from its turn off at the valley floor! When we finally got to the cave entrance there was a guide there ready to run a tour. He started up the petrol generator (fuel carried up on his back) and took the small group of people waiting in. The cave is fully developed with concrete paths, some metal grids and handrails, we didn't ask how this material, or the generator, got there. This is a very interesting cave, a high-level breakdown chamber with lots of stalagmites, flowstone and some rim pools. It is certainly worth a visit, if only to see how energetic European tourists and cave developers can be.

SLOVENIA

Our stay from late October to the end of November at Postojna in Slovenia was the longest in the whole trip. This was to allow Armstrong to have discussions, undertake fieldwork and use the library at the Karst Research Institute. It was also a great opportunity to meet up with the many good friends we have made among the staff of the Institute and their families.

Karst Research Institute

The Karst Research Institute of the Slovenian Academy of Arts and Sciences is located in a newly restored government palace facing the main square of Postojna. The Institute has a research staff whose expertise covers a range of disciplines relating to

caves and karst including: - biology, chemistry geomorphology, geology, hydrology, mineralogy and mathematical modelling and has an extensive specialist library dedicated to karst. The Institute publishes the scientific journal *Acta Carsologica* as well as a series of monographs on karst-related topics.

We stayed in the visiting scientists' flat located on the lower ground floor of the Institute. Normal working hours in much of Slovenia follow the old Austro-Hungarian model of 7.30am-3.30pm, so on some mornings bleary-eyed denizens from the flat would appear at early morning coffee upstairs.

The Director Dr Tade Slabe and all the staff of the Institute, are enthusiastic and extremely helpful. Fieldwork included examining caves without roofs with Andrej Mihevc, palaeokarst, including some with dinosaur bones, with Bojan Otonicar, incomplete solution of limestone with Nadja Zupan-Hajna and cupolas with Tade Slabe. We also met up with Daniel Rojsek from the Institute for Natural and Cultural Heritage and went on a field trip for Masters Students in Environmental Science with Professor France Sustersic from the University of Ljubljana. While show caves were not the main focus of this time, we did visit some and attended a UNESCO workshop on cave monitoring at Skocjanske jama.

Goffova jama

Goffova jama is not a conventional show cave, but it is open to the public one Sunday per month. The cave is located near the Slovenian-Italian border and was part of the Italian defences during WWI. On Sunday morning a large number of people collected near the centre of the village, paid their small fee and walked several kilometres along rough tracks up hill to the cave. They were met by members of the local caving club who had a large pot of fruit tea boiling on a fire and a generator set up to run a system of floodlights set up in the cave.

The cave was used as a barracks and equipment store in WW1. A series of steps and artificial terraces were constructed in the large initial chamber, while the inner part is relatively undisturbed and quite well decorated. There are some war relics in the cave and it is a quite interesting visit.

Predjama jama

Predjama jama (literally the cave in front of the cave) is named after Predjama Castle (the castle in front of the cave) which is built inside a very large cave entrance a few kilometres from Postojna. Predjama became a well-known feature following its use in a Jackie Chan movie. The Castle and the cave have a rich history centred on the "robber baron" Erasmus, but we won't spoil it for you by telling you the story.

The cave and castle are operated by the same organisation as the show caves at Postojna. The castle is open for inspection, which allows access to one part of the cave and here is a separate tour through the Cave



Cavers exploring an up market building site, Buda Hills

Behind the Castle, entered via the former stables door. The restoration of the castle is of a high quality and both the castle visit and the cave tour are well worth doing. From a speleogenetic point of view the lower part of the cave is a classic stream cave, but the upper part and the cave in which the castle is built are something else again and require considerable new study.

Vilenica jama

Vilenica jama, located close to the Italian border, is considered to be Europe's and probably the world's oldest show cave. Tours commenced there in 1633.

The old visitors book contains interesting entries by 18th century sailors from America on leave from their ships tied up in Trieste (then an Austrian port). Since 1963 the cave has been operated by the Sezna Caving Club. All of the development and guiding is done by volunteers. While some of the steps and paths leave a bit to be desired, the lighting is good and the volunteer guides, often young cavers, are very well-informed and enthusiastic.

The outer part of the cave is quite cold and contains large stalagmites and columns with secondary evaporative coatings. The inner part of the cave is a bit warmer and consists of large cupola-shaped chambers. It is reminiscent of the Orient Cave at Jenolan.

International Workshop on Monitoring in Karst Caves

In late November we attended the International Workshop on Monitoring in Karst Caves held at Skocjanske jama. This proved to be an excellent event and a good chance to meet up again with some old friends. We were also not the only Aussies present as Elery Hamilton-Smith gave the opening address. Armstrong gave his paper "Significance and Monitoring" on the second day. The papers from this

meeting are now published in a special volume of *Acta Carsologica* and make an interesting read.

Apart from the interesting papers the workshop provided another welcome opportunity to visit Skocjanske jama, which has to be one of the most impressive caves anywhere. Several visits are recommended if you suffer at all from vertigo as it takes a little acclimatisation before one can really appreciate the sheer size of the river passage and the amazing feats of those who explored the cave initially and constructed the paths.

TURKEY

At midnight we flew to Turkey from Slovenia on the Ljubljana-Istanbul "truck drivers special". With only ten days to look around Turkey we booked on an organised bus tour. While we saw a lot of interesting things, three are of particular relevance to cave managers.

Fairy Towers and Underground Churches

The region of Cappadocia is famous for its strange erosional landscapes with underground dwellings and churches carved into them. Both the landforms and the buildings have their origin in thick beds of volcanic ash from volcanoes, which still dominate the skyline.

We stayed in Urgup in a conventional building made from blocks of volcanic ash, but it is possible to stay in hotels carved into the rock pillars. Goreme Open Air Museum is a must-see. Several underground churches are located here and it is possible to observe some of the conservation works and management issues at this site.

Underground church and show cave management have much in common, in fact underground churches with fragile frescoes and built in crumbly rock may be more vulnerable than the average show cave. Erosion of the soft rock by tourists walking is a significant problem. So a visit to Cappadocia is quite instructive and highly recommended.

Underground Cities

As well as towers and churches, Cappadocia also has thirty-six underground cities. These are complex systems of rooms, passages, airshafts, built on several levels. While early Christians used them as refuges, it is not exactly clear who built them.

We visited the Derinkuyu Underground City, a complex excavated on eight levels around vertical airshafts. Wells dug from the lower level reach down to the water table. The city was designed to be sealed against invaders. Large stone wheels (like those shown in bible illustrations of the stone on Jesus' tomb) are set in alcoves ready to seal the main passages in case of invasion. Air quality in the underground city is good due to the design of the airshafts. As with the underground churches, a visit to the underground cities is highly recommended for cave managers.

Pamukkale

Pamukkale and Plitvice Lakes are the two World Heritage tufa dam sites. While Plitvice Lakes are surrounded by temperate forest and the tufa contains fragments of vegetation, the white rimstone terraces at Pamukkale are located in a much more arid environment and are vegetation free.

The rimpoools at Pamukkale are formed on the edge of a terrace on which the ancient Roman city of Hierapolis was built. They are deposited by water emerging from hot springs. The rimpoools are very much like their cave counterparts, however one unusual feature are the raised channels that the main streams run along.

Old tourist hotels that were once a blot on the landscape have been removed and people's movement on the terraces is much more controlled than in the past. A swim in the thermal waters of the public pool upstream of the terraces is highly recommended. Here one can relax in the warm water, study carbonate deposition and swim between Roman columns all at the same time.

SOME KEY ISSUES OF INTEREST

Caving Clubs Managing Show Caves

In Austria, Hungary, Ukraine and Slovenia show caves, with varying levels of complexity and infrastructure, are operated by caving clubs. The funds raised from these operations are used to purchase club equipment and to fund expeditions. In some cases the clubs took over abandoned show caves and redeveloped them.

While we might think that public liability problems would make such operations impossible in Australia, it is worth remembering that running a show cave is not all that much different to running a wildflower

park or a historic railway, many of which are operated in Australia by volunteers with varying amounts of assistance from state and local government. This approach may be the solution for small show caves (or almost show caves); particularly those located near population centres. It is at least worth considering.

Incorporation of Cave Maps, Exploration and Science in Interpretation

Maps of caves, stories of past and current exploration and ongoing scientific work are an integral part of show cave interpretation in central Europe. While relations between cavers and managers are not always good, the work of cavers (and cave divers) in exploring and mapping caves is highly regarded and is explained to the visitors.

There is a lot that we can learn from central Europe about integrating exploration and science into show cave operations and interpretation.

Quality Souvenirs

One of the striking features of show caves in central Europe is the high quality of souvenirs and of the interpretive material available both for free and for purchase. Each cave, and most other tourist venues, usually has one or more free colour brochures, a colour book of about one hundred pages containing quality information, photos and diagrams and a video or CD for sale.

Souvenirs are not just plastic junk with a badge stuck on, but include quality ceramics and glassware. Organisations that manage several cave sites produce overview booklets, maps and high-quality books that cover all their sites. This is another area in which we have a lot to learn.

AN UPDATE OF KARST ISSUES AND CAVE MANAGEMENT IN TASMANIA

- Arthur Clarke

Rationalisation of Parks & Wildlife Service within Tasmania

Over the past decade or more, Tasmania has witnessed the continued dilution or weakening of the Parks and Wildlife Service (PWS) from its original status as a government departmental body. A prime concern for PWS was research and protection of the environment and natural heritage of the State (including cave and karst resources). It appears to be coming an increasingly more divided and pragmatic structure with more of a focus on economic or tourist development and/ or regimented control with access restrictions

In the latest departmental reshuffle of Tasmanian Government departments, following the re-election of the Bacon (Labor) Government, PWS has now

become a section (or perhaps a division) under the new Department of Tourism, Parks, Heritage and the Arts (DPTHA). This new Department is now the umbrella body for all national parks, field centres, visitor centres and the respective PWS district offices. The Nature Conservation Branch which includes the Earth Sciences section is still retained as part of the Division of Resource Management and Conservation within the Department of Primary Industries, Water and Environment (DPIWE).

Prior to the recent reshuffling of ministerial portfolios, there has already been a rationalisation within PWS, reducing the number of state-wide operational sections in Tasmania. For example, the Southern District office of PWS, based at Huonville (incorporating management of the Hastings and Ida

Bay areas etc.) has now been merged with the Hobart-based Southern-Central office of PWS.

Due to the subsequent duplication of certain PWS job positions following the merger, the net result is the loss of some staff. One considerable loss is Wendy Basire, who was extremely dedicated and doing a superb job preparing the Hastings Caves management plan (as well as the Port Davey plan). The Hastings Plan will now be taken on by another planner (Leslie Frost), when she has completed the plans for Mt. Field National Park and Macquarie Island. Perhaps Rolan Eberhard could be seconded into working on the Hastings Caves plan, since his project on the integrated catchment strategy at Mole Creek appears to be coming to a conclusion.



Looking outwards towards the Hastings Thermal Pool from the Outlet Channel

Recent draft management plans in Tasmania

In recent years, aspects of karst in Tasmania have formed part of four management reports or draft management plans that have been released by the Tasmanian government:

- 1: *Tasmanian Wilderness World Heritage Area Management Plan 1999;*
- 2: *Draft Mount Field National Park, Marriott Falls State Reserve & Junee Cave State Reserve Management Plan 2000;*
- 3: *Draft Mole Creek Karst National Park & conservation Area Management Plan 2001*
- 4: *Draft Reserve Management Code of Practice 2001.*

All these management plans including the recent Mole Creek Karst National Park (MCKNP) draft management plan (DMP) are coordinated by PWS planning officers. Of course, the extent to which the PWS planner actually writes the plan, as opposed to organising material prepared or submitted by others, can vary.

Since these DMP's are corporate documents from PWS and there may be a succession of planners involved, so it is rarely meaningful to talk about the author of a management plan, although some officers are happy to be identified with a particular plan. Before a plan is released, there are various levels of approval, ending with the Departmental

Minister. Part of this process includes the invitation for public comment on any DMP.

Public comment to all these DMP's – including input from cavers or speleo groups – has been received and is either currently under consideration by the Tasmanian Resource Planning and Development Commission (RPDC) or is now the subject of a published report that summarises the input of individuals and details the responses by the PWS Director.

The RPDC reports may include recommendations for amendment (or no change) to the plan being forwarded back to the relevant officers: PWS Director, departmental planners and section heads for compilation in the final plan.

Although some plans include nebulous mention about a karst strategy, there is no clear indication that PWS or government bodies will liaise with cavers at either a local or national level. Amongst the concerns raised by cavers about aspects included in these draft management plans, there are two controversial items.

Firstly, the concern about mention of the Tasmanian Cave Classification System: a new system for classification and management of caves that has apparently been formulated without consultation with Tasmanian caving groups or national bodies.

Secondly, there is also some concern about the proposed development of a Tasmanian Minimal Impact Caving Policy. Once again, seemingly without consultation with cavers, this seems strange in light of the fact that the ASF Minimal Impact Caving Code already exists and another similar code is been formulated by ACKMA.

However, on the positive side, cavers are delighted to see that the most recent DMP for the Mole Creek Karst National Park includes a recommendation for the re-establishment of a cave management advisory committee that will presumably include representatives from caving bodies as well as government bodies.



Banded Shawls in Riveaux Cave in the recently discovered Hustling Creek karst.



Ian Household and Sarah Joyce at HS Creek

More news from Hastings

Although there is no dedicated PWS planner presently engaged in formulating the DMP for Hastings, other scheduled components or contributions to the DMP process are continuing. Amongst these there is a proposed fauna study, plus the present geomorphic and hydrologic studies. In recent months Ian Household has been investigating the Hastings area, sometimes in conjunction with other staffers from the *Hastings Enterprise* or with local cavers from STC. Ian has recently discovered another “new” area of dolomite karst at Hastings, adjacent to some gigantic glacial moraine features further west up *Hot Springs Creek* at an elevation approximately 100 metres above *Caves Hill*. This new area includes a swallet and some vertical cave entrances.

In conjunction with a more detailed determination of the karst geology and geomorphology at Hastings, a hydrological study is being conducted by Sarah Joyce as a BSc Honours project for the School of Geography & Environmental Science at the University of Tasmania.

Sarah has been assisted in recent weeks by Ian Household from DPIWE, along with Stephen Bunton - President of Southern Tasmanian Caverneers (STC) - and Arthur Clarke. During her initial appraisal of the karst, Ian gave Sarah a brief overview of the karst showing her a number of potential sites of interest including *Fossil Creek Swallet* - considered to be a major stream sink input for waters into the Hastings karst.

During a period of sporadic rain in late October, Sarah, Ian and Arthur decided to do something different and went to a local hardware store in Dover and purchased some “bombs”. The bombs were actually lead weights that could be used as sinkers

to attach to charcoal detector bags to keep them immersed at various sampling sites.

We then spent a week locating suitable sites to insert small flywire bags of granulated charcoal (for use as dye detectors) in various warm or cold water springs and clear-water streams with high conductivity readings.

In one of the warm springs at Hastings, Arthur braved the biting mosquitoes to collect a number of aquatic invertebrates include some extremely minute 0.5-0.75mm long hydrobiids and some tiny 1-2mm long crangonyctoid amphipods. Detectors were placed in all these warm springs and also in the outlet stream from the thermal pool, where it was noted that an algal bloom was forming on the new cobblestone paved base of the pool outlet.

In a small chamber beside the knee to thigh deep flooded streamway passage of *Mystery Creek*, below the tourist section of *Newdegate Cave*, Arthur also revealed an area of boxwork: residual sheets of unweathered silica in dolomite joint cracks.

While searching for other likely spring water sites to place our charcoal detectors, Arthur was determined to find the long lost *Jack Dalton's Blue Lake*, believing it could be another potential spring site. In order to find this site, we were fortunate in obtaining the able assistance of a former Hastings Caves superintendant (ACKMA Life Member, Roy Skinner). As a front seat passenger, he was able to point us in the direction of some old-timers fallen logs near the Hastings Caves Road that he used to walk along to find the lake.

After a few minutes of searching, Arthur located three large collapse features, the third of which contained the famed *Jack Daltons Blue Lake*. Straddled by a large fallen moss covered tree, the collapse, with its lake at the bottom, is quite a spectacular feature, but the water isn't blue (it's dark inky black), though it might be blue in the drier summer months.



*In the Hastings Visitor Centre:
L – R: ACKMA Life Member, Royal Skinner, Arthur Clarke, Ian Household, and Sarah Joyce.*

Jack Dalton was the former publican at the Dover Hotel in the 1930's and 1940's and he reportedly located the feature while walking through the Hastings bush near the road east of the car park, while a party of his hotel guests visited *Newdegate Cave*.

We were extremely grateful to Roy Skinner and took him back to the new Hastings Visitor Centre for a well deserved cup of tea. (While we were down there with Roy, Peter Price and Robin Wass were starting construction of the new picket fence alongside the carpark near the Visitor Centre.)



Ian Household on a log above Jack Dalton's Blue Lake.

Back to our "new" lake. *Jack Dalton's Blue Lake* is formed in the base of an 8-10m deep vertically sided, 10-12m wide cylindrical collapse feature that appears to be formed in glacial outwash debris; one of a row of three similar collapse features.

The lake water level appears to undercut one side of the rock debris collapse wall. It requires a ladder or SRT to access the lake bottom. The lake feature could perhaps be termed as a partially drowned collapse doline in subjacent karst or maybe it is the single known cenote in Tasmania?

On a stringy bark gum tree beside the feature, an old thin aluminium tag bears the number punched "209" figure. In the list of the known caves and karst features at Hastings (*Speleo Spiel* #310: p. 16), "H-209" appears as one of five allocated tag numbers (without corresponding cave records), given to the Southern Caving Society in the 1970's.

On Saturday 26 October, it started to rain and the rainfall was continuous. Considering that the creeks were still full and running and there was still fresh snow on the catchment highlands, it seemed like a good opportunity to insert the dye tracer. Ian returned to Hastings from Collinsvale with his partner, Jenny Dyring, and with the aid of a mixing bucket from Arthur's house at Francistown, 800g of fluorescein was placed in *Fossil Creek Swallet* at 5pm. So if you are heading for Hastings, please look out for and report any green water sightings!

It would provide a superb visitor experience if the proposed surface karst walk at Hastings could be re-routed or extended to incorporate both the two mentioned features: *Fossil Creek Swallet* and *Jack Dalton's Blue Lake*. In this way, the karst walk could be routed to show off two, possibly three different swallets, including *Erebus (Waterloo Swallet)* and *Trafalgar Pot*. In the case of *Fossil Creek Swallet*, the karst walk could be routed around the back (western) side of *Caves Hill*, connecting with a track to *Adamsons Falls*, then continuing east along the original planned route.

Although *Jack Dalton's Blue Lake* (close to the Caves Road) may be further away from the route of the proposed surface karst walk, the lake could be included as a side walk from the main karst walk, or as a separate walk just to show of the feature on its own. Either way, the lake feature would have to be fenced off if it is going to be made into a visitor attraction.

It is certainly worth developing because, it is probably one the very few examples - if not the only one - of a cenote in Tasmania. In fact there are not many cenotes in Australia; the few that are known on the mainland are only found in the Tertiary coastal limestones around Mount Gambier and out along the Nullarbor Plain.

Ida Bay

Mystery Creek Cave at Ida Bay has just been re-surveyed by members of Southern Tasmanian Caverneers. The cave is to become the focus for another adventure caving operation run by the *Hastings (Caves) Enterprise*. Amongst the existing licensees that sporadically or very occasionally conduct adventure caving operations in this cave, there are two named: "Magical Mystery Tours" or "Mystery Glowworm Tours".

Some concern is felt about the proposal by the *Hastings Enterprise*, because they are talking about naming their operation as "Entrance Cave Tours" to distinguish their operation from the others. It would seem a pity to use the older alternative name "Entrance Cave", particularly since it is no longer in common use and might appear as is if it was a tour to another different cave.

Although these other operators mention the name "Mystery", they do not specifically say "*Mystery Creek Cave Tours*" and this would seem a more appropriate name for the *Hastings Enterprise* to use. In "*Family Bushwalks in Tasmania's Huon Valley*" - the book that *Hastings Enterprise* partners (Ian and

Sue Hall) have published and are actively promoting in the new Hastings Visitor Centre, there is a ten-page section describing *Mystery Creek Cave*. Apart from describing the cave as *Mystery Creek Cave* with access to the glow-worm chambers, the book includes a partial survey of the cave in that same name.

Mole Creek

Over recent years, it has become evident that a number of caves at Mole Creek are starting to show signs of being heavily used. In order to minimise some of the impacts of visitors, PWS is placing further access restrictions on a number of caves. One such example is *Tailender*, where a cave gate is about to be placed at the entrance.

During his time of employment with DPIWE, STC member Rolan Eberhard has been engaged in formulating an integrated catchment management strategy for the Mole Creek karst area. He has been determining more information about the subterranean hydrology and has also been involved in the discovery, exploration and survey of many new caves at Mole Creek including a new deep vertical cave: *Shooting Star*.

Now gated and declared off limits as a "Limited Access Cave", *Shooting Star* is now rated as the 8th deepest cave in Tasmania (and Australia). Rolan has also contributed to the formulation of the *Draft Mole Creek Karst National Park & Conservation Area Management Plan 2001*. A number of cavers from Tasmania and interstate have voiced their objections in submissions to the MCKNP management plan as it stands, although overall, the submissions reportedly ranged from being highly critical to balanced and supportive.



Charcoal bags with bomb and boot!

The RPDC has just distributed its report which summarises the various submissions and details the responses by the Director of PWS.

New karst areas in Huon & Picton River areas

Over the past two or three years, there have been several reports about "new" areas of carbonate rock with karst being discovered in State Forest in the vicinity of the both *Huon River* and *Picton River* in southern Tasmania.

Forest coupes extend across or abut to some of these carbonate rock areas where there is confirmed karst. Dolomite karst was already known in the Blakes Opening/Red Rag Scarp area where State Forest extends, but another location was described as a new limestone area situated north of Mount Riveaux, near *Hustling Creek*. There were reports of 10-12 known caves, plus mention of a logging coupe road reportedly crossing a limestone outcrop near a cave swallet entrance.

This new karst was recorded by ASF as the "Hustling Creek" (HC) karst area. Some of the karst and its caves were documented and surveyed by the Forest Practices Board (FPB), along with PWS and selected members of STC (all sworn to secrecy)! Late last year (2001), *Forestry Tasmania* engaged two mainland geomorphologists (Russell Drysdale & Mark Taylor) to prepare a consultancy report to document the karst in the limestone and dolomite areas within the logging coupes (planned timber harvesting areas).

Their December 2001 report titled "*The Riveaux Karst Study*" described a number of karst features, a possible drowned doline and cave entrances, some previously mapped by FPB. This report and the FPB studies were not made public. Earlier this year, STC was contacted by members of the Native Forest Network (NFN) who were eager to ensure that the cave or karst areas were assessed by an independent body with speleological expertise.

These logging coupes were reportedly scheduled for logging in 2003, so the NFN were keen to have a detailed speleo assessment, rather than relying on the hearsay of reports from forestry workers, *Forestry Tasmania* and the FPB.

During a brief assessment, STC members mapped a 650 metre long stream cave which was named *Riveaux Cave*. This cave had apparently been mapped by FPB (known then as "Roberts Cave", named after a local forest ranger: Robert Orr.)

Officers in FPB have suggested that this "HC" limestone karst area remain as a wilderness karst area, off limits to cavers (or speleologists), even though speleologists from FPB and selected government departments have already inspected parts of the karst. Following some recent TV and newspaper media coverage relating to the significance of these karst areas and the threats from proposed forestry operations (road-making and logging), *Forestry Tasmania* is now proposing a management committee to oversee the site including representatives from FPB, PWS and STC.

There are another two new recently discovered limestone karst areas: one near the Huon River and the other in the Picton River valley. Located west of the Warra Long Term Ecological Research study area, the first area is in an un-logged part of State Forest, north of Huon River. Documented as the "Warra" (WA) karst area, STC members recently explored an estimated 80-100metres of passage in an efflux stream cave on the southern edge of one of two limestone outcrops. Containing an abundance of cave crickets and many different spiders, it was appropriately named as *Hickmania Hideaway*.

Situated immediately north of, and opposite the Hustling Creek karst area (across the Huon River), this area of limestone (with the Warra karst) is also reported in the Drysdale and Taylor report.

Another recently reported possibly new karst area, is situated further south from the Huon River in the Picton River valley. Located in an area on the edge of the recently logged PC33e coupe near the junction of *Picton River* and *Cook Creek*, this may be part of the already known "Cook Creek" limestone karst area near Mt. Chapman.

A synopsis of other karst related items of interest

* *Dismal Swamp* in NW Tasmania. Rated as one of the best examples of a polje in Australia (see *Cave Management in Australasia*, 13: 52-74), this feature is now under threat. Although the details are sketchy, it is believed that Forestry Tasmania are proposing a large scale theme park tourist development. There have been a number of objections lodged against the proposal and the Planning Appeals Board is scheduled to conduct its hearings at Smithton in NW Tasmania on 3 & 4 December.

* There was a recent notice in the Mercury newspaper of an exploration application for dolomite

mining in the Weld river area. It is unclear what area of the known Weld karst will be affected.

* Kevin Kiernan recently announced his resignation from the Tasmanian Forest Practices Board (FPB) after working for almost two decades as a geomorphologist for the Forestry Commission then the FPB, (For some years now, the FPB has been divorced from Forestry Tasmania and is part of the Department of Infrastructure, Energy & Resources.) It is hoped that Kevin will still continue to maintain his active interests and involvement in karst and geomorphology outside of the FPB.

* For several years now, in addition to his karst related duties, the Tasmanian Government (PWS) karst officer (Ian Household) has also been charged with formulating a strategy for management of fluvial areas in Tasmania. This fluvial geomorphology project is now nearing completion with other officers assisting, so Ian looks forward to being able to spend more time devoted to karst related issues.

* Following the ASF conference at Bunbury in Western Australia, the January 2005 conference is scheduled to be held in southern Tasmania. STC (Southern Tasmanian Caverneers) have agreed to host this next bi-ennial conference, and preliminary planning has already commenced. Arthur Clarke will organise a cave fauna section that is expected to attract a number of international cave biologists to Tasmania.

* STC has become part of a new volunteer body known as "CaveCare" which is formed within the framework of WildCare. A similar body of volunteers called "KarstCare" is currently operating in caves at Mole Creek.

* The School of Geography and Environmental Science at the University of Tasmania has been actively seeking a geomorphologist to add to its lecturing staff. It is understood that they have a preference for obtaining the services of a karst geomorphologist

COMING CONFERENCES

-Elery Hamilton-Smith

This simply lists them - if you are interested in any of them and need more details of contacts, etc., contact Elery <elery@alexia.net.au>.

2003

2-7 Jan ASF Conference, Bunbury, Western Australia.

27 Mar- 2 Apr International Workshops and Conference on Salt Water Intrusion and Coastal Aquifers, Merida, Yucatan, Mexico

5-12 May ACMKA Conference, Chillagoe-Undara, Queensland

3-8 June International Conference on Karst Hydrogeology and Ecosystems, Bowling Green, USA

23-31 July Neglected environmental proxy-archives: continental shelves, karst

and drylands, XVI Inqua Conference, Reno, Nevada

26-28 Aug Gypsum Karst Areas of the World, Bologna, Italy

? Sept Water Resources in Karst and Hard Rock Formations, Isfahan, Iran

8-17 Sept World Parks Congress, Durban, South Africa

13-18 Oct Caves and Karst Management Symposium, Gainesville, Florida, USA.

2005

14th International Congress of Speleology, Athens, Greece