

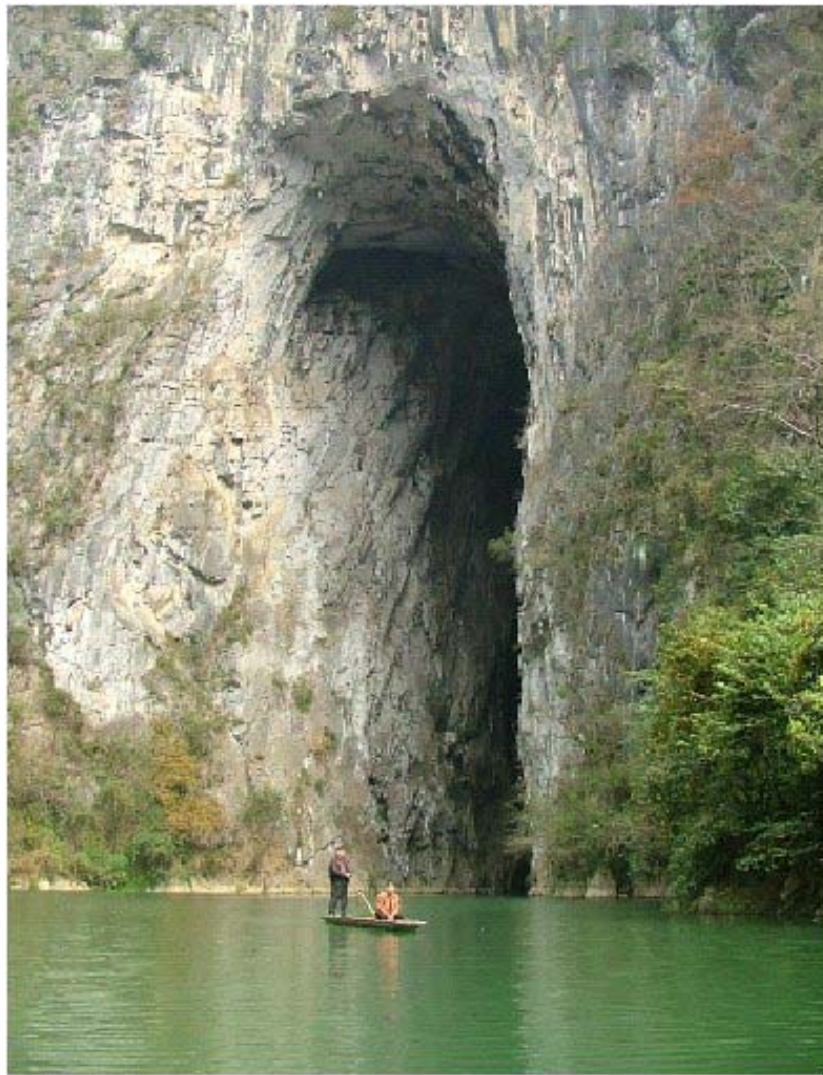
# YRC JOURNAL

THE YORKSHIRE RAMBLERS CLUB

MOUNTAINEERING & CAVING ETC.

China Supplement Summer 2006

## ***EXPLORATION OF CAVES IN TIAN'E AND FENSHAN, GUANGXI PROVINCE, CHINA***



Chang Dong

*photo Bruce Bensley*

## FOREWORD

Arguably China has the most spectacular caves and karst in the world. Approximately 2.6 million km<sup>2</sup> of the country is karst, with about half of it (and most of the mature karst) concentrated in the southern regions. It is therefore no surprise that expeditions are continually drawn to areas in Guangxi where the sheer scale of caves and karst features are always spectacular.

British cavers are playing an increasing role in the exploration of these areas and during 2004 members of the Club played a major part in two expeditions to the area, with financial support from the Club and from the Mount Everest Foundation, the Ghar Parau Foundation and Andy Eaves and the China Caves project.

There has been close emphasis on working with the local government in the provinces and with ministries of tourism, to profile major karst areas with the promotion of tourism in mind, but at the same time giving full consideration to important issues of protection and sustainability. This involves gathering scientific data and providing clear outputs which give a deeper understanding of the karst areas.

Our two expeditions have visited the karst of Tian'e and latterly Fengshan where the longest cave in Guangxi, the Jiang Zhou Cave System, has been discovered. This project, operating in this remote karst area in the north-west corner of Guangxi, has worked to such a high standard that it has helped Jiang Zhou and the surrounding area to achieve geopark status. Clearly the benefits to the area will be considerable, bringing in tourism, protection to the environment and economic benefits for the local people.

This publication charts the teams' work over two expeditions in 2004 in Guangxi. It includes articles which are both scientific and descriptive, covering surveys of nearly 50 km of cave passage. It has been prepared for the club but a more comprehensive report has been produced by the team which runs to 160 pages and contains additional material and photographs and goes into more technical detail. The YRC members taking part were Bruce Bensley, Ged Campion, Alister Renton, Graham Salmon, Dave Williams and Ernie Shield. The team was made up by Ruth Shield, Jane Butler, Emma Porter, Dave Appleing, Tony Harrison, Mike Clayton and Mike Peters. Between them they represented the Craven Pothole Club, Cleveland Speleo Group, Scarborough Caving Club and the Gloucester Speleo Club.

Ged had led an earlier expedition into this province back in 2000 supported by YRC members, John Riley, Bruce Bensley, Graham Salmon, Arthur Salmon, Alister Renton, John Whalley and Harvey Lomas and various members had been back since. That expedition to Guangxi was extremely successful having discovered and surveyed seventeen kilometres of cave in just three weeks. The caves were comprehensively photographed and a film was made by the Chinese for television. Our biologist discovered many new species of cave life and a wider chemistry project was completed on Shandong.

Ged, as deputy leader, Bruce and Alister were back on another expedition in 2002. and with others explored the Hidden River area. The main focus of the expedition was to follow a major river into the mountainous area and discover its route through to its resurgence. However other major features were also explored and a total of thirty kilometres of new cave passage discovered over a period of six weeks.

(See Journals no. 12/15, 12/19, 12/22, 12/23.)



## THE EXPEDITIONS - By Ged Campion

The Hidden River Expedition to Leye in 2002 had revealed many exciting finds and yet again demonstrated the huge potential for new caves in this area of Guangxi. Of particular note had been the big tiankengs and deep shafts, but the possibility of long, continuous, big cave passage stretching from Dashiwei Tiankeng to the resurgence 20km away in the north at Beizhong had eluded the expedition.

However, in order to continue the China Caves Project's new millennium remit "to explore the significant karst regions to the west of the Hong Shui River in North West Guangxi", a China Caves Project team comprising mostly Yorkshire Ramblers Club members, but including cavers from others clubs, was assembled and dispatched to Tian'e and Fengshan counties in February 2004. These areas were east of the spectacular Lingyun massif

which had been the objective of the 2000 China Caves Project, giving a logic to comprehensively explore this small corner of China's spectacular karst. Both Tian'e and Fengshan held great promise, Tian'e with its significant vertical range potential from its high craggy plateau to the river below, and Fengshan tantalisingly near to the Bama district where the China Caves Project in 1988 had found continuously large cave passage with beautiful rivers and stunning karst features.

Whilst Tian'e was to yield deeper caves, the Fengshan area was to provide a cave of significant length, Jiang Zhou, where 7.5km of passage was surveyed in the last few days of the March expedition.

Realizing the great potential of this cave and the attractiveness of the surrounding karst features generally, the Fengshan local government decided to put

forward the area for designation as a "geopark", and commissioned the Karst Institute in Guilin to complete a survey of the caves and study the karst in the area. An important objective of the second expedition in 2004 was therefore to carry out exploration and survey work for the Guilin Institute and Fengshan local government, but under the wider remit of the China Caves Project to carry out comprehensive exploration of the karst in the area. The idea of a geopark is to afford some degree of protection to important geological sites which do not have the benefit of World Heritage Site status or some other form of protection.

The second visit in 2004 was another China Caves Project expedition drawn again mostly from the YRC and other clubs which have been exploring the karst in the north-west corner of Guangxi Province for the past 5 years. The expedition was conducted over a period of a month with some of the team (11 UK members in total) there for the full period and others joining half way through the exploration. The Jiang Zhou Cave System was extended from its spring 2004 limit of 7.5km to a new length of 29.2km, making it the longest cave in Guangxi and the third longest in China. The nearby Qiaoyin River system was also investigated, as well as other significant sites in the Pingle, Xialjian and Poxin drainage area. Also preliminary reconnaissance was also carried out in Bama county to consider the cave potential in the Haolong area.

The China Caves Project is the product of an ongoing highly successful relationship between British cavers and the Institute of Karst Geology in Guilin, and has resulted in numerous joint Sino-British expeditions over more than 20 years to these magnificent karst areas of southern China.

The first of the 2004 expeditions successfully explored and surveyed a large number of caves in the thick karst deposits of Tian'e County, some of significant depth. These include Wei Dong south-east of Tian'e town, the San Gui Shui Tiankeng further south, and further south still, Jiang Jia Tao which was the deepest cave found by the expedition with an entrance shaft of 180m. Interesting and complex vadose and phreatic caves were also found along the thin swathes of limestone to the south-east of Tian'e town. The team also explored a number of caves near Fengshan town, and then moved south to discover the massive cave passages of the Jiang Zhou Cave System. In the final days of the expedition, a total of 7.5km of passage was surveyed in this system with numerous leads left unexplored.

Realizing the potential of the system a further expedition was planned, and 11 cavers left the UK for Fengshan later the same year. Again in cooperation with the Guilin Karst Institute, and with the full support of local government bodies, the team (which included Chinese caving colleagues) extended this system to become, at present, the third longest known cave in

China and the longest in Guangxi Province, at 29.2km. The main features of the system, lying under typical fengshan (tower karst) landscape, are the size and length of most of its passages, often up to 30-50m in width and height. Possibly, given the massive size of its passages, the system will prove to be the largest in China in terms of underground volume.

The expedition also explored the Qiaoyin River system and other significant caves in the Pingle, Xialjian and Poxin drainage area, including the large phreatic cave passages extending from Si Fang Dong to Green River Sink to the north of Jiang Zhou village and west of the Ma Wang Dong system explored by the China Caves Project in 1989. This last cave was revisited by the current expedition but a potential link between it and the nearby Green River Sink eluded the team.

As well as the Jiang Zhou Cave System, the two expeditions surveyed 19 other caves in Tian'e and Fengshan Counties. The length of cave passages surveyed in total was 48.6km (30.2 miles), mostly to BCRA Grade 5B standard.

A specific and important objective of the later expedition was to assist local government officials and the Karst Institute to achieve national "geopark" (geological park) status for Fengshan County. The successful outcome of their application to Beijing was undoubtedly much more robust and detailed than would otherwise have been the case as a result of the expedition's efforts. Equally importantly, the expeditions have raised awareness in Chinese official circles of the damage and destruction done to caves in the region from continuing attempts to extract speleothems for sale abroad. Debate on this issue has been heightened by our findings, and there is now a much greater understanding of the economic benefits of conserving cave environments for the purposes of tourism and scientific research.



Hong Shui River

photo Bruce Bensley

Parts of Guangxi are considered to be some of the most spectacular karst areas in Asia. This much eulogised scenery cannot fail to impress even the most seasoned traveller, with karst towers, arches, tiankengs and dolines of incredible dimensions. The vast area of limestone terrain is characterised by a sub-tropical climate, and has fenglin and fengcong karst at altitudes from 150m to 2000m above sea level. The Tian'e and Fengshan areas are particularly striking, with an array of karst features that include the massive entrance portal of Chang Dong north of Tian'e, the San Gui Shui Tiankeng south of Tian'e, the Jiang Zhou natural arch forming a gateway to the village of the same name in Fengshan, the huge fossil cave entrance of Man Fei, and an abundance of fengcong conical hills populating the whole area. This spectacular landscape is the product of 500 million years of deposition of carbonate material, transformed by subtle climatic conditions and tectonics and a complete absence of glaciation interference, leaving a legacy of rich cave bearing limestone found in abundance across Southern China.

The karst towers are topographically made up of two types, the fengcong or "peak cluster depression" sub-system, and the fenglin or "peak forest plain" sub-system. These have different morphologies and orderly configurations. The fengcong is also called "cone karst" because its peaks usually have a conical shape. These predominate in the Jiang Zhou area. The base of the depression is marked by the presence of sinkholes and shafts. The height of the fengcongs, from the depression floor to the top of the peaks, ranges from tens of metres to over 500m. One of the most important geomorphological features of the fengcong areas is the lack of rivers and surface water courses, the water usually being assimilated into the sub-strata. Generally the development of these often spectacular features is the product of a complex interaction between tectonic, lithological and climatic factors.

Along with most of the caves in southern China, those newly discovered at Tian'e and Fengshan lie in limestone, the age in a sequence that extends from Devonian and Triassic. Karst development in the region is closely linked to the geologic and tectonic evolution and also to the paleogeography. The limestones largely post-date the Caledonian orogeny, but were all folded in orogenic phases in the late Triassic and in Cretaceous times.

Palaeozoic karst is found across large areas of Southern China. From the early Triassic to the late Jurassic, most of Southern China had a humid, tropical-subtropical or humid-temperate climate that greatly favoured karst development. From the middle Pleistocene onwards, the climate in Southern China became hot and humid, and has remained so to this day.

Karst therefore developed over very long periods of time. China has about 2.6 million km<sup>2</sup> of karst, with about half of it (and most of the mature karst) concentrated in the southern regions (Yuan, 1991; Zhu, 1986).

The tiankengs found in these regions are also of particular note. Tiankengs, as a geological classification of karst feature, have only recently entered our vocabulary, but their discovery and recording in these regions has been quite prolific. The impressive Dashiwei and Bai Dong Tiankengs in Leye County were the subject of the China Caves Project in 2000. The evolution and morphology of these types of landforms in Tian'e, Fengshan and Bama are briefly discussed in this publication.

Parts of Guangxi are considered to be some of the most spectacular karst areas in Asia. This much-eulogised scenery cannot fail to impress even the most seasoned traveller, with karst towers and dolines of spectacular dimensions.

The vast area of limestone terrain is characterised by a sub-tropical climate, and has fenglin and fengcong karst at altitudes from 150m to 2000m above sea level. The Fengshan area is particularly striking, with an array of karst features that include the San Gu River, tiankengs, the Jiang Zhou natural arch forming a gateway to the village of the same name, the huge fossil cave entrance of Jiang Zhou Dong, and an abundance of fengcong conical hills.

Such is the potential of the area for scientific investigation and tourism development that the local government of Fengshan sought and has obtained Geopark status. The 18th and 19th field programmes of the British China Caves Project (Gill et al, 1990; Waltham & Willis, 1993) had been assisting the Karst Research Institute (in Guilin) and the Fengshan government in trying to achieve this status. The China Caves Project has now surveyed 50 km of passage in the area, including 29km in the extensive cave system of Jiang Zhou Dong, which underlies parts of both Fengshan and Bama counties. This cave system, now recorded as the third longest system in China, would be the centre piece of a Geopark in Fengshan. Explorations were by 17 cavers from Europe, 8 members of the Karst Research Institute in Guilin, and members of caving clubs in Nanning.

It is perhaps not unreasonable to be impressed by the understanding of karst held by the local people in China, given that their country has such an abundance of limestone and spectacular karst terrains. In Fengshan, the large dry fossil passages were easily explored by

villagers, but were unmapped until the recent expeditions. Particular problems were encountered in the exploration of the river caves from the karst boundary, where sediment infill is extensive and frustrated exploration of passages that would otherwise be very extensive. There is almost certainly potential to explore more of this cave system further, both along remote passages and down undescended shafts into the river series. Nevertheless the size and volume of the fossil caves place Jiang Zhou Dong among the most impressive in this part of China, and the cave is a fitting match to the spectacular surface geomorphology of natural arches, dolines and tiankengs in the fengcong and fenglin karst.

The damage to the caves at Fengshan is perhaps the single biggest concern from our appraisal and study of this remarkable karst. Local people have traditionally viewed the speleothems within the caves as a rich harvest to exploit, notably from Jiang Zhou Dong and Yulong Dong. Generations of villagers have systematically plundered the caves to sell the speleothems in the markets of Guilin and elsewhere.

Other examples of cave exploitation are perhaps more acceptable where man and cave co-exist. The cave of Chuan Yan Long Dong has been developed as a factory comprising units for workshops, using the plentiful supply of water, the ventilation and the natural shelter to aid industrial enterprise. However, this is a short and unremarkable cave, with few speleothems, in the centre of Fengshan town.

In order to address the problem of speleothem removal from the caves, considerable work will need to be done in re-education of the local people. This must make them aware of the unique resource that they have in their possession, in terms of tourist potential, and also of the long-term economic benefits a Geopark could have for the locality. Conversely, it is important to consider what impact increased tourism might have on the area in terms of conservation; it could bring some disadvantages, but it could for example promote better local roads and infrastructure. This is a delicate balance that has to be considered in any future planning at Fengshan.

### Cave formation in Southern China

Along with most of the caves in southern China, those newly discovered at Fengshan lie in limestone, the age in a sequence that extends from Devonian and Triassic. Karst development in the region is closely linked to the geologic and tectonic evolution and to the paleogeography. The limestones largely post-date the Caledonian orogeny, but were all folded in orogenic phases in the late Triassic and in Cretaceous times.

Palaeozoic palaeo-karst is known across large areas part of the limestone in China. From the early Triassic to the late Jurassic, most of southern China had a humid,

tropical-subtropical or humid-temperate climate that greatly favoured karst development. Karst from this period is to be seen in many sites at Fengshan. From the middle Pleistocene onwards, the climate in southern China became hot and humid, and has remained so to this day. Karst therefore developed over very long periods of time. China has about 2.6 M km<sup>2</sup> of karst, with about half of it (and most of the mature karst) concentrated in the southern regions (Yuan, 1991; Zhu, 1986).

### The Jiang Zhou cave system

The cave system of Jiang Zhou Dong underlies both Fengshan and Bama Counties in the hill area of Duyang Shan, in Guangxi. It lies about 24km SSW of Fengshan Town and roughly 50km west of the Hongshui River. The nearest large village is Jiang Zhou, about 2km from the southwest edge of the system; one of the entrances to the cave is close to the village of Longhuai, and another is just to the north of the scattered hamlet of Dalue.

### Surface morphology

The multi-entrance cave system lies beneath a typical fengcong karst, with individual karst hills rising to about 500m above a surrounding alluvial plain at about 300m altitude. The main entrances and the fossil sections of the cave lie 50-100m above the alluvial plain. The cave passages are breached by a spectacular doline, the Herb Garden, which houses a forest isolated by its perimeter cliffs. The karst hills are of two types. Fengcong cone karst, of the peak cluster depression sub-system, is dominant in this area. On the alluvial plains, there are some isolated fenglin towers, of the peak forest plain sub-system.

### Limestone lithology

Jiang Zhou Dong has developed in predominantly Lower Paleozoic dolomitic limestone, mostly of Ordovician and Devonian origin. In many parts of the cave there is evidence of more soluble varieties of limestone, and also gypsum, that have provided easy hydraulic routes. These beds fractured and dissolved more readily than the dolomitic rock, and provide some explanation for the impressive size of cave passages throughout the system mostly of Ordovician and Devonian origin. In many parts of the cave there is evidence of more soluble varieties of limestone, and also gypsum, that have provided easy hydraulic routes. These beds fractured and dissolved more readily than the dolomitic rock, and provide some explanation for the impressive size of cave passages throughout the system

### Structure

The explored cave system comprises mainly very large fossil passages and chambers, the floors of which are extensively strewn with massive boulders. They are also decorated with speleothems, especially flowstone, stalagmites and large gour, some of the most spectacular of which are located in the upper galleries in the far reaches of the cave (Hijack Passage). The typical

passage in Jiang Zhou is about 30-50m high and wide. There appear to be no major faults in the area, and passage development has been controlled by percolation along joint planes, causing dissolution and the collapse of the intervening joint blocks. Percolation of rainwater landing directly on the karst surface has contributed to cave development, and accounts for the diversity of branch passages converging on the main trunk caves.

### Hydrology

Underlying the fossil caves, there is an extensive active cave system which can be reached at various points from the fossil galleries by descending large elliptical shafts, some of which are over a 100m deep (DWII shaft). Some shafts also extend upwards to daylight (Skull and Crossbones Pitch). The cave rivers pass through numerous flooded sections, so that only short sections of vadose river passage have yet been found. Rivers off the alluvial plains have transported large quantities of sediment into sink holes, often causing massive infill and blockages in the active passages.

Within the fengcong, many dolines have floors choked with sediment at levels well above the cave rivers (Doline MF2502).

### Man's impact on the caves

It would seem that generations of local villagers have explored many of the fossil cave passages, and have even descended some of the shorter vertical shafts (Hijack Passage), risking life and limb to remove speleothems for financial gain. This has left well-worn paths penetrating even the most remote parts of the system, and has inevitably caused despoliation of the speleothems and removal of many of the most impressive features. In the nearby cave of Yulong Dong, bamboo scaffolding has been erected to reach the finest stalactites located 30m high on the passage roof. There is no evidence that Jiang Zhou has been used for ritual purposes or for burials; however, substantial defensive dry stone walls in the Man Fei entrance and the Herb Garden doline suggest there may have been turbulent times during the past, in this quiet part of China.



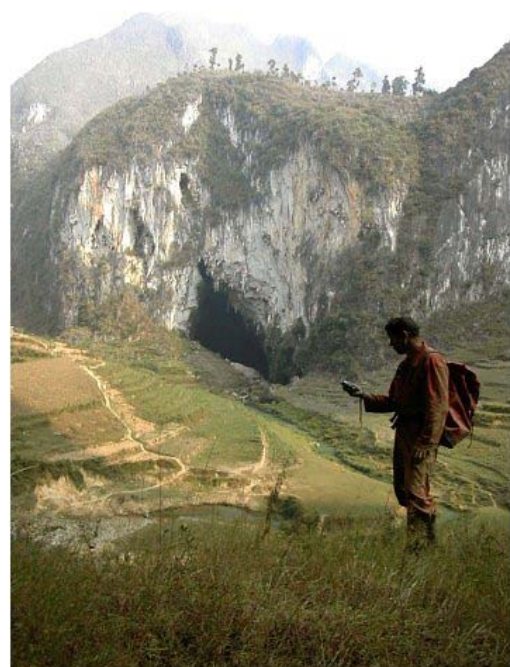
Jiale Tiankeng, Bama County

photo Julia Tian



Liang Dong

photo Bruce Bensley



Green River Sink

photo Graham Salmon

## **CHINESE GEOPARKS** - By Tony Harrison

This article describes what the China geopark initiative is, and how it fits in with global attempts to preserve geologically important sites and regions.

Many people are now aware of the UNESCO World Heritage List. This is embodied in an international treaty adopted by UNESCO (the United Nations Educational, Scientific and Cultural Organisation) in 1972, whose aim was to "establish, keep up-to-date and publish a World Heritage List on cultural and natural properties, submitted by the States and considered to be of outstanding universal value". By late 2004, 788 sites were on the list, with nominations from nearly all the countries of the world. In the UK, for example, Hadrian's Wall and Kew Gardens are two of the 26 sites which have been designated, and in China 30 sites are now on the list, including the Great Wall and the Potala Palace in Lhasa. The majority of World Heritage Sites - 611 in fact - are cultural, but 154 are natural and 23 are "mixed". Giant's Causeway, the wonderful geological formation in Northern Ireland, was one of the UK's first submissions to the list in 1986, and China has successfully submitted many geologically important sites, including the Three Parallel Rivers of Yunnan, added to the list in 2003.

In 2004 a related but separate worldwide initiative was launched, also involving UNESCO. This is the "Global Network of Geoparks", established at an international gathering of experts under the aegis of UNESCO. The aims of the Network are to "ensure a healthy environment" for the geoparks, to educate those involved in the earth sciences, and to foster "the sustainable economical local development" of the parks. Europe and China have both been at the forefront of developing the concept, and the initial list of 25 geoparks agreed in February 2004 comprised 17 existing

## **CHINA'S LONGEST CAVES** - By Tony Harrison

China has roughly half the world's total area of limestone, so it is reasonable to expect that a fair proportion of the world's longest caves can be found in China. However, to date, that has not proven to be the case, and China's longest known cave is well down the "world's longest" list. Almost certainly this is not a function of geological structure but because of the fact that China's caves are still relatively unexplored and unknown.

The world's longest cave - at present - is the Mammoth Cave System in Kentucky USA, weighing in at an astounding 579km (360 miles). In fact 18 of the "top 25" known longest caves are to be found in the developed countries of the USA, Western Europe and Australia, where experienced cavers have been pushing these caves to their limits for many years.

European geoparks (the "European Geopark" label was created in June 2003) and 8 Chinese sites. An example of a European site is the North Pennines Area of Outstanding Natural Beauty in England. It is possible for a site to be on the World Heritage List and also in the Global Geopark Network; in China, the Lushan National Park in Jiangxi Province and the Zhangjiajie Gritstone Peak Forest in Hunan Province are examples of this. However it seems that one of the main advantages of the Global Geopark initiative will be to provide some degree of protection to important global geological sites which do not have the benefit of World Heritage Site status. It is said that the objective of the Network is to establish a total of 300+ geoparks globally, adding about 20 new sites every year.

How did China select its 8 sites to submit for inclusion in the Global Network of Geoparks? Like Europe, China has in fact been working on the geopark concept for some years, since the Chinese Ministry of Land and Resources started a pilot programme in 1999 in cooperation with UNESCO. In March 2001, prior to the introduction of the Global Network, China designated its first group of 11 national geoparks from a shortlist of 18. Today China has 44 national geoparks, all of which are sites of national importance where both tourism and scientific research are encouraged. They include Shuanghe Dong, China's longest cave.

China is said to be planning to designate 310 geoparks in the next 10 years. Let us hope that Fengshan County, and the other outstanding areas of karst scenery in Guangxi Province known to British cavers, make it on to the list in the near future. Also, some of them may perhaps be fortunate enough to be designated for the Global Geopark Network or as World Heritage Sites.

China's longest cave, on the current official list, is the 85.3km Shuanghe Dong in Guizhou Province, explored by the French. (At the time of our expedition in late 2004, it had a surveyed length of 54.4km, but early in 2005, a French expedition extended it yet again!) The second longest is Teng Long Dong in Hubei Province, which has 33.5km of passages and was surveyed by a Belgian Team. The previous no 3 was the French-explored Baishui Dong in Guizhou, but the two expeditions described in this report have now pushed it into fourth place. The Jiang Zhou Cave System in Fengshan County, Guangxi Province, has a surveyed length of 29.2km. One thing is for sure, however, over the next few years the length of these Chinese caves, and their position in the "longest caves" pecking order, will change again and again, as more expeditions probe China's fascinating underground world.

Herb gardens, saltpetre, defence, cemeteries, fishing, stock control, ornaments, medical functions...the use of caves in Chinese society has always been a fundamental part of daily life. From the tales of mass destruction of human life in Maguai Dong during the Cultural Revolution, to the defensive walls at the spectacular Man Fei entrance, to fishing in Hei Dong and Jiang Zhou, to a home in a doline and factory units in a cave.

The use of caves is not merely historic but continues today for the everyday survival of rural China. During the easy traverse through the Jiang Zhou Cave System from Man Fei entrance, one negotiates between several defensive or stock control walls. On moving towards the daylight of the Herb Garden, the Fishing Pool Pitch where locals are reputed to go fishing is passed. The garnishing for the fish can be found in the Herb Garden, a huge sun-struck doline named due to the cultivation of herbs part way through this majestic crack in the limestone. One proposed theory is that, perhaps, unlike most of rural China, this almost subterranean land due to its remoteness can be freely cultivated void of tax and rent, as it escapes unnoticed from life above ground.

As well as the more modern use as a tourist attraction, the top entrance to Ma Wang Dong had a number of old saltpetre pits. Saltpetre or potassium nitrate has been used for hundreds of years throughout the world as a component of "black powder" or "gunpowder". The deposits from the bat droppings in the cave were collected to provide a nitrogen-rich supply for the production of the saltpetre or possibly fertiliser. The large cave entrance to Ma Wang Dong gave plenty of shelter for the production of the saltpetre and yet was in daylight to make the work easier.

At the far end of the Ma Wong System, evidence of the Chinese traditional burial methods is seen above the spectacularly draughting Hei Dong. A broken and rickety ladder can be observed which leads to some burial ornaments strategically positioned in the small entrance (these were not explored). The Chinese in this area bury their dead in the land and once the body has put its goodness back into the land after years of providing goodness to the living, the bones are extracted and left to guard over the fields as the new generations tend and nurture crops.

One unique but modern example of industry utilising caves is Factory Cave which still today hosts a wide variety of trades from head stone carving to breeze block production and hidden in a remote corner, a religious shrine. Like Peak Cavern in Derbyshire and its historic rope making, this underground environment provides a reliable transport system and natural resources to produce goods.

## The "stal" trade and conservation

From both a speleologist's and conservationist's perspective, by far the most common but destructive use of the caves in the Fengshan region is the devastating removal of speleothems. Prior to our explorations of Fengshan, not one of the expedition members had seen or heard of such mass removal of speleothems, or "stal thieving" as we unfortunately encountered.

The "stal thieving" appeared to demonstrate a high degree of organisation and is, in this area, very widespread. Almost every cave we visited and even the extremities of caves would produce evidence of the systematic selection and removal of formations. One such example was found at the bottom of Long Shi Shaft. This shaft has an 80m free-hanging pitch with a total depth of approximately 110m. From the surface, a wire tensioned cableway to the bottom of the shaft has been erected. Next to the base of the wire, we found various formations that had been wrapped in plastic shrink-wrap for removal to the surface, together with bowls and chopsticks. Chinese characters were carved into a rock near-by and it was our assumption that this could have been some form of tally of the stal removed. Continuing deep into the Jiang Zhou Cave System, one of the furthest points that our team reached was a sign boasting about the number of men that had been involved in extracting 40 tons of stal.

Like trees ready for logging, some formations were found ringed with red paint, proof that the formations were being "selected" for removal and perhaps, what seems unbelievable and almost unthinkable but stealing to order? This was particularly prevalent in what would have been a beautiful stal forest in Green River Sink.

A cursory search on the internet reveals that formations can be found for sale in China, sold primarily as ornaments (a stroll in the surrounding streets near the Karst Institute of Guilin is evidence of this practice), but are also claimed to have "medical functions", including warming lungs, relieving asthma and inhibiting acid secretion! Some people believe these formations bring luck, happiness, prosperity and fortune. It is rare these days to find speleothems for sale in the West, although as recent as the late 1990s speleothems were being sold in Clearwell Caves, Forest of Dean but this practice ceased after much protesting from local cavers. It is also interesting to note that companies such as Ebay, the internet auction site, have under pressure from active cave conservationists, changed policies to remove listings of speleothems for sale on websites.

Expedition members were told that the formations would be sold to Japan and other Far Eastern countries.



However, during the laying of a rudimentary drainage system at the rest house in Jiang Zhou, speleothems were being laid in front of our eyes, as we stood aghast looking on with government officials. The Chinese government officials advised us that the removal of formations is illegal but policing and monitoring of this trade is another matter. All expedition members were horrified at the extent of the destruction and spent considerable time explaining to the local officials that for a cave to become a show cave and tourist attraction it needs formations in it! Whilst Chinese legislation protects the formations, there are so few cavers in China that the caves have no voice. The officials explained that the cave destruction was due to "outsiders" coming into the area to steal the formations, using local labour to enter the caves and remove them at cheap rates. The expedition's local guides knew the caves very well, perhaps from regular trips to remove formations? Sometimes the effort required to remove the "stal" would be colossal and the determination and ingenuity required to remove very large formations was unbelievable.....such is survival in rural China.

Our concerns about the serious damage to this delicate and fragile karst environment were raised with local government officials on many occasions. At the final official meeting in Fengshan with the assistance of our friends, Professor Zhu and Zhang Hai, we emphasised the need to protect the Jiang Zhou Cave System through education and good cave management. Obviously, with such management comes a huge responsibility, as tourism can alter the underground environment from its natural state and encourage other controversial conservation issues such as road building. Our hopes are that the local population are made aware of the long term benefits of tourism and conservation, rather than the short-sighted view of making money

from the removal of speleothems, and that everyone can benefit and enjoy this special area for years to come. The issue of the stal trade and the protecting and balancing of interests in the Jiang Zhou Cave System has also been given high international profile at the recent 14<sup>th</sup> International Congress of Speleology held in Athens, Greece and generated much interest. Further, the expedition raised the issue of protection and sustainability by submitting a paper, Caves and Karst in Fengshan County, Guangxi, Southern China (Appendix 10) to the International Union of Speleology (UIS).

Despite the destruction of speleothems, the Jiang Zhou Cave System has retained its splendour with its huge majestic entrances, dramatic dolines and some hidden, dark secrets. One of these secrets is the abundance of cave pearls which have not been observed like this before by the expedition members, so many that to walk on them feels like it is a crime but there is no alternative in order to explore this part of the system. These cave pearls are large in size and fortunately, have not become a cave thief's treasure. As Vierderman writes in *The Rough Guide to China*, it is difficult to imagine a day when wild resources in China are no longer threatened by a combination of necessity and the desires of the population, especially in a country where a fifth of the human race resides and with the economy growing four times faster than Britain's (*The Sunday Telegraph*).

Education and good cave management are perhaps the keys to protection. The geo-park application, will we hope, drive the increasing awareness that caves are not renewable resources and that the broken speleothem that took millennia to form and seconds to destroy will never re-grow, and together with good cave management will assist in protecting this special environment.

## **TIAN'E COUNTY EXPLORATIONS**

### **FOREST PARK PYLON CAVES**

By Bruce Bensley

Branching off a roundabout on the outskirts of Tian'e, a narrow and unlikely looking track between two houses climbed steeply up the hillside towards the "Forest Park", giving impressive views of the town from its hairpin bends. A few solitary cone hills stood alone in the development zone to the SE of town and these looked very vulnerable amidst the quarrying frenzy and construction surrounding them.

The whole team was there that day to recce the park. It appeared that the local government was looking to supplement the park's natural beauty with a possible cave attraction.

The vehicles passed a gatehouse and stopped to let us

out at a small car park by an office. From here, a climbing footpath led us into a shallow farmed valley at the head of which stood an electricity pylon. A rock scar ran along one side of the fields and on the partially cleared bank below this were located several small holes. Ged and Bruce investigated the first of these which was little more than a rock shelter. In the mouth of this slot a farmer had created a sleeping quarter. Colourful blankets lay on a hay bed constructed from a raft of poles and a Robinson Crusoe toothbrush rack was attached to the low ceiling. Assorted clothes hung from a string line and a best pair of shoes was neatly paired on the dusty floor.

Further along, a couple of smaller holes dropped between surface boulders into small chambers below. The entrances were fixed by GPS and a brief inspection of one was possible without the use of a rope. By carefully climbing down over loose rocks and stones a pitch head

was reached. These holes resembled mere digging opportunities back home and we climbed back out unimpressed by the pitch head that was too small to squeeze through. We called this hole Pylon Cave (P2).

The others were up ahead and when we caught up with them, they were taking in a magnificent view that looked out along a straight stretch of the Longtan River. The swelling waters well below us, stretched into the distance up this steep sided valley. The roads that bordered it wiggled along both sides disappearing into the haze up stream in the direction of a huge dam project that was set to flood the valley to a depth of 200m.

After taking scenic photos, we left the pretty cherry orchard and thatched huts behind and headed back to the vehicles. On the way down the narrow path, two women were carrying long timbers on their shoulders. Of course it seemed appropriate to lend a hand so we jokingly pinched their timbers as they were passing by. As we neared the car park, scenes from "Life of Brian" sprang to mind.

There were signs of ongoing works and the road base of locally quarried limestone petered out just short of a lone farmhouse. In the yard outside a high mesh fence encircled a natural rock outcrop and dashing around inside were a handful of small monkeys. As we approached, Ged and Dave Williams returned from looking at a deep shaft (Jian Shi) hidden amongst the vegetation behind the farmhouse.

The following day a couple of teams returned to descend this shaft and take a better look at the "Pylon" caves. Before leaving Tian'e, we stopped off at a metal workshop where some welding was underway. On the floor were lengths of rod that we hoped could be fashioned into crowbar and chisels. Before too long we left with our homemade tools and a rather poor Chinese club hammer with a loose head. At the Forest Park car

park Ged, Dave Williams and Chen headed off to rig the shaft and Bruce, Dave and Jun re-entered P2. The small hole was widened by levering out a rock in the floor and Bruce reversed through into the head if a steeply slanting rift. A short abseil dropped down onto a silty floor but the rift was choked and narrowed down in both directions. It wasn't worth getting everyone to the bottom so Bruce carried out a one-man survey that involved crawling over the millipedes that inhabited the floor. On the way out, the tight hole must have somehow shrunk. The calcite crusted walls provided just too much resistance against cotton overalls. Bridging across the pitch below, a full de-tackle and undress ensued before an exit could be made. On the way out Dave wiggled down a tight vertical tube at the other end of the small chamber, but no way on was revealed.

A little further on, was the entrance to P3. By this time we were all looking a bit disinterested and sat over the hole stifling the odd yawn. Jun was selected to investigate this hole that dropped down between jammed boulders. A makeshift sling deviation was rigged making use of a couple of young trees either side of the short pitch. Jun drew the short straw and descended into the gloom. A quick look around him confirmed his suspicions...no cave system could be found here.

We re-joined the others who had been invited into the farmhouse opposite the monkey cage. Inside we sat around an open hearth on a raised platform. In the smoke from the fire pork belly hung curing above our heads. This was sliced and warmed in water and was served to us with a naturally buttery tasting vegetable that resembled lemon grass in appearance and which had a yellow flowering head before preparation.

For us, the day had been pretty unproductive on the whole, but the shaft team had dropped about 80m to the bottom of the choked shaft where they had found some interesting skulls and carcasses of a monkey and linsang that are described in an appendix of this publication.

## **NUMBER EIGHT CAVE (BA DONG)**

By Ernie Shield

This cave is located in a box canyon close to the village of Ba (Chinese for Eight), near Bala Town. The prominent 20m wide and 13m high entrance lies below a vertical cliff and is reached by a steep scree slope. Inside the entrance the floor descends, covered in large boulders, at about 40 degrees for about 120m to the mud floor of a large chamber, the edge of which has fascinating water-worn, sculptured, solution "Swiss cheese" rock, angled stalactites and stal bosses and flows.

The party consisted of Dave Appleing and Ernie Shield,

a group of cavers from Nanning, Cheiry and two television photographers, one dressed in his best suit with no light. Working our way left round the chamber there was no obvious way on, apart from an insignificant 20m high passage! On our left were steep cliffs and boulder slopes disappearing into the darkness. Very impressive! After a session of climbing under and over boulders, we eventually emerged at a 5m high stall boss and the start of the main chamber.

The echoes were phenomenal as you entered the darkness, everything disappearing into a black void, and lights failed to penetrate the gloom. A 38m high calcite boss loomed out of the darkness with a steeply rising boulder slope to the left, and with the ceiling about 80m above.

We followed the right hand wall round the massive chamber to a descending 15m wide flowstone ramp, with the ceiling now about 40-45m above. Below the ramp water could be heard noisily making its way through boulders. Dave climbed down to a small inlet which ended in a hanging sump. The passage continued down over more boulders, becoming narrower until eventually the roof lowered and a stream was encountered flowing from left to right. The downstream passageway gradually sumped between mud banks and was not entered as it was static enough to allow calcite rafts to grow across the surface, leaving a crispy layer on top.

Upstream the water is knee high and only goes 15m to a domed chamber with a large active flowstone and stalagmites and a sump pool with a big gour rim pool. There was a strong draught and a large number of bats too. The cameraman followed us upstream filming all the time, even when the water was up to his waist, with a smile on his face and mud on his best suit. We were most impressed.

Dave and I attempted to catch a catfish in the sump pool, with no success. Cheiry found a child's fishing net and promptly caught a long nosed fish and a shorter more transparent one, both with orange colouring. Both seemed blind. These were put into a water bottle to be taken back to Ruth Shield for analysis.

The Chinese contingent made their way out, while Dave and I started surveying, eventually arriving at the big stal boss and calling it a day after 7 hours underground. Dave and I returned the next day and surveyed down to the lower wall from the stal boss and back to the entrance passageway. All that was left was the big black void and the entrance chamber. We decided to survey to the left of the cavern, hoping that eventually we would cut across the passage which descended to the sump.

The steep slope was climbed to a ridge which dropped vertically to the entrance chamber.

Many 30m survey legs followed until the back wall and ceiling came into view. The chamber was then followed to the right passing a few small formations and steep drops into the black void.

Much mention of the "Where the heck are we?" type was made. We surveyed to a corner where a well decorated chamber with ancient flows, stal and pillars lightened the day. Following the wall, the boulder pile started to descend steeply and great care had to be taken as the boulders were very loose, and we did not wish to lose sight of the wall or end up riding a rock. The descent continued into the unknown, passing some sparkling formations and eventually dropping into the bottom of the main chamber. More pleasing than anything else was the sight of the large stal boss. We were not lost after all! The survey was then abandoned for another day, and

we made a hasty retreat to the surface after more than 8 hours surveying. The entrance chamber could wait for another day.

Cheiry had waited outside the cave for all those hours, and had become worried when we did not appear, so at 8:30pm she had rung up the rest of the team to initiate a rescue. We popped out at 9pm, knackered, much to the disappointment of the rest whom we met at the entrance. They got their revenge; we were too late for dinner at the hotel, so were taken to a street market, a result of which both of the surveyors had stomach problems the next day!

Dave and Ernie returned the next day with Zhang Hai, Chen Lixin and Julia Tian who were filming and taking photographs. We continued surveying from station 62 which was in the upper gallery. This led past many ancient stal bosses and pillars. Once this had been completed - and much posing had been done - it was back to the big stal for lunch, to watch the camera team get lost on the boulder pile!

We continued to survey out, being passed by the camera crew who exited at 5:30pm, followed by us at 7pm. We were invited into a local farmhouse for a meal of rice, pork fat, pig's liver, pak choi and other titbits we were reluctant to have identified. As always the local people were generous, friendly and helpful.



The huge 38m boss

photo Chen Lixin

## **SAN GUI SHUI (LAO PUNG) TIANKENG AND A LESSON IN DESTRUCTIVE LANDFORMS**

By Ged Campion

Lao Pung is a hill area located on the Tian'e / Fengshan county boundary. The road from Tian'e winds up in a southerly direction past sites we had visited behind the Long Tong Gorge. The village of Lao Pung is very small but services the isolated road between the two towns. A small friendly café provides excellent all day noodle breakfasts served with that extra bit of chilli!

The hills just beyond Lao Pung, however, were to reveal something quite special in terms of cave discovery - "a new tiankeng".

Tiankengs are a relatively new phenomena in karst nomenclature. Prof Zhu Xuewen and his colleagues at the Institute of Karst Geology in Guilin have been major exponents of this new karst classification.

Tiankengs are a unique geological feature found throughout China but especially in South West China. They have often been called "great" dolines or "giant" dolines in the past. These immense structures dominate landscapes in Leye, Haolong, Jialoe in Guangxi and Xingwen in Sichuan province. There has been much heated debate about what constitutes a tiankeng as opposed to a doline, and our encounter with San Gui Shui gave us an opportunity to ponder further on this debate. Basically, the chief characteristic of a tiankeng is that it is of a very large size. Our experience of exploring Dashiwei Tiankeng in Leye and Haolong in Bama has helped inform our knowledge of these spectacular features and it is difficult not to be in awe of their incredible sizes. My recent visit to Haolong Tiankeng in Bama, one of the three biggest dolines in the world, made me aware of just how big these structures can get. Its entrance diameter is a staggering 800m long from east to west and 600m wide north to south, the maximum depth being 509.3m; the total volume is 110 million m<sup>3</sup>. These types seem to form a super tiankeng category of their own, which Chinese geologists call 'oversize' tiankengs.

In contrast most dolines look like shallow basins where the width is greater than the depth. Tiankengs have a clear division between their walls and their floors, where dolines generally do not. Tiankengs have steep walls at least 100 metres high and significant evidence of collapse on their floors, while dolines typically have gentle slopes, thick soil and sediment on their base, and a small sinkhole. The development of karst dolines is closely related to - and positively enhanced by - surface landforms, for example dry valleys, arches or cone karst, whereas tiankeng development is known as "negative" or "destructive" to surface features, in that the surface area collapses and takes everything with it! Indeed tiankeng formation dictates that there is likely

to be no relationship between the tiankeng's entrance position and the surrounding surface landforms. Tiankengs generally develop through deep saturated zones influenced by the formation of vigorous underground rivers, with a humid, rainy climate providing the right conditions for dissolution and river flow on the surface.

The development of tiankengs is therefore likely to be abrupt and result in some cases in massive collapse. In geological terms they are the youngest of the large negative karst landforms formed generally since the later Pleistocene, making them more than 128,000 years old.

Tiankengs of different sizes or at different stages of development will have distinctive features. The smaller tiankengs for example, will look like inverted dolines as the process of collapse begins, the entrance then broadening out with additional erosion; eventually the oversize tiankengs may, paradoxically, have profiles more like giant dolines, eg Haolong Tiankeng in Bama.

Our new tiankeng, with an entrance perimeter of 292 square metres, could be classified as a youthful tiankeng yet having the vital statistics to allow its inclusion in the very exclusive tiankeng club: 100m perimeter cliffs (at their highest point), separate walls and floor, evidence of considerable collapse at the bottom, a location bearing no relation to surrounding surface landforms, and a volume weighing in at 457,300cu m. The Chinese name for the tiankeng is San Gui Shui meaning ancient water cave, but as we peered over its precipitous entrance we could see no sign of water. The Chinese had never been able to descend into this feature so it held much awe and mystery for them, and we appeared to have the whole village assembled around the top of the tiankeng as we prepared our gear, rigging off the biggest tree we could find to descend this monster. I was nominated as the rigger, Bruce would be occupied with the filming, and the two Daves were happy for me to have the pleasure of touching down first. As I dropped down to the tree that hung over the void, the trees hanging over the hole swayed in the wind and golden leaves spiralled down the shaft in a beam of light. As I embraced the tree trunk, struggling to get the 2m tape sling round its girth, the rope bag with its 200m innards decided to move off the grass ledge where I had persuaded it to sit while I fixed the belay. The weight of the bag pulled heavily on my harness, unearthing vegetation and a few rocks which crashed down the drop below me reminding me of the seriousness of my position. I hung the bag on the tree and attached the rope to the sling. I began abseiling slowly, spiralling in the free hanging void in awe of the size of this tiankeng.

Stillness and light gave me an opportunity to survey the architecture of the walls below the entrance portal. The tiankeng's entrance was severely undercut, hence increasing the volume of the void considerably. Quite remarkably the tree gave us a perfect 85 metres free-hang all the way to the bottom. As the noise of the circus above melted away into confused echoes, I struggled to feed the weight of the rope through my stop. I released the remainder of the rope from the bag to assess the distance to the bottom. The rope whizzed down and landed haphazardly on the canopy below. Eventually I descended through the trees and landed in a deep, dusty, brown coloured soil, undisturbed by man or beast until now. The verdant forest canopy which formed the floor of the tiankeng disappeared away down a 100m steep loose slope to a low arch that guarded the access to the cave below. I moved well away from the fall line of the pitch to safety below the tiankeng's arching walls; to have been hit at this depth would be painful to say the least! Incredible large plants were in abundance giving the place an eerie feel indeed, it wouldn't have been a surprise to see a small dinosaur rush out of the undergrowth! Instead, I was greeted by a grumbling Bruce who dangled like giant spider above the canopy.

### **ONE FOOT IN THE GRAVE IN CEMETERY CAVE**

At a distance one could be forgiven for mistaking Ernie Shield for the anti hero from a popular sitcom referred to in the title of this piece, especially when he takes his helmet off but there the similarities end. I had the pleasure of two splendid days with a good natured Ernie recreating Cemetery Cave passage by passage by the process of survey. We were assisted by Ged and Yidean, and of course a few locals on the first day.

This rather interesting cave's entrance lies on a hillside just above the single track road. A short approach walk up hill passes through a traditional Chinese Cemetery where colourful buntings rattle in the wind suspended from white Stupa like gravestones. There were no Gothic horrors here, just the peace and tranquility of resting ancients. Just above, the entrance to the cave can be found at the foot of a rocky outcrop.

Rock steps lead up indicating its use by locals and stacks of bamboo were found just inside the porch. The cave cuts directly into the hillside with minimal variation in direction or height. Easy walking leads to several sections of passage way containing many chert nodules and some beautifully striated rock can be found. Some small passage ways leading off the main passage were found but these closed up almost immediately except for one narrow oxbow which Ernie Shield explored and then insisted we should survey. Ged however dismissed it as too small to bother with.

Eventually, a climb up and down a calcite bulge lead to an

It took a long time for the others to join us, each one in awe of the tiankeng's dimensions.

San Gui Shui was a real gem, beautifully decorated and quite spectacular in size. Big galleries led off up and down, but there was no sign of a river or a pitch that would reward us with depth. In terms of tiankeng formation this was an example of a feature where the river had already found an alternative route, leaving in its wake vast, undisturbed fossil passages. We surveyed the huge galleries and chambers and took photographs before we made our way back to the tiankeng, and on the way met Zhang Hai and Mr Yel Ho who were marvelling at the well decorated passages. They turned around and ascended the pitch first. Mr Yel Ho managed to get stuck on the tree belay and took a record 50 minutes to climb the rope! By the time we had our turn we were rewarded by a prussik up to starlit sky and only a few spectators. The circus had long since gone but had left us the glowing embers of a burnt out fire and a small boy with an irritable, yapping, little dog, which ran the risk of disappearing into the tiankeng's forest 100m below. Zhang Hai was delighted by the discovery of a new tiankeng to add to the Karst Institute's growing list of big limestone features.

By Dave Williams

area where huge claw marks were found, the span of which matched an outstretched man's hand, measurements and photographs were taken of these. It was as if someone had tried to claw their way out of the cave at some point was this a zombie that had escaped from the cemetery we thought! The cave continued into the hillside until a greasy and dangerous climb up a flowstone wall led to a traverse into a larger chamber. It was on this climb, whilst telling the others to be careful, that I slipped and fell approximately 2.5m landing on my back across some jagged rocks. Luckily, I had a full pack loaded with food, gear and water sample bottles which cushioned the landing. I immediately jumped back to my feet like a highly sprung grave digger. I managed to escape unscathed except for a sore wrist. The possible consequences of a bad fall at this point are pretty frightening. If it had been more serious at least it wouldn't have been a long way to the nearest cemetery!

The larger chamber was explored and beside the usual crickets and Hairy Marys, a brown rat was spotted and its rather smelly nest was found between two large rocks. This was over 600m into the cave. Shortly after this, a tricky climb down led into a streamway and a change in character for the cave. Downstream soon sank into boulders with no way on and up stream continued on along a clean washed out stream bed requiring some crawling. The passage way in this area felt pretty unique as the rocks were beautifully coloured red, brown, yellow purple and grey. More crawling led to several small climbs and crawls around blocks until the passage again

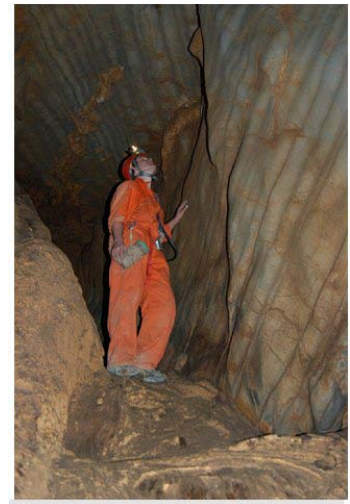
gained height. Eventually, the passage opened out into a chamber with a mud bank on one side and an area of washed out streambed leading to a perched sump emitting a gentle flow of water. The cave contains several areas of good formations of stalas and gours and as previously mentioned, an unusual colourful and striated rock. Cemetery Cave didn't prove too spooky at all we did however spot a bat but on closer examination it didn't turn out to be a vampire!

Yidean took some very professional photographs that seemed to capture the unusual nature of this cave. Ernie got a bit impatient

with the slow pace of the photography on the return trip and as we stopped for yet another "I promise this will be the last shot" cantankerous cries of "I don't believe it!" could be heard as Ernie headed back to the entrance.



Clawed walls photo Yidian Tang



Rippled walls photo Yidian Tang

## **RATCHET CAVE**

By Bruce Bensley

(Also known as Ratshit Cave, more precisely.)

We arrived at Dung Lee Village, a small collection of houses with some new buildings under construction. It seemed like the hub of the village was the small grocery store. Amongst a gathering of villagers was the head man, who greeted us and invited us to sit down on small wooden stools outside the shop. From here, a track led up to the far end of a closed valley. We followed a handful of villagers a short way along this and then cut left across dry paddy fields to the foot of a slope. Scrambling up the cultivated bank a little way, we reached a small entrance on the edge of the natural vegetation.

As our hosts looked on, Bruce climbed down the entrance ramp into a little alcove from which a narrow channel stepped downward to the right. This looked uninviting, being littered with leaf debris and peppered with spiders' webs. Although cool, there was no obvious draught at this point, but within a few metres, a pitch dropped 20m into a chamber below.

A rope was rigged off a small tree and passed down. We hadn't brought a drill with us but had our trusty bolting kit, or so we thought. An awkward spit was placed and a bolt and hanger was requested. "Er, bloke who packed the bolting kit - we've got the wrong bolts!" This crack team of "Foreign Cave Experts", who had been welcomed to Fengshan with loud banners across the streets, was in danger of looking like a bunch of amateurs. Fortunately, the situation was expertly recovered by craftily adapting a thru bolt from our plentiful supply. By locking two nuts together on a thru bolt and inverting it, a satisfactory bolt was made to fix the hanger to the wall.

The short abseil dropped into the middle of a small

chamber and Bruce, Dave and Jun assembled at the bottom. The lowest part of the chamber, at one end, was our first choice for investigation. Between two large rocks part way along was a stone chute which was a little loose and crumbly, but a delicate traverse to the right and a small climb down avoided being dumped on unceremoniously below. Scampering over rocks and boulders the perimeter of the chamber was searched. It was possible to drop into flowstone carpeted chimneys between the wall and the boulders, but none of these resulted in any draughty continuations. In one such place, a musty and pungent smell was evident which led down to a flat bed of tree leaves and home, we presumed to a rat. Several insect and millipede samples were taken from around this noxious location.

Retreating back towards the pitch, we noticed a small family of non-glowing glow worms whose threads dangled beneath the undercuts on a large rock beside the rope. Jun was commissioned to photograph these using the soft glow of our carbide lamps. In addition to these finds were a few interesting insects that had dropped in with the leaf litter. These included a large wasp and an insect whose armour resembled a leaf.

At the other end of the chamber was a more promising descent that was accessed by squeezing past a teetering block that threatened to squash a passer-by against the wall. Although more spacious than the other continuations, it again closed down rapidly.

We made our way out, surveying as we went and then headed up the valley where we hoped the winding streamway would flow into a more substantial cave entrance. We stopped briefly beside a farmhouse, separated from the rest of the village where cockerels scurried beneath drying greens harvested from the

fields. A pile of root crops was being washed and trimmed outside the house and in the field below, a man carefully watered individual seedlings with a bucket and ladle. We continued on our way, leaving behind several readily humored farm girls and a smiling woman sporting a bright gold tooth.

At the far end was a large circular water tank from which several channels fed the surrounding paddy fields. Dave volunteered to inspect the vegetated depression beside this into which the dry streambed led. The undergrowth swallowed him whole and several cries for help later he emerged only to report a muddy clogged pit. The small group of locals dissipated at this point as we continued to follow the stream round. They weren't able to tell us that we were not going to find anything. Along the route of the stream, a couple of short mud-choked crawls provided limited drainage during times of flood. These were home to spiders, large "Hairy Mary" centipedes and assorted rubbish including a light bulb.

Returning to the main village, we sourced the river to a short cave up against the surrounding cliffs and that barely remained underground at its start. We followed a few locals within, holding our breath as we stepped over a rotting goat carcass. The stooping passage ramped gently into a gloomy sump pool from which the water flowed noticeably into a low shallow outlet stream. Several small bats roosted above the muddy sloping banks of the pool, and no way on was found. Back outside the entrance, amongst the broken rocks that had been trundled over the cliff above for the new buildings, a similar passage was shown to Dave who returned wet through having swum across another pool.

The obvious streamway around the valley was typically 3-4m below the field level and this suggested that it flowed and was at times well drained. It is likely that in times of peak rainfall that the limited drainage causes the closed valley to flood and possibly this is how the

large water tank becomes filled. Dave and Bruce scouted along the streambed and investigated a couple of minor sinks along its route (Light Bulb and Centipede Sinks). Both were low crawls that became plugged quickly with mud and shingle. As well as being unpromising, these were also uninviting, being inhabited by spiders and large centipedes. Roots and rubbish also hung from the walls and ceilings.

Returning back to the village, we were shown two short caves behind the houses that supplied the locals with water throughout the year. These were located under a limestone cliff. The carpet of broken rocks outside suggested that scree had been trundled over the edge and probably used in the village for building. The left hand cave followed a stoop/crawl along the face of the cliff that in places broke out into daylight before turning right over a decaying goat corpse to meet an incoming stream that fed a mud-banked sump pool. The air was warm and moist, ideal for the handful of bats that clung to the low ceiling above the water. Dave was sent in to the right hand cave which also ended after a short way in a sump. There must have been some suggestion of a continuation since Dave came out of this cave dripping wet having swum across the sump pool.

Our invitation to this little village presumably resulted from a previous recce visit by Zhang Hai. The villagers knew of an entrance (Ratchet Cave) on the hillside and were keen for us to investigate. We had circumnavigated the closed valley and checked out all possibilities. Our promising lead had been a little disappointing but there's no gain without pain... it could easily have been something much more substantial. Zhang Hai. The villagers knew of an entrance (Ratchet Cave) on the hillside and were keen for us to investigate. We had circumnavigated the closed valley and checked out all possibilities. Our promising lead had been a little disappointing but there's no gain without pain... it could easily have been something much more substantial.

## **WEI DONG: IN PRAISE OF LIMESTONE LANDSCAPES** By Dave Williams

It was my first trip to China, and I wasn't disappointed. The people and places were exciting and full of energy. The poverty was sometimes apparent in the countryside but less so in the towns. Tian'e was a bustling place; something different on every street corner. The Hong Shui River, the life blood of the town, provided a beautiful setting amongst the rugged limestone of the Longtan Gorge. The first day we got a chance to climb high up a winding road behind the town. As we approached the top we parked near an imitation temple adorned with decoration. A small park area gave access to a cave area where a local man wanted us to see a family of monkeys which was kept in a large cage. The zoo arrangement seemed quite incongruous amongst this beautiful natural area.

Next day we travelled along the river edge towards a cave we wanted to explore called Wei Dong. Here limestone shapes of every type and colour could be viewed on the water margin. Small lizards were basking in the early morning sun amongst juniper and thyme, along the small streams feeding the river. This is real karst on a scale I'd never seen before. The river cut through the terrain giving the place an energy and purpose. Lines from W H Auden's poem "In Praise of Limestone" came to mind:

"If it form the one landscape that we, the inconstant ones,  
Are consistently homesick for, this is chiefly  
Because it dissolves in water. Mark these rounded slopes  
With their surface fragrance of thyme and, beneath,

A secret system of caves and conduits; hear the springs  
That spurt out everywhere with a chuckle,  
Each filling a private pool for its fish and carving  
Its own little ravine whose cliffs entertain  
The butterfly and the lizard; examine this region  
Of short distances and definite places:  
What could be more like Mother or a fitter background  
For her son, the flirtatious male who lounges  
Against a rock in the sunlight, never doubting  
That for all his faults he is loved; whose works are but  
Extensions of his power to charm? From weathered outcrop  
To hill-top temple, from appearing waters to  
Conspicuous fountains, from a wild to a formal vineyard,  
Are ingenious but short steps that a child's wish  
To receive more attention than his brothers, whether  
By pleasing or teasing, can easily take."

We rounded a few corners and struggled up a road more like a river. This was the stone washing plant, spilling onto the road. The cave entrance was located in a working quarry, the quarry men intrigued that we should want to explore the cave used to drain their workings!

We set up and rigged the entrance pitch. This was a photographers' feast. Cameras were clicking everywhere. The cave descended canyon-like to narrower, shiny, water worn passage. This place would be a turbine in wet weather. It was bit like Ireby Fell Cave; short but pleasant pitches. After the third pitch we encountered a pool. The Chinese cavers took their boots off; we got ours wet. We arrived at the top of a splendid pitch, just like the big pitch in Hurnel Moss Pot.

Bruce rigged this pitch and set off. At the bottom was a big choked area full of flood debris, but, as we discovered, it wasn't the final bottom. Through a few boulders we arrived at the top of an enclosed loose pitch.



Bolting the #1 in Wei Dong  
photo: Zhou Zhong Jun

We descended to a sandy floor and a huge chasm beyond. This looked promising. The chasm descended uniformly. The boulders were so big it was difficult to determine whether they were part of the cave's infrastructure or separate to it! Route finding in this land of giants was interesting, weaving in and out of the boulders.

A few further climbs and we arrived at water. Bruce announced it was the sump. The water was blue, and as we waded in catfish surrounded us. Bruce used a welly to catch one for analysis. The sump was probably not far from the Hong Shui river level since the fish had eyes.

We made our way out in good time. At the entrance, Bruce managed to get a drive in the quarry's JCB! We travelled back to Tian'e, the karst as incredible as ever. The next day would bring a new challenge with the promise of visiting Chan Dong, a huge river cave with a spectacular entrance. Once again I reflected on Auden's lines...

"but when I try to imagine a faultless love  
Or the life to come, what I hear is the murmur  
Of underground streams, what I see is a limestone landscape".



Wei Dong entrance rift photo: Zhou Zhong Jun

## JIANG JIA TAO (180M SHAFT)

By Bruce Bensley

The Taliban wagons trundled to a halt on the track amongst surrounding fields filled with flowering crops. We had stopped just short of the small village and were soon enveloped by curious and welcoming villagers. It wasn't clear what was in store for us, but we had packed some long ropes, a safe option for anything involving a pitch in China. Once our greetings were complete, we were shown the way along a driveway and across the

fields to a dry streambed that disappeared into an overgrown hollow. We entered this further back where the steep banks could be more easily negotiated, and a couple of short climbs were tackled before reaching the pitch head. Although the opening was only a few metres across, the stones we dropped down rattled away until out of earshot.



A large assembly of villagers had gathered and was perched on all available outcrops, so an exclusion zone around the immediate pitch head was established in the interests of safety which gave us space to sort the kit. Mr Chen was there to film us and Bruce had also brought his video camera connected to a helmet camera for a trial run. Dave Appleing and Dave Williams set about rigging the pitch. Some large water-worn threads in the stream walls provided excellent sling placements and Dave Williams was soon teetering over the edge, drill in hand. The bolts went in for a Y-hang, and Dave descended down to a large ledge below, successfully avoiding filling up his wellies in a stagnant plunge pool. Others were less fortunate. Mr Chen filmed the action from a hastily rigged rope slung alongside and cushioned with tackle bags.

We all met up on the spacious ledge 30m below and Dave Williams continued drilling and rigging from the right hand wall. Another 30m and another step in the pitch. From a Y-hang on the left wall we descended again to the next ledge. No sign of the bottom yet. For a while, the villagers above could be heard chattering and laughing above, which was reassuring as we became swallowed up by the enormous throat-like shaft.

By now, Dave had been hanging around in his harness for some time and had that cutting feeling like someone with a trolley load of shopping in a Sainsbury's carrier bag who'd just missed the bus. After drilling one more bolt in the right wall from the comfort of the ledge, the buck was passed to Bruce. Just below was a small scoop in the rock before the pitch dropped away, near vertical again. Bolting into the smooth bedrock out towards the middle, rope rub was avoided and a decent hang achieved with the others inconveniently out of reach and with a dwindling supply of thru bolts, single bolts were placed where possible and in one case this meant grinding smooth the quartz crystals around the knot. Below this, the shaft became slightly undercut and for the first time the bottom could be made out in my feeble main beam; a large circle of water of unknown depth. I called out excitedly to the others and then swung out to one side using my cows tails to anchor me to a small cleft in the rock. Here the rock looked more solid and a suitable bulge was found to bolt the rope out of danger from anything dislodged on the pitches above. The rope hung free to spot fortunately on the edge of a welly depth plunge pool perhaps 15m across. A short foray whilst the others regrouped confirmed the continuation of a downstream passage. Opposite this point was a silt and stick bank leading up some flowstone into a rising incoming passage. Dave A made a brief inspection and it was explored more fully later. Chen took the opportunity to film the chain of descending cavers and also feature the plunge pool which contained some interesting rounded stones with fine banding.

As the team slowly re-formed, a few ducked into the ongoing passage to scout ahead and Bruce crawled into

a dry soil-filled tube that he found leading off from a similar bank of silt and stick debris. The lack of draught indicated little prospect of development and sure enough it closed down after 20m. The two Chinese cavers who had tagged along appeared to be steadily negotiating the pitch and were within sight of the bottom, so I scampered along to catch up with the others.

The floor was pebble and shingle and was obviously the outgoing drain for the plunge pool when the stream above was in flow. Several pools were encountered along the passage's length and could often be avoided by taking to water worn bedrock shelves and outcrops or bridging against the smooth walls. At the start of one short section of shingle crawl, glow worms were found hanging from the ceiling.

After a few metres the team were held up by a short undercut pitch that looked too awkward and smooth to safely free-climb. With no rope or hangers we had to find a way to improvise. The passage was not overly developed and it could conclude before long, making a return trip wasteful of our time. The drill was summonsed and our last thru bolt sunk. Three remaining slings were linked together and hooked over the protruding thread. This looked just sufficient to reach the sloping ramp below, but it wasn't exactly bomb proof. Above the hang was a slender rib of rock that when drilled through provided an 8mm thread for the chord, cannibalised from a tackle sack. This was our backup for the sling and so the pitch was named Fudgit Pitch.

Bruce elected to climb down and explore beyond. To the left a calcite flow climbed upward into the darkness, but the obvious continuation was along a narrow clean-washed vadose rift with waist deep water puddles along its length. A couple of minor steps were easily negotiated before encountering a wider more tricky drop, tackled by shuffling along a sloping ledge on the right hand side to where the rift narrowed and could be chimneyed. The passage widened just beyond where a steep flowstone climb was encountered which threatened to halt my exploration. Knowing that the others would eventually come looking for me, I down-climbed using definite holds down the one side that allowed a layback position. A high straight section of corridor passage stretched forward for a short way ending in a lower crawl that terminated in a silt plug.

I returned to meet the others and struggled back up the linked slings. On the way out we discovered that the Chinese lads had returned to the surface after battling with one of the pitch rebelay. It turned out they were relatively inexperienced and had done extremely well to take on such an intimidating shaft (180m) to within sight of the bottom.

A couple of days later Bruce and Dave A returned to survey the cave and remove the gear. They also carried Bruce's video camera linked to a helmet cam, a bulb

photography kit and specimen sampling bottles. The ascending passage was surveyed first, with Dave sketching and Bruce on film and instruments. At first the passage rose up easily climbed flowstone floor and then levelled out along straight sections of corridor. The feeble stream pooled along a high corridor with muddy banks. The mud itself was light and layered with fine bandings of white sediment like a Vienetta ice cream. Further along, the floor became more silty with rocks and some miniature gours trickling with water. Up above these, a flowstone choke was climbed to a drop on the other side and a possible, although unpromising continuation.

Returning to the plunge pool, the cave was then surveyed downstream. At Fudgit Pitch, a hanger and short rope were installed. At this point, the uphill flowstone passage to the left was explored which ended in a muddy perched pool below an aven.

By now we were both getting a little weary and time was marching on. The downstream rift survey was methodically completed and we returned tired through the tighter sections with Bruce becoming irritated by his cumbersome video equipment and Dave doing his best to keep him chilled. We had already been hampered by carbide and video workshops and were by now keen to get out. At one point our tired eyes seemed unable to focus on something small on the cave wall. Straining them further the vision eventually came sharp. A long legged fly, similar to a 'Daddy Long-Legs', was quivering so rapidly that it became completely blurred to the eye. It would eventually stop, allowing us to tweezer it into the sample bottle!

At the foot of the main pitch, there was no time for the multi-flash shaft photo that we'd planned and we proceeded out, surveying as we went. Large hanks of

rope were collected as we went since it seemed likely that a rope haul would snag and result in more faff. Dave had the better deal up front and by the time Bruce had reached the final pitch it seemed only fair to lumber Dave with the enormous rope bag that we had just packed up. The driver and villagers who had patiently waited for us were calling for us to hurry, but what could we do? We were knackered!



Jiang Jia Tao entrance shaft photo Chen Lixin

## **FENGSHAN COUNTY EXPLORATIONS**

This part of the report describes explorations made in Fengshan County, both by the expedition in February/March 2004 and by the later expedition in October/November 2004. The first of these expeditions used Fengshan town as its base for most of its explorations in the county, whereas the later expedition spent its first few days in Fengshan town and then moved to Jiang Zhou village further to the south to enable more effective exploration of the Jiang Zhou Cave System and nearby caves.

Many of the caves explored by the expeditions in Fengshan County are not described in detail here but they are all included in the Cave Synopsis

Fengshan county is approximately 40km south of Tian'e. It used to be almost 3 days' journey from Guilin by road but a newly constructed motorway has changed it to

within one long day's drive. It still retains a sense of remoteness compared to other counties of Guangxi. Approached from the north the winding road from Donglan plunges down the mountain side, giving a spectacular view of Fengshan town nestling somewhat awkwardly amongst the conical hills. Hundreds of years of farming on the alluvial plain below provides a spectacular tapestry of green and brown colours interspersed with glimmers of water in circular concrete wells and elliptical pools, there to provide life to this sometimes parched landscape.

The Qiaoyin river flows through the town and rises from Chuan Lung Yan Cave (Factory Cave) and a collection of smaller caves in the local catchment area.

Fengshan County covers an area of 1738km<sup>2</sup> and includes 11 towns, and has a population of 190,000 where 58.2 percent of the people are Zhuang, 34.8 percent are Han,

and 7 percent Yao. Fengshan town bustles with activity and life. This is a very poor area of China where there is little economy and farming is a struggle; there is no promise of a huge hydroelectric scheme as is found in the neighbouring Tian'e. Fengshan however does have its own treasures, mountains and rivers where gold, aniseed, and numerous exotic plants have been found - and, of course, Fengshan's own breed of famous black pig. Tourism is also developing and caves here play a significant part. The town's show cave, Yuan Yang Dong, and San Men Hai Dong which is 20km south in Pao Li village, are visited regularly by the aspiring middle classes from Nanning and Liuzhou.

The area is dominated by limestone of Devonian to Carboniferous age with a thin band of Permian carbonates cropping out in the area south west of Fengshan town. The limestone in this area is massive and the two richly cave-bearing sectors in the east, the Qiaoyin and Xialijing drainage areas, are separated from the Ma Wang and Jiang Zhou sectors in the west by a tight syncline of Triassic sandstone and shales running directly from north to south. The limestone sectors nearly pinch together at Pao Li village where the waters of the San Mei Hai River resurge below the Ma Wang system. The Xialijing limestone continues south across the county boundary into Bama, where river caves south of Yueli and Poyue (many surveyed during the 1988 China Caves Projects expedition) eventually resurge at Beimo.

The Jiang Zhou and Ma Wang sector in the west, however, has been the main subject of our exploration. This prolific area of karst, dominated by fencong, spawns 29 km of cave in the Jiang Zhou Cave System in the south and 12 km in Ma Wang Cave in the north. This block of limestone is shaped like a pterodactyl's head, dipping away south east from the more massive limestones of Zhongting and Lingyun in the west.

To the north of Jiang Zhou and to the west of Ma Wang Cave, a truncated series of very large phreatic cave passages extends from Si Fang Cave to Green River Sink, providing a near complete fossil highway stretching from east to west. Here the immense passages of Mayo Li Dong and Dong Li Dong cut through the hillsides in majestic style.

The cave system of Jiang Zhou underlies both Fengshan and Bama Counties in the hill area of Duyang Shan. It lies about 24km SSW of Fengshan town and roughly 50km west of the Hongshui River. The nearest large village is Jiang Zhou, about 2km from the southwest edge of the system. The village has a spectacular gateway - a huge karst arch of approximately 30m high which features in many tourist leaflets. One of the entrances to the cave is close to the village, one is at the nearby Long Huai village, and another is just to the north of the scattered hamlet of Dalue.

The multi-entrance cave system lies beneath a typical fengcong karst. The main entrances and the fossil sections of the cave are situated 50-100m above the alluvial plain. The cave passages are breached by a spectacular doline, the Herb Garden, which houses a forest isolated by its perimeter cliffs.

Jiang Zhou Dong has developed in predominantly Lower Paleozoic dolomitic limestone, mostly of Ordovician and Devonian origin. The explored cave system comprises mainly very large fossil passages and chambers, the floors of which are extensively strewn with massive boulders. They are also decorated with speleothems, especially flowstone, stalagmites and large gourls, some of the most spectacular of which are located in the upper galleries in the far reaches of the cave (Hijack Passage).

The typical passage in Jiang Zhou is about 30-50m high and of similar dimensions in width. There appear to be no major faults in the area, and passage development has been controlled by percolation along joint planes, causing dissolution and the collapse of the intervening joint blocks. Percolation of rainwater landing directly on the karst surface has contributed to cave development, and accounts for the diversity of branch passages converging on the main trunk cave.

Underlying the fossil caves, there is an extensive active cave system which can be reached at various points from the fossil galleries by descending large elliptical shafts, some of which are over 100m deep (such as DWII Shaft). Some shafts also extend upwards to daylight (Skull and Crossbones Shaft). The cave rivers pass through numerous flooded sections, so that only short sections of vadose river passage have yet been found. Rivers off the alluvial plains have transported large quantities of sediment into sink holes, often causing massive infill and blockages in the active passages. Within the fengcong, many dolines have floors choked with sediment at levels well above the cave rivers, for example doline MF 2502, just to the east of Man Fei Sink itself.

Other significant features and caves in this area include Maguai Dong, lying south west of Fengshan in an area of thin Permian limestones. The entrance to this cave is located in a deep, heavily forested, elliptically shaped doline, well guarded by cliffs at its southern end. A karst arch provides a bridge for the road above where heavy vehicles thunder across, blissfully unaware of what lies below. Deep in the doline a howling draft and pitch guard access to a river that is believed to resurge at the bottom of a gorge 1km away to the north.

To the north of Fengshan town an area of caves - Hei Dong and Liang Dong, (Light and Dark Cave), Pan Yun Dong and a 70m shaft, Biao Dong - cluster near to the village of Ping Shang. Liang and Hei Dong comprise big well decorated fossil caves with a collapsed doline

breaching their entrances. Conversely, Pan Yun Dong has a surprisingly remote and small entrance at the side of a craggy hill which opens out into immense well decorated chambers, where sadly there is significant evidence of speleothem removal and damage. Pan Yun Dong almost certainly forms the back door of Hei Dong but no connection has been found to date.

The valley in which Ping Shan is found was the subject

of an Italian expedition in December 2004/January 2005.

The Italian team surveyed and explored a number of other caves close to Ping Shan village.

Fengshan is extraordinarily rich in caves and karst features, and the articles below tell some interesting stories about our exploration of this area.

## **CAVES NEAR FENSHAN TOWN**

### **THE QIAOYIN - PAN YANG RIVER SYSTEM**

By Bruce Bensley

The Qiaoyin River takes an intriguing line running for some 20 km in a north-south direction between the locations visited by our expeditions. Over this route it disappears in and out of the karst landscape beneath grand cave entrances. The northern most section of this system was unwittingly explored during our first stay in Fengshan town whilst visiting Chuan Long Yan Dong and the surrounding area.

During the following October/November expedition, we were taken to see several entrances much further south that together form a continuation of the Qiaoyin River. These included the large river entrances of Shia Wan Hur, Wan Hur and Ling Wan amongst others.

The overall objective of this recce was to give us a better understanding of the system as a whole and introduce us to possible future exploration tasks. It is worth mentioning at this stage that extensive work has been carried out in this area as far back as 1988 and 1989 by the China Caves Project. Indeed, we unknowingly revisited four neighbouring entrances that were previously explored and mapped by these expeditions: Da Yang Dong (north and south), Chushui and Xiao Shui Dong (we have called this Ling Wan).

The majority of other river caves that were explored and mapped at this time continue south to the Beimo Resurgence 9 km further south where their waters flow into the Pan Yang He River.

A number of huge fossil passages were also explored above the river system and these are described in a China Caves Project publication of the trip. The Beimo Cave resurgence is now a show-cave and tourist destination. It takes 20 minutes to walk from Poyue to where the main rising for the Pan Yang River is met by waters from the Pan Yang Cave System. From here this small river flows south through the central area of Bama County for 143km before joining the Hongshui River.

### **CHUAN LONG YAN DONG ("FACTORY CAVE")**

During the February/March expedition of 2004, the team was taken on a leisurely excursion to see "Factory Cave" on the northern outskirts of Fengshan town with our Ye Lie, Director of the town's tourist board. This through-cave's local name is Chuan Long Yan Dong and the naturally formed feature had been used for many years as an industrial unit. Anywhere else on the planet, this would be a steel-framed structure with pressed metal skin. We were intrigued to see just what a factory cave would look like, and had visions of some villain's hi-tech hideout in a typical James Bond movie.

Leaving the town centre, we crossed a road bridge over the river and turned onto a dusty track where we all piled out of the van in our orange suits. The cave entrance could now be seen set in the cliff face just upstream, a gentle span with old gnarled stals hanging from the roof-line over a lazy flowing river. A few bemused bystanders gathered on the bridge to see what was unfolding but we re-boarded and trundled down the uneven track passing a gang of women labourers digging a trench through the stubborn soil. The van climbed up the rise into the cave, needing its headlights to cut through the gloom and dust stirred up by a passing "tractor" ferrying concrete building blocks out of the cave. These small articulated tractor units are common across rural China and have a small engine mounted at the front driving a flywheel. A large single "Cyclops" headlight sits prominently on the front. Avoiding a couple of cyclists on the narrow roadway, we pushed onto the far end of the cave stopping short of the exit and everyone piled out again.

We were parked at one end of a moderately ornate arched bridge that spanned the river giving access to the far bank where the track continued on alongside the river. Time was allowed for us to glimpse the work going on around us. The atmosphere was buzzing with the noise of machinery and other clanking noises. A rickety power line passed through the cave, which is 300m long, and then cut across the enclosed flat field system to the north. Inside the cave and to one side, a couple of busy teams were in operation making concrete blocks.

One team broke up deliveries of limestone rocks with little more than bendy sledge hammers, their shafts being made of several strips of bamboo bound together. Fine for shock absorbency, but unwieldy to swing! A standard rock-crushing unit carried these pieces up a conveyor and into a small hopper where they were broken down into fine gravel and dust. The other team of three fed a large, open, horizontally designed cement mixer that resembled an open cake tin of about 2m diameter. The finished mix was then shovelled into an upright vibrating mould that formed several blocks at once. The vigorous shaking soon compacted the dry mix and bound it together. A hand-pushed forklift cart made from bicycle wheels was then able to scoop up the load and take it a short way to a long walled pile of finished blocks where they were left to cure.

On the other side of the road were a handful of dusty buildings and by looking over the wall between them could be seen a stone mason's yard below. The workers seemed to be specialising in gravestones and many completed stones were laid upright around the yard. Some stones were being worked on and were laid over old tyres so that engravings could be cut using an electric hand router.

On the same level and a little further along, was a concrete pylon production yard that was manned by only a couple of hard working men. Alongside a long pile of finished pieces lay several metal casts that could be split open along their length. From one end snaked thick black pipes through which the mixture may have been pumped in. Nearby stood a tall boiler that needed stoking regularly with coal. This may have heated water that was fed through the piping to circulate through ducts in the casts and hence speed up the concrete setting. We had seen mini trucks carrying away several pylons at once, and these were loaded like telegraph poles lashed down to a frame behind the cab and extending up and over the roof.

On the town side (south) entrance, next to a gatehouse, was a large wood yard surrounded by a high brick wall. From a prominent point on top of an old flowstone mound a good view inside the yard revealed that the main output was garden fencing that was probably destined for the city suburbs elsewhere in Guangxi. Some plank cutting was also evident and a huge domed pile of scrap dominated the yard.

On this same side of the cave, the calcite flowstone slopes rose up towards a large boss feature. Our impromptu survey of the cave was quickly accomplished at the end of the day and so we were not able to explore this unused area thoroughly in the time available. It is also possible that a cave lead existed close to the south entrance in the vicinity of a shrine that had been set up away from the hustle and bustle of the factory.

The river flowed thorough the cave initially on the east side, where a concrete footpath ran beneath the undercut wall. Along its length were many carefully inscribed writings. The river then cut across the passage, running beneath the bridge to the other side where it followed the wall before flowing out of the north entrance. A couple of low dams had been built across in the past, but these were badly breached now.

The team were led out of the north entrance and made their way around the enclosed flood meadow area towards a smaller entrance on the far side known as Shui Liang Dong. A few workers tended to their crops as we passed by but there were very few buildings to be seen in this vast expanse of fields. We relaxed for a while on the cobble beach that bordered the waters of the onward section of cave. Only a small flow oozed from within, feeding into the main river outside. But the day was for rest and we amused ourselves by photographing the reflected sunlight that danced around on the entrance walls.

Suddenly a man appeared unexpectedly trotting across the pebbles with a polystyrene raft on his shoulders. He launched his craft and punted out of sight into the darkness. A short time later, we were amazed to see him return with a full blown version of his little raft. This was equipped with little chairs and a central pile of polystyrene blocks on the deck; an incredibly reassuring attempt at health and safety. The provision of these buoyancy aids indicated that this entrepreneur was destined for success!

Our boating trip had been arranged prior to our visit but came as a surprise to most. The raft was boarded and our weight was carefully distributed across the deck. We drifted silently out of sight of the entrance and followed the beautifully scalloped passage through the hillside. At times, the shallow-arched ceiling was so low we had to duck. It was a fine example of a vadose passage. After about 150m we emerged into daylight and dry land once again. As we disembarked into a boulder strewn closed valley with steeply vegetated surrounding slopes, the ferryman warned us of snakes and the danger of quarried rocks being trundled from above. We disregarded these warnings and set out to the far side where Dave Williams came across another polystyrene raft moored in another water-filled cave entrance (Little Raft Cave). Without much persuasion Dave took to the water and canoed to the muddy bank opposite. After a little foray into the darkness without a head-torch he returned suggesting there was no easy way on.

Back at our drop off point we discovered that someone had paid the ferryman, who was nowhere to be seen. With the words of Chris de Burgh's song repeating in our heads, we followed an uphill path through the undergrowth hoping for a way out. Half way up was a

concrete water channel flowing out of the cliff side and traversing across the slope. A small brick shed bridged the culvert and one by one, our small group balanced their way across the gap using a narrow in situ log. At the top of the slope the path disappeared into a natural cave passage with a powerful draft blowing through from the other side. We followed this back through the hillside emerging in a light open entrance area with an amusing little truck parked inside. We soon bumped into some workmen who were busy blasting a tunnel back through the hillside. A long drill piece was thankfully undergoing repair at the time and we had been spared any surprise explosions. In one corner we were shown numerous boxes packed with sticks of explosives. We made our escape from "Garage Cave" and emerged overlooking the small hydroelectric station that we had passed on our way to the raft site.

The others, who had caught the last boat, were sat

outside on a low wall eating their packed lunches (sticky buns, eggs and an apple). Always interested in Chinese machinery, Bruce, Dave and Ged moseyed on in to greet the young lady supervising the turbine who sat on a little chair next to a primitive live coil heater. The leads from this hung delicately from bare connectors on the wall beside her. All that technology just to power an electric heater! She kindly allowed us to inspect the spinning flywheel whilst Dave Williams larked around pretending to read the bank of gauges and dials above a desk in the corner. This generated power was supplying the nearby "Factory Cave". It wasn't obvious what the tunnelling was for in the cave above, but an expansion of the hydro facility seemed like one possibility. A later visit to this area in October by Emma revealed that clearance work was underway in Factory Cave.

Perhaps a tourist through trip was being planned?

## **OCTOBER RECCE OF THE QIAOYIN RIVER SYSTEM**

The arrival of all the October expeditioners was separated by two weeks. The first group, comprising Dave A, Bruce, Tony, Mike P and Ernie, travelled to Fengshan town from where they took a couple of days out to recce a number of large cave entrances on the Qiaoyin River System.

Our first sortie on Day 2 took us about 10km south of Fengshan. Travelling in three vehicles, we branched off the main route to Jiang Zhou and headed east. The first port of call was to be Wan Hur but as we took the turning onto a dirt road we encountered across it a mound and ditch. We set about bridging the obstruction with rocks and chunks of earth. The "Taliban"

into the ditch scraping their tailgates as they passed through, but the dinky 4x4 mini bus made the task look very easy. About a kilometre further on, the road overlooked another impressive cave entrance where the river disappeared underground again. This must have been the north-west entrance to Shia Wan Hur and was duly photographed and fixed with the GPS. About 7km further on, the south entrance to Wan Hur resurges. Getting there from the road involved a short 30 minutes walk through a small hamlet surrounded by fields of various crops including sunflowers. Bruce, Mike P, Zhang Hai, Chen, Li Ya Qiao (Guangxi Pictorial), and our man from the Ministry of Land and Resources who we nicknamed "Eddie", proceeded to the cave entrance, and the other team drove 2km further south to the next resurgence and sink downstream. In the meantime, the dogs of the village barked to greet us as we arrived at the last farmhouse where the farmer's beautiful wife sat plucking beans from their pods on a stone porch at the head of a flight of steps. From here we could make out the nearby cave entrance through the trees and

were led down the steep banks to the waters edge by an old man carrying a pole to steady himself.

This resurgence is about 4km SE of its upstream entrance. From here, the surface river flows east for approximately 600m before going underground once more. Taking off our boots, we forded the small river that was flowing knee deep. Along the right-hand wall a deposited mud bank could be followed easily as far as a section of bedrock shelf. An attractive bright green frog hopped away quickly as we approached. Chen followed us in, filming with the aid of his new helmet camera that he'd mounted on a telescopic pole. A small LCD display monitor taped to the pole allowed a bird's eye view to be successfully filmed. A deep gently flowing river soon took up the full passage width and our progress was halted. We hadn't anticipated needing our caving suits and wellies that day, so it looked like the end of the road. Not wanting to give up too easily, Bruce decided to explore further by stripping down to just his boxers and his carbide lamp. The water wasn't overly cold and so the swim was bearable. He could feel the current against him as he followed the right wall which gently curved out of sight of the others. Beyond here islands of mud snaked onward into the gloom. Although the banks of these were soft and once on top the going was firmer. It was quite spooky to be out on a limb like this, but Bruce continued for a little way further before returning to get a feel for the nature of the caving.

Mike, meanwhile, climbed steeply up for 30m on the right hand side of the cave, over mud and areas of flowstone, to reach a massive chamber with a 25m flowstone pillar guarding its entrance. The local people had obviously been there before as evidence of burnt out bamboo torches were found in the higher levels of the chamber.

Perhaps inflatable dinghies would be useful for surveying these muddy river caves? Back at the farmhouse a chicken soup had been prepared for us in an ornate cast pot that resembled a witch's cauldron.

Dave, Ernie, Tony and the obligatory press contingent returned from the most southerly resurgence of our recce, having made about 800m of upstream progress by hopping from mud bank to mud bank over the river. The passage was large, generally about 30-50m across and the noticeable fog at the limit of exploration made visibility across it difficult. Due to the time constraints the team turned back, but had a brief look at the sink on the other side of the doline only to discover that it sumped.

Both teams returned to the metalled road at the road-block and we continued east, passing a river dam on our right that was holding back a fair head of water. The river backed up around a bend to a resurgence entrance located below the road and nearby to a road tunnel entrance. Located on the bend just before this, we noted a short section of fossil through-cave higher up the hillside with an electricity power line passing through it to the light on the far side. Beyond the tunnel, the road climbed up a steep set of hairpin bends and continued on the other side of the hillside to a site 1.5km east of the Shia Wan Hur sink. In the heavily vegetated valley below we could see a short section of river emerging from the Shia Wan Hur resurgence, and this shortly disappeared into the probable north entrance of Wan Hur. The two entrances were perhaps 150m apart.

On day 3 we headed further south, travelling a long 20km south of Fengshan, passing past the Ma Wang Dong resurgence where we had lunch and a boat trip, before heading on to find the Ling Wan sink. Bruce was coaxed into the San Men Hai 4x4 off-roader driven by the proud lads from the showcave. This incredible vehicle had every accessory imaginable including a power winch, sand ramps, Jerry cans, an array of spotlights and a large heavy-duty jack. Thinking that we would follow the other team to our destination, the GPS was left running in the other vehicle. This however was not the case and he was whisked away to another location. The short journey ended up close to a huge bridge construction site whose purpose must have been to hold open the highway when the valley's plains were flooded. An impressive series of pillars could be seen stretching into the distance. The river below the road at this spot headed into the one corner of the valley and entered yet another large entrance that was probably the northern sink of Da Yang Dong (1989 Expedition).

Not being able to communicate his concerns he just had to sit tight. Driving on, we eventually caught up with the other teams who had parked up and were seen entering a tall cave resurgence entrance in a cliff face off the track which turned out to be Da Yang Dong south.

A pleasant river flowed out into the open passing under a quaint footbridge with the occasional bamboo raft tethered to the banks. Bruce scrambled across the adjoining fields to join "Eddie", our friend from the Ministry for Land and Resources, who was always entertaining us with his antics. This time he was having a playful wrestling match with the horns of a water buffalo.

We decided to leave the others to investigate this one and moved on across the another previously explored resurgence not far away, Chushui. This was presumably just a flood overflow to Da Yang Dong, since very little water was flowing out. Outside the cave mouth a large mound of big boulders had collapsed in front. The idle stream trickled through these to fill a ponded section of river bed where ducks kipped on the banks. Moving on a short way downstream we rejoined the main river at a large riffle confluence that could be easily crossed without getting too wet. Beyond this the gradient steepened and the water flowed more rapidly, turning around a left hand bend into the roaring Lingwan cave entrance (Xiao Shui) where a hazy mist was visible against the dark interior. By this time the others had parked up nearby and were keenly picked their way across the boulders around which the white waters thrashed. Inside the entrance the left hand side was followed onto an undulating path that broke out onto a big dry mud bank. As the entrance light dimmed and the large passage continued onward, we decided to return to the vehicles.

It was only back in the UK where we compared data with previous expeditions, that we realised that the caves in the Lingwan depression had been already been surveyed. Later study of the hydro map also suggests that these entrances may actually be tributaries to the main Qiaoyin River System.

Our journey took us back on ourselves for a few kilometres before taking another road heading about 4km further east of Ling Wan. The vehicles struggled to climb the complete set of hairpin beds on the dirt road to the village of Ting Tse, and so we took to foot for the final leg of the journey. The village was small but had a school and family planning office. Outside was a concrete table tennis table and when the children were allowed out to play, we were able to string a makeshift net across to tighten up the rules a little. A bent basketball hoop provided further opportunity to interact with the kids. Afterwards, we walked on through the fields dropping into a basin with a small cliff-sided doline marked the entrance to a fossil cave. At first we expected to rig a short rope through the brush but as is often the case, the locals indicated a way down along an exposed ledge that led to an awkward chimney to the vegetated floor of the doline. Everyone climbed down without incident and we went inside to explore. The passage opened out into a spacious but moderately steep descending slope.

After the initial 25m we were met by gour pools, stal bosses and gentle slopes of flow stone floor which sparkled in our lights. This continued for over 300m until slopes reached upwards to meet the 40m roof.

The group split up looking for leads, but unfortunately no way on was found. We about turned when Zhang Hai called "away to go!", a phrase borrowed from Professor Zhu meaning that it was now about time to move on. Halfway out we were greeted by two young Chinese who had entered by the light of cigarette lighters and shod only in flip flops!

They led us out with great accuracy and we all resurfaced - except for Dave and Chen Lixin. Nobody knew where they'd wandered off to and after a while on the surface we felt obliged to look for them. Mike returned into the cave and after much shouting made verbal contact with Dave and met them underneath the enormous piece of stal which had crashed from the roof long ago. Dave announced with a cheeky grin, that he had been led astray by Chen whilst finding their way out in the final section of the huge chamber.

Sweating profusely in the humidity, the lost cavers climbed back to the terraced fields and caught up the others at the village. They had stopped off at a farmhouse in the village where an old woman laboured over a millstone and were now enjoying a welcome bowl of chicken soup containing the familiar floating animal head and feet.

## ***SPICE GIRLS, FACTORIES AND CAVES: CHUAN LONG YAN DONG (FACTORY CAVE)***

By Ged Campion

The way in which caves and people co-exist in China was very well illustrated when expedition members were escorted by two young and very attractive tourist office girls to an interesting cave "in town", virtually nestling between shops, offices and karaoke bars. The girls, with brightly coloured matching handbags and winklepicker shoes, led their escorts enthusiastically up to Chuan Long Yan Dong, which we now know affectionately as "Factory Cave". Who needs tackle bags and wellies when you can get this sort of gear?!

Chuan Long Dong comprised a huge entrance some 70m across and 50m high with a sizeable river flowing out. It was a huge truncated section of cave approximately 200m long. The area inside of the cave had been totally divided up between stal bosses and other spelothems and littered with industrial space housing "units" manufacturing concrete blocks, grave stones, telegraph poles and a whole host of other assiduously crafted goods. The non-stop activity, deafening machines, and glare of mains electric lights gave the cave environment a strangely surreal atmosphere quite alien to what we are accustomed - an example, perhaps, of nature not quite in harmony with technology.

No mapping was done on this occasion since the day was expected to be just a recce trip and by now time was getting on. It was not apparent whether or not we were looking to connect back into the river system, but since we were so high up in fossil cave this was probably just an interesting detour that had resulted from enquiring locally about the caves. The area seems to be fairly rich in ancient high-level fossil caves, such as the large Yu Long Dong (Desecrated Cave) that lies about 5km to the north-west and was partially explored and mapped in March 2004.

We reached Fengshan town in the dark at 7.30pm. This very good day ended our stay here as we prepared to move 30km further south to Jiang Zhou village.



Lingwan (Xiao Shui Dong) sink  
photo Bruce Bensley

It was nevertheless, still a cave and as dutiful expedition members we had a responsibility to survey and record it. The girls were happy to demonstrate their newly acquired survey skills and led off nimbly through the cave armed with tape measure and handbags. As we encountered factory worker after factory worker, some on their tea breaks, some going about their daily business, we were greeted by giggles and laughter and bewildered faces. They must have thought the Factory and Shops Inspectorate had arrived at last, measuring up the area before consigning it an unsuitable environment for a workforce!

As we surveyed south to north, we reached an ornamental bridge spanning the river. On the east river bank a sizeable tunnel with fairy lights led off up a slope to what appeared to be a shrine. At closer inspection this was an old Taoist shrine with assembled seats and altar laden with effigies and candles. There was no space in this huge cave that had not been put to use. We later learnt that Chuan Long Yan Dong forms the upper part of the Qiaoyin River cave which emerges in Fengshan and flows south to Bama county, intersecting more karst yet to be explored.



29km in 20 days  
an account of the system's exploration

#### BACKGROUND

There is no doubt that local people have been exploring the extensive Jiang Zhou Cave System in Guangxi Province for very many years, long before the first visit by Westerners. The massive dry-stone walls to be found in various parts of the system suggest an early defensive use of the caves, possibly of many centuries ago. The wall near the Herb Garden doline in particular is much larger than would be required to retain domestic animals, and is about 1.5km underground from the nearest easily accessible entrance. More recently, but probably over many decades, villagers have been scavenging the system to recover stalagmites and other calcite formations for sale, and these activities have taken men into extremely remote parts of the cave, aided only by bamboo torches and primitive hauling devices.

The first sighting of the system by Westerners was in late 2003 by an Italian caving expedition led by Rosario Ruggieri and supported by Zhang Hai of the Guilin Karst Institute. However although they viewed the Long Huai entrance to the system, they did not venture underground. Western exploration for real started in March 2004 when the Sino-British Tian'e Expedition, then based in Fengshan, became aware of the existence of a large cave system near the village of Jiang Zhou. This happened when Ged Campion asked questions about the area which was shown on a pictorial tourist map outside the expedition hotel, and which implied the existence of spectacular karst features. The map included an abundance of horseshoe features which usually indicate large cave entrances.

The Chinese hosts were initially a little reluctant to allow the expedition to visit the area (partly because of unfinished business nearer Fengshan Town, but also because the area had been "half promised" to the Italians!).

Eventually the Chinese agreed that there was a strong case for the British team to visit the area and three expedition members, including Zhang Hai, were dispatched to make a preliminary investigation.

#### THE FIRST FORAY

On 12 March 2004, Ernie and Ruth Shield and Zhang Hai headed south from Fengshan Town to the entrance to the system now known as Long Huai (or Village) Entrance, which they then called Nan Fei Dong (Very Large Cave). They took a GPS fix and surveyed the first 300m of the cave to the first main passage split. They then

continued to the right (east), along massive underground passages up to 40m wide and almost as high. They passed within sight of the daylight streaming down the doline now known as the Herb Garden, and exited from another entrance to the system now called the Man Fei Entrance. The size and potential extent of the system was immediately apparent, and the Tian'e Expedition, then into its final days, threw all its remaining effort into exploration of the cave.

The days for the five British cavers (Dave Appleing, Bruce Bensley, Ged Campion, Ernie Shield and Dave Williams) and their Chinese colleagues were long and arduous, and involved daily travelling times of around 4 hours from the base in Fengshan town. March 13 was largely spent surveying the ground covered earlier by Ernie Shield and Zhang Hai, but on the following day a further 2km of massive passage beyond the Herb Garden doline was explored and surveyed, to the chamber called Colossus (because of its size), and a pitch just beyond from which the enticing sounds of an underground river could be heard. The final two days' caving involved exploration of the Herb Garden Oxbow and the start of the nearby passages subsequently called Beginner's Passage and Foggin' Passage, and also the almost complete descent of the underground pitch beyond Colossus by Dave Williams (called, in his honour, the DWII Pitch) to within a few metres of a fast flowing river. This opened up the possibility of a large active series some 200m or so below the extensive fossil series in which the team had so far put most of its effort.

When time ran out, the expedition found that it had surveyed 7.5km of the system in only 5 days of exploration. (Is this a world record for an entirely new cave system, in terms of survey length per person per day?) It was already clear that a second expedition would be necessary to understand the extent of this unique caving complex, and plans to return to China were being formulated even before the team had returned to the UK.

#### A MAJOR PASSAGE TO THE EASY AND A NEW SOUTHERN ENTRANCE

The next expedition, the 2004 Fengshan Expedition, was in October and November 2004, and had the exploration of Jiang Zhou at the top of its agenda. The team comprised 11 UK members and many Chinese friends.

Five of the UK members went out two weeks ahead of the rest of the British team. After 3 days looking at caves nearer to Fengshan town, the expedition set up a base in Jiang Zhou village on 15 October. On the next day, guided by Luo Ming Chun from the hamlet of Long Huai, the five team UK members (Dave Appleing, Bruce Bensley and Ernie Shield of the earlier expedition, plus Tony Harrison and Mike Peters), with Chinese colleagues

Chen and Cheiry, set off to reach the DWII Pitch, the furthest point of the previous exploration. However the passages are vast and it is easy to lose one's sense of direction, and the three languages in use - Mandarin, English, and the local tongue - provide many opportunities for failures in communication. As a result the team found themselves some kilometres to the east of the DWII Pitch, at a large formation in an entirely new passage, before realizing that Luo Ming Chun had inadvertently led everyone astray. The new passage was appropriately named Hijack Passage. Retreat and reorientation allowed some members of the team to reach the pitch head at last and drop off some gear there, and other members to start on the survey of the new passage, before the end of an exhausting but satisfying day.

On the next day, helped again by the knowledge of local villagers, a potential new entrance to the system to the south was located and entered. This is near the scattered hamlet of Dalue, in Bama County a few km to the east of Jiang Zhou village. A significantly sized river flows into the impressive entrance and the team followed the stream for about 500m until it ran into boulders in a high chamber. It was thought that high in the roof of the chamber was a way on to the passage to DWII Pitch and Colossus, and there was also the prospect of rediscovering the underground river as it flowed down to the north. After a search in the roof which discovered the start of the likely fossil connection to Colossus, the team split: Bruce Bensley and Mike Peters continued the search for the connection, and Dave Appleing, Tony Harrison and Ernie Shield surveyed the route from the Dalue entrance. It was another successful day as the high-level party eventually found the DWII pitch-head (and even rigged and descended the pitch). The following day the low-level party also reached the same underground river by following the Dalue watercourse down Yorkshire-style phreatic and vadose passages, involving rope-assisted climbs and some crawling (a rare phenomenon in the Jiang Zhou Cave System!)

This successful period of exploration opened up the whole of the south of the system to the expedition, although an attempt on the next day (19 Oct) to reach the river again down the Dalue watercourse failed because an overnight increase in water flow had caused shingle banks to move and block a short but vital phreatic tube connection. The fossil passage link between Dalue to DWII Pitch was surveyed over the next few days.

#### A NEW NORTHERN ENTRANCE

On 20 Oct, the expedition started to explore the northern part of the system, again initially on the higher fossil level. Dave Appleing, Tony Harrison, Ernie Shield and Luo Ming Chun entered via the Long Huai (Village) Entrance and turned left (north) at the fork a few hundred metres inside the cave into new territory for

the expedition. 1.9km of massive passages (with boulder slopes which would have been classed as mountains in the UK!) were explored and surveyed that day. The following day the same team pushed still further north to discover the northern Terragoata Doline, the Snake Choke Entrance and a sump at the most northerly part of the system.

Meanwhile, Bruce Bensley and Mike Peters continued to push down Hijack Passage; it was becoming clear that this major route heading east had the most potential for significant new finds.

Over the next two days, Bruce Bensley again continued the push down Hijack, "burning off" a different partner each day. By 24 Oct the passage had been explored and surveyed as far as the Size Matters Oxbow. During this period a second team continued to explore the far northern end of the system, finding the interesting passage which was called Shaftlands.

On 25 Oct the team was expanded significantly by the arrival of the second contingent of UK cavers: Jane Butler, Ged Campion, Mike Clayton, Emma Porter, Alister Renton, and Graham Salmon. They were quickly made aware of the discoveries to date and the potential for yet more kilometres of new cave. In only 8 days of caving in Jiang Zhou Cave System over the previous two weeks, the 5 UK expedition members, supported by various Chinese colleagues, had added a further 13 km of surveyed passage to the 7.5 km initially explored in March, with many leads still unexplored.

For the final two weeks of the expedition the team decided to focus on three objectives in Jiang Zhou: firstly the exploration of the rest of Hijack Passage, secondly the "filling in" of various gaps in the complex area of large fossil passage already mapped, and finally the search for a significant active part of the system, to be accessed via the many deep shafts noted throughout the system or down stream sinks.

#### FILLING IN THE GAPS

On 26 and 27 Oct, a total of 5 teams went underground in the Jiang Zhou Cave System mainly to tackle the second of these objectives. (Yet another went elsewhere in the district, looking at possible "outlying links" to the main system). Emma Porter, with various companions, spent the two days exploring and surveying the passage near the Herb Garden doline which was called Foggin Passage. This ended only a few tens of metres from the main Man Fei entrance to the system, but not before passing through some delightful areas of calcite formations.

Dave Appleing, Alister Renton and Ernie Shield filled in a missing sector down Hijack, discovering much mud and Turkish Delight Sump. Bruce Bensley and Mike Peters completed a missing link in the Colossus - Dalue Entrance passage survey. After this intensive period only another

5 days were spent in the Jiang Zhou Cave System by the expedition as there was much to investigate elsewhere in the district, but these trips allowed a number of other leads in the fossil series to be closed. These included Beginner's Passage, another delightfully decorated passage of quite modest proportions by Jiang Zhou standards, and also the side passages near Colossus and some loose ends in the north near The Rubble Hill.

### THE ACTIVE SERIES

The period between 26 Oct and the end of exploration by the expedition on 3 Nov also included a number of determined attempts to open up the active series which usually lies 100-200m below the massive fossil passages. Bruce Bensley and Mike Clayton again descended the DWII Pitch only to find that the river at the bottom soon sumped in both directions. An attempt by Ged Campion and a small team to follow the surface river which runs underground a few hundred metres below the Man Fei Entrance resulted in the discovery of a quite spectacular cave river passage (Butler's Boulevard) which led to yet another sump. Close to where this stream runs underground (at what we called the Man Fei River Sink), another river emerges from, and immediately re-enters the hillside, and on the final day of caving in the Jiang Zhou Cave System, Jane Butler,



Dalue Entrance photo Bruce Bensley

Tony Harrison and Graham Salmon followed this watercourse upstream, again to reach the inevitable conclusion - an impassable mud sump. The two remaining obvious routes to the active series, Fishing Pool Pitch and Skull & Cross Bones Pitch, both near to the Herb Garden, were also rigged and descended in these final days, the former by Bruce Bensley and Mike Clayton, and the latter by Bruce Bensley, Ged Campion and Alister Renton. Unfortunately the streams beneath each pitch ended in sumps in both the upstream and downstream directions. Although some leads in the active series still remain, it seems probable that most of the underground river system is blocked by mud sumps, soil and debris being carried underground by the high flows of water encountered in the rainy seasons.

### HIJACK PASSAGE

This major lead was also not forgotten in our final days! On 31 Oct, Dave Appleing, Mike Peters and Emma Porter, with our guide Luo Ming Chun, Cheiry and a Chinese caver called Tin, had an extended day and night underground progressing along a passage they called the Ho Chi Minh Trail to The Mother of All Slopes, only to be stopped by lack of gear at the pitch just beyond. On the following day (and night!) Ged Campion, Alister Renton and Graham Salmon pushed yet further to the Far Reaches and were eventually halted by a 6m pitch which could not be free climbed. This represents the current end of the system. Subsequent comparison of the survey with a surface topographical map showed that this point, nearly 8km from the nearest entrance of Manfei, is only a few metres short of the surface in Bama County. Even at this extreme point of the system, evidence of stal plundering by local villagers was apparent. The effort needed to get cut stalagmites from here to the surface using only manpower and primitive pulley and roller systems is mind-boggling, and indicates the lengths that poor rural people will go to generate an income from their environment.

### CONCLUSIONS

The expedition started on the return journey to Fengshan and Guilin on 4 November, but not before totting up the survey results for the Jiang Zhou Cave System. The total distance mapped - in only 20 days of caving by two relatively small expeditions (in manpower terms) - was found to be 29.2km, making the system the third largest yet discovered in China. Sufficient leads remain to push it up to second place, a feat requiring the discovery of only another 5km or so of passage!

### **HIJACK OR BUST: A TRIP TO THE FAR REACHES OF HIJACK PASSAGE**

By Graham Salmon

It was getting towards the end of the expedition; I'd done some great caving but there was still so much to do. I'd spent a lot of time caving with Ged and Alister, mostly leaving Ged to decide what was next on the agenda. There had been a lot of activity in Hijack Passage - it was simply going on and on with no sign of finishing.

Emma's team had returned the previous day with harrowing stories about climbing the "Mother of All Slopes", caving through the night on a 15 hours plus trip. What's more, they had stopped at an undescended pitch. I was curious to go to the coal face to judge all this for myself, but we would need a concerted effort with the limited time we had left.

Dave appeared to be involved in organizing a trip to Ma Wang Dong. He was being persuaded by Zhang Hai and a few locals to complete an estimated 4 day (but this number was ever decreasing), bizarre through-trip, attempting to link two teams, one entering from Hei Dong to the south and the other from Ma Wang itself in the north. It seemed a bit pointless really; Ma Wang had been explored and surveyed in 1989 and there seemed to be little chance of scooping new passage. However, this was Dave's first year in China and a combination of inexperience and too many Hijack trips seemed to be taking their toll. Despite the pressure, and seeing a potential circus being staged, I stated my alibi and we quickly pushed Bruce forward as a sacrificial lamb (rather than a lion) to go off and join the Billy Smart's team.

I chatted to Alister about a long trip down Hijack. He tried some excuse about staying with Jane who had been a bit pecky for a day or two, but eventually made a promise to join us; the thought of a full rest day after Hijack seemed to do the trick. Ged, as usual, was game for anything that included a trip with the irresistible Julia who was trying to recruit underground photographic models anyway. Little did she know that she would be embarking on a 15 hours trip! We needed a trusty trail-blazer, and Mr Wang was engaged to do the honours.

He quickly recruited a friend, Mr Lung, a cheerful chap who appeared more dressed for a stroll in the park than a full blooded caving trip!

The usual melee was taking place in the expedition HQ concourse that morning: lots of bickering about transport departures times, people forgetting equipment, and Mike Peters having to be dragged out of his bedroom to go caving. We gathered our packed lunches, taking as many apples and eggs as possible, the chosen cave food in China. I had been delegated the task of cook, so we bought a supply of spicy noodles and packed a stove. We had been told that the previous team had been halted at an 8m pitch, so we packed a rope and just one SRT kit between the five of us.

Scheduled to be the longest trip that day we left last, the usual sort of logic on a China caving expeditions! When we arrived at the entrance of Man Fei Dong, we fired up our carbides and took plenty of water and spare carbide to weigh our sacks down. Ged was merrily decanting carbide supplies to get a lighter sack. Mr Lung's sack was steadily filling, and realizing what he had let himself in for, his demeanor was becoming less and less cheerful.

At last we set off, passing the by now familiar "Up yours!" formation which was almost trying to tell us something as we strode confidently by. We climbed the slope to the higher gallery, passing the crevasses and always taking a new line in what by now should have been

worn pathway. The sizes of these passages here defy you to remember their detail. Soon we could see daylight radiating into the cave from the Herb Garden doline. Blinded by light we crossed the forest and entered the start of Leviathan, apparently christened by Dave Williams (a true expeditioner) back in March. I tried to imagine what he had thought when he assessed the size of this place, the first ever foreigner to enter these vaults, like Ike promising to return but destined somehow never to come back.

Clambering up and down carelessly placed boulders, it wasn't long before the floor leveled out and just ahead I could make out the reflective tape on a cairn where a big tub of carbide was sitting. This was it, the "T" junction marking the start of Hijack Passage. Straight ahead the Diomedes Drag led off into the darkness. We strode off to the left, forced on to the right hand side of the passage by a slope. The proportions of the passage decreased and we entered a gloomy muddy area where a seasonal sump pulled at our wellies. This oxbow series twisted and turned until things got bigger, and then seriously bigger. We'd entered the true Hijack Passage. As we moved on it was straight enough and big enough to drive a bus through. The floor was completely level - you could even run! And so we did. We reached shallow lakes with muddy gour rises providing crossing places. We tiptoed across, and at one point I nearly got my feet wet.

Soon the nature of the passage changed again, allowing quick progress. We passed beautiful minarets and reached big chambers where the remnants of an old Chinese camp were evident. We stashed water and carbide reserves here and rested awhile, checking the rough survey Bruce had scrolled for us. We now realised how long our trip was going to be. Julia in particular, assessing our relative position on the survey, was beginning to realize what she had let herself in for! Not to be daunted we carried on. We soon reached the "Size Matters Oxbow", losing no time. Here we needed to take a right. Onward we trudged and reached a breakdown area, possibly, we thought, the Pink Pyjamas roof collapse. Here the nature of the cave changes - a lot more boulders requiring a slower pace.

Down a few rocky steps the floor passage padded out into fine silt, the dimensions increased, and the floor became firmer. This was the start of the Ho Chi Minh Trail, a straight running passage - literally! If you could drive a mini-bus down the start of Hijack, you could have driven a double decker down here! The progress was a stunning, running pace. This was caving in China at its best; this was the opposite of caving in the Yorkshire Dales. But all good things come to an end, and we reached a big cavern with a moveable path winding up the left hand side of the slope. It was like climbing a mountain. "It is a mountain", Alister remarked. It got steeper and looser as we clawed our way to the upper reaches. Cairns stood precariously at the zigzag corners, and you could have taken a serious fall from this

mountain's dizzy heights! Finally a delicate arête led upwards to the summit slopes, the boulders here huge as they teetered on the sloping edge. The summit was a number of big boulders, one bearing an inscription apparently gloating that 100 Chinese had removed 40 tons of stal on one expedition in 1978! If you needed incriminating evidence, here it was.

We moved on, the size of the passage diminishing seriously for the first time. Hopping over boulders, your head could almost touch the roof of the passage. It wasn't long before we reached the infamous "Mother of all Slopes". This proved to be a daunting climb, on loose material. God knows what it was like without a rope - pretty scary, I should think! At the top an even tunnel-shaped passage led off. Here we decided to have a brew and rest. Ged went off to rig the pitch that had halted the previous team's progress. After a refreshing break we tackled the pitch, Mr Wang's friend free climbing it using one hand on the rope! With everyone down using one SRT rig, we pressed on. The dimensions were a lot bigger - it looked promising. We headed off along a sandy, Dan-Yr-Ogof style passage, punctuated by short awkward climbs. We descended a slope to a big T junction below, and Ged, demonstrating just how incompetent a surveyor he can be, broke the handle off the tape. From there we surveyed in spaghetti style, heading in a western direction. Not to let him forget, the junction became known as "Tape Handle Junction".

We took the left hand turn which led along big passage to a obstructing wall. We trended right and found an awkward chimney providing access to the top. More interinteresting climbs followed and a more decorated area was reached. We climbed up to galleries and a crawl - yes, a crawl - to forests of stals. Even this far into the cave, the place had been plundered. A steep slope led down to a rift and a un-climbable pitch. The pitch was 3m or so and below the cave twisted away - but for another time. There was no detectable draught which was not a good sign. We were disappointed; we had secretly believed we could pop out in to Bama County.

There was no chance now, only the long winding road back thro' the cave. We checked out the other larger passages, and found the "Yorkshire Way" which ended in muddy gloom and dangerous waters. We were attacked by acute survey fatigue. We thought we'd better to

## **EXPLORATION OF MAN FEI RIVER SINK**

My introduction to caving in China was a day with Ged, Graham and Mr Chen Lixin (who is a freelance TV producer as well as an excellent caver) exploring the "resurgence" of Man Fei Cave. It was a sunny day and everyone was in good spirits and keen to explore. "Gambai man" (one of our local hosts) was busy taking photographs and was prepared to go to great lengths to ensure he recorded the trip. As we climbed down the

think of the return trip and we used Julia's tiredness as an excuse.

We arrived back at our bivi stop and consoled ourselves with a hot noodle dinner. Julia was so tired by now that she was prepared to nibble our limp but steamy noodles! It felt so civilized, just languishing in the passage with plenty to eat. The road home was efficient and predictable. We had stops where we had made water and carbide dumps. With weary legs we reached the Herb Garden before dawn. The entrance was near. We got to Man Fei and there we could hear dogs barking by the road. Our reception team was probably waiting, we hoped. We didn't hope in vain and were greeted by a yawning Cheiry. We got back to HQ in time for breakfast.

Wow, what a trip! It had taken 15 hours and had covered 16 kilometers of cave. Bruce would be so jealous!

I climbed into my bed and closed my eyes to the dulcet sounds of the World Service and Ged complaining that George Bush had been re-elected. Alister climbed into bed with Jane in the next room, and closed the door for the first time that trip. Being the youngest he'd still got energy left. We were glad to be back, but what lengths we had gone to in order to avoid the circus in Ma Wang!

We were later to learn that the two teams had not linked up; even worse, Bruce had mutinied, Emma had forced a no confidence vote on her team, and Zhang Hai was asleep in a village somewhere. Tony, our resident rescue expert, was busily organizing a rescue bid! We'd definitely made the right decision this time, but would anyone, I thought, ever return to Hijack's coal face again?



Surveying Hijack Passage

photo Julia Tian

By Jane Butler

steep approach path to the river we quickly realized that this was a sink and not a resurgence. A steep canyon led down to a number of deep pools. It was reminiscent of halcyon days of my youth, gorge walking and trying to keep dry. We moved down the river using our climbing abilities to remain dry, until we eventually had to change into wetsuits. Mr Chen plunged across first with his waterproof filming equipment so he could film us all

swimming across. How I wish he hadn't. I plunged across with a primitive rope around my waist unable to touch the bottom of the pool. The swimming was actually quite pleasant, but I had great trouble with the wellies I'd borrowed from Ged. Being a size too big, they flew off as soon as they filled with water and I started swimming. I was frantically treading water to try and rescue my wellies. What a spectacle! Ged was shouting not to lose his wellies, while everyone else hooted with laughter. All this captured on film!

A few more steep drops led to the top pitch that required a rope. More swimming led to a confluence of a much bigger river flowing from the right. The party chose the downriver section, hoping this would provide more clues to the hydrological infrastructure of Man Fei. We were soon faced with the prospect of a very long swim into the unknown. Ged was tied onto a rope and bravely launched himself in to the unknown. After an Oscar winning performance, Ged stood up with the water barely touching his ankles. Dry land was in sight and the team joined Ged with less exotic performances.

We continued in a large river passage that led to a large area of boulders. Sediment was also evident giving indication of the flooding potential of the passage. We could now stride along with the largest section of the cave spanning 30m. The passage trended to the east and we thought we were heading to the streamway's "epicentre" of Man Fei. Unfortunately, quiet waters were ahead signifying the possibility of a sump. Graham bravely swam in the sump confirming our worst fears, the end of our downstream journey.

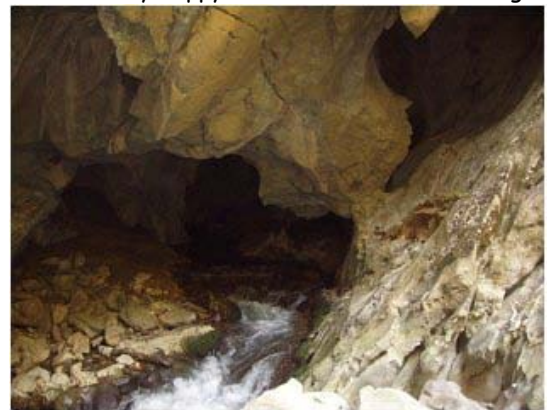
Mr Chen interviewed us for his TV film before our return journey to the confluence. A lunch of boiled eggs, sponge cake and an apple then spurred us on upstream. The confluence only gave up a few survey legs that led to the foot of a draughting tube. Graham managed to climb the 5m tube to discover a descending pitch and strong draught. Insufficient rope and a lack of SRT gear called for a little imagination. I climbed the pitch in a make-shift rope harness to join Graham on a very narrow ledge. I was then ceremoniously lowered down in to the void. It was exciting but also a little nervy. It reminded me of my childhood imagination of the sort of place that trolls would live. A muddy tube slanted downwards. The end of the tube signified a substantial drop and I could see a slow flowing river below. With insufficient equipment it was clear that we

would have to return here another day. I was then hauled back up the pitch to much welcomed light and familiar faces, and a desire to return again soon to see where the pitch went.

The opportunity to return to Man Fei Sink, to open or close down the upstream part of the river, came towards the end of the trip. Laden with SRT and survey kit, Tony, Graham and myself returned. Graham skillfully placed a bolt at the top of 'Janey's' Pitch. This enabled us to overcome the 2m or so drop at the end of the tube onto a muddy bed beside a flowing river in a large cavern with steep muddy slopes. We were able to carry out quite a few lengths of surveying until the inevitable happened: a mud choke blocked the way and the river disappeared under boulders.

Although not a great find for China caving, this was one of the most enjoyable days underground. The end of the trip was nearing and everyone was in good spirits.

Tony was the star of the day. At one point we were stopped in our tracks by a pool spanning approximately 10m. Graham and I were not keen to get wet so we traversed the sides on very friable clay. It was a gamble as to whether it could be negotiated, or whether we were in for a nasty shock if we unsuspectingly fell in. After watching our knife edge antics, Tony decided he would swim the pool and be in total control. Unfortunately, Tony had underestimated the depth of the pool. He gracefully slid into the pool and then was completely submerged. What a star! Fortunately for Tony the cave closed down soon after and we were soon back into the sunlight. After exiting the cave, Tony produced a "Mars" bar, relatively intact, for each of us from under his helmet. I will never forget this day and it is one of the many happy memories I have of caving in China.



Man Fei Sink explorations photo Wen Yuan

By Bruce Bensley and Graham Salmon

## **OTHER CAVES NEAR JIANG ZHOU VILLAGE**

### **DONG LI DONG**

From the road a distinctive horseshoe-shaped stream meander can clearly be seen snaking its way between two entrances in the enclosed valley below. We had passed this interesting spot many times on the road from

Fengshan to Jiang Zhou. From our hydro-geological maps it was apparent that these formed part of the west-east hydrology link through to the Ma Wang Dong showcave resurgence.

Ged, Bruce, Graham, Chen, Cheiry and our two guides Lou Min Chun and Mr Wan wandered over to the entrance of Dong Li Dong which is set in a cliff face below a larger unexplored fossil entrance higher up on the hillside. No water flows at this time of year but it soon became clear that the deep mud within must have been laid down in the wet season when the caves and surrounding valleys struggle to cope with the huge rainfalls. We battled on, through, up and over mud banks and arêtes formed by earlier flood waters, often sinking dangerously close to the top of our wellies. One 10m long arête tempted several to straddle along its keen knife edge, whilst the others wallowed through the surrounding quagmire. However, it was questionable who was laughing at whom. The cave was generally wide with a low ceiling throughout, and the mud was a key factor in slowing our progress. After 700m we encountered a large sump pool with no apparent flow. Our team assembled along the mud shore and Chen proceeded to film using his powerful Kowalski HID diver's lamp to light up the far walls. Did the passage continue, or was there another way on?

The group had gathered, yet not turned back. A silent vote had been cast and Bruce had sensed the consensus of opinion first. A thorough exploration was definitely called for to maintain our professional image. As he signalled his intent, Ged voiced words of warning. Soft mud, deep water and lack of buoyancy were the raw ingredients for a drowning, after all. For safety, a rope was tied on and wellies discarded before he slithered down the bank and into the water like a penguin. This method successfully avoided being sucked under. After a negative outcome, our fish was hauled in and we backtracked to the entrance to be greeted by warm sunshine that dried our muddy faces.

### **MAYO LI DONG**

After a brief lunch the team cut across the meadow to the large entrance of a downstream cave. A rocky rise spanned the cave mouth and it descended steeply on the other side before passing under the canopy. The climb down was awkward and some slithered down behind a large block from the promontory above, whilst the others scurried down over rocks. We noticed a manmade tunnel whose head-height arched entrance headed back under the boulder rise and may have even passed right through to the outside. The team, however, pressed on into the cave, taking care as they traversed round a deep steep-sided conical pit. A careless step on the hardened mud could result in an uncontrolled slide into the left hand wall. Just beyond this hazard, the large passage turned to the right and levelled out. The firm mud floor followed a central line down the passage, with a channel soon developing on the left hand side. Because this was a "walk in the park" compared to the previous cave, we temporarily named it "Mayo Li Dong" since it was nothing like as bad in nature ("mayo" meaning "no" in Mandarin). Rapid progress was made over the gentle undulations and we were soon pleased when a dim glow of light was spotted in the distance. Although only a few notable

formations had been seen, this significant passage had stretched impressively beneath the hillside and under the road to emerge out of a bell-mouthed entrance and into a green closed valley.

On the far side of this was another large entrance that we christened "Green River Sink" owing to the milky green stream that flowed into it. We had recognised our location by the lone farmhouse with a barking dog that sat centrally in the valley on the high ground above the naturally terraced banks of the stream.

We had recced these two opposing entrances a few days previously from the vantage of a high col visible from the road. Not wanting to retrace our steps through the cave, we gladly took the steep path up to this point and got back on the road. Bruce and Cheiry flagged down a passing truck and jumped on the back before the slower members of the team arrived. They jumped out a little way down the road, but were then passed by Ged, Graham and Chen who had boarded a minibus destined for Jiang Zhou village.

### **GREEN RIVER SINK**

After plotting our measurements back at base, it was clear that we were looking at the west-east hydrology link indicated on the Chinese geological maps, and a push in this direction was definitely high on our agenda, despite the leads still being explored in the large Jiang Zhou System. The next day, Dave, Bruce, Mike C and Ernie returned to the Green River Sink and surveyed in from a GPS fix outside. The entrance stream feeds into a pond on the right that is bypassed by climbing up onto a hill formed by an entrance collapse. Beyond this, the small stream can be easily crossed where it cuts through a section of mud floor, before widening out into a more sizeable river on the other side of a rocky rise. The passage takes on large dimensions, bending gradually out of sight of the entrance light as the river is followed along the right hand river bank. Higher up on this side a worn path picks an optimum and dry route, as is so often the case in Chinese caves.

After perhaps 600m, the team met a river junction with a deep canal heading off to the right that has to date not been explored. The mud banks alongside this appeared to taper off quickly leaving only a swimming option. At this stage of the game, it seemed best to stay dry. (Little did they know what lay in store later on!) From the junction, the flow appeared to be more not iceable as it bubbled through a few boulders, passing under a distinctive natural "pit prop" of rock that resembled "Durdle Door", before continuing off along the right-hand wall. Steep slopes rose up from the river into the darkness high above. The survey traversed this across easily scaled boulders and rocks interspersed with flowstone floor. The large passage could only be sensibly estimated in size by keeping the right wall and river in range of the helmet lamps. After 200m, the river

spilt over a set of gour dams that provided a means of crossing to the far bank, and then appeared to sink under the walls as the cave bent to the right. Dave A picked his way along the muddy banks into the corner to check for a continuation, whilst Ernie climbed up the rocky slope high up to the left. Nothing was found in either place, so they reluctantly left the river behind and climbed up the flowstone and boulder strewn slopes on the other side of the river. On the high ground above, several stal formations of fair size were found. The terrain sloped down to the left along the passage length, and lower down, where the ground became soily, the dark, still waters of the river were spotted again. Keeping it in view the cavers traversed these slopes to the far end and then descended a scree through a developing fog where they joined the river once more. The passage width was much reduced, and the river that accounted for much of it flowed into the cave along the left hand wall.

Soon after, the river-bank petered out and the team was faced with an expanse of water stretching into the darkness. Ernie, who didn't look best pleased at this, volunteered the youngsters for the swim. Foresight meant that buoyancy aids were at hand. Valuables and food were packed away in Darren Drums and sealable sacks before Mike tentatively took to the water swimming cautiously into the eerie gloom ahead, followed by the others.

Ernie was left behind; this kind of caper was not what he'd bargained for! A large offshore rock just short of the far mud bank provided a much needed survey station as the tape reached its 50m extent, and this allowed a measurement out of the water where life jackets were ditched and the reduced team continued on its way. Another hour's survey progress was made following the river. The banks were generally muddy and littered with boulders and rocks with patches of flowstone. Climbing up and over a prominent soil buttress allowed the team to gain easier ground over a flat mud beach. This then narrowed down to a slender and slippery walkway that hugged the wall ("Slipfoot Traverse"), and delicate footwork was required along the hard-packed bank top to avoid slipping into the river.

As the team waded back into the slow moving water beside a flowstone wall formation, ripples lapped at its base creating a strange ghostly drone as the trapped air vented through gaps in the wall's body. At this point a long 70m swim lay ahead. This almost claimed Bruce when he became tangled in the trailing tape measure as he swam. Always best to wear a life jacket! The forward survey station then left him stranded waist deep in the cool waters, gradually sinking in the soft quicksand riverbed whilst waiting for the others. With teeth chattering, he wondered what creatures inhabited the spooky waters, having seen the occasional white cave fish earlier on. On making the shore once again, the decision was made to return to Ernie and make a way out.

A quick look ahead over flowstone and large slippery boulders indicated that the cave continued onward and a return trip was needed.

Two days later, Bruce returned with Graham and Emma to push onward, having recruiting them at breakfast that morning. Picking up from our last point we surveyed onwards, sometimes taking to the water in preference to the awkward shore terrain. A deeply pocketed rock, where we regained the bank was christened "Swiss Cheese". At a point where the river widened and the passage opened out into a chamber, we were soon forced to swim again. As we swam, the disturbed water spilt over a lip beyond the range of our lights, and a tall 1.5m gour dam that retained the river was encountered ("Kielder Dam"). The river then deviated round the rocky hillside which occupied the chamber, and disappeared silently beneath the right-hand walls. Climbing high up the slopes, we searched for a continuation. Some manmade steps cut into the slope answered the question and led us back down to river level where we picked up the clean bedrock river overflow. More steps were found hacked out in the rock, leading in and out of a pit arena in the riverbed. This usually meant one thing: this was a stal trade route.

Although we didn't know it at the time, the end of the cave was nearing. Up ahead, a long ascending passage branched left, climbing steeply up over rocks and boulders and becoming more and more densely decorated, with 2m stals in its upper parts. To our disappointment, every formation had been ringed with gloss paint ready for cutting. Remnants of cling film wrap lay twisted about the floor. Was this a stone forest in the process of being irreversibly harvested, like in so many other caves in the area? Had the operation been interrupted by the seasonal weather, or had the wreckers given up some time ago? It was a long and difficult trek out, but the use of bamboo rafts would have significantly aided the removal of heavy formations.

We scrambled back to the junction 90m below, following both walls as we went in search of the distinct draught that we had lost on the way up. The thought of breaking surface was attractive, but perhaps not if you're a beautiful stal formation! Nothing was revealed and we resumed our exploration... but not for long. A deep pitch was by-passed, only to be followed by the ledge of another. Rocks dropped into each fell for 4.5 seconds, suggesting they were about 100m in depth. As we had no other equipment, this lead was left for another day and indeed another expedition.

This river cave heads in the direction of the Ma Wang Dong resurgence and although it is only 1km short of the most westerly fossil entrance (Hei Dong), about 2.7km of cave is needed to connect into its lower river series. On our way out, half a tub of fluorescein was dumped in the river in the hope that the harmless dye would be reported to us on a later visit to Ma Wang Dong.



## **MAGUAI DONG**

By Alister Renton

At the end of the expedition Ged and I went to look at Maguai Dong, a very impressive cave entrance that you pass on the roadside. In fact, on closer inspection the road actually bridges over the doline which is associated with the entrance. It is overlooked by a cave further up the hillside that holds a dark secret, the scene of a mass-gassing where the liberation armies murdered large numbers of people in its chamber. Zhang Hai referred to this as the "San Men Disaster".

We travelled to the cave from base camp via a very slow and mechanically unsound trike. This was one of the outlying caves and why we did not use a fast jeep I have no idea, but just over an hour later we made it.

We left the driver and started to make our way down the doline, surveying as we went. The doline was typical for the area, with steep vegetated sides but a track was easily made. This was not the nicest of places as the bridge was, or rather still is, a dumping ground for the local hospital. The ground was covered with needles, bottles and hospital waste. We carefully navigated this, surveying all the way.

As we neared the bottom the route finding and surveying became far more involved and complicated due to the thickness of the vegetation. Progress was very slow. After manoeuvring down through a section of open rift we came across a very strong breeze blowing.

## **SI FANG DONG**

By Mike Peters

As I write this it is now 9 months after my China experience, and how I wished I had made more notes on one of the most action packed months of my life! Never have I had so many new, colourful and stimulating experiences bombarding me in such a short time. So many, in fact, that memories merge and details are lost. So with excuses and mitigating comments dealt with, I will try and pass on a few "China moments" to you.

It was one of those great days when Bruce and I, with our local guide, had the enjoyable task of sampling life above ground. The task was to find and obtain GPS fixes for the cave entrances that Zhang Hai asked us to check out. Like every day of the expedition, the sun shone as we set off from Jiang Zhou standing in the back of the "Taliban" wagon.

This is the ONLY way to travel! You see so much more from this vantage point as you are closer to everything about you. The open smiling faces of the children and adults greet you as you drive quickly past. Fleeting eye contact is made between them and you as they see these white skinned men in their red boiler suits roar past. They stare back in wonderment as we leave them in a cloud of dust, of which they seem oblivious.

A roaring river and pitch could be seen, but we had no equipment to investigate and this still is un-descended today.

From here we started to climb back up to the main cave entrance. The route was quite nasty with loose rock and gravel underfoot, made all the more difficult with tape, compass and clinometer.

On making the cave entrance we continued surveying and found a small eyehole near the back of the entrance chamber. Could people may have been herded into here too and gassed? It was a large flat-bottomed open space with only a few large boulders. The chamber had a very spooky feel to it. We quickly passed through the eyehole and pressed on. We followed the passage for a good while, well formed with a muddy bottom. Time was pressing on and we still had the doline to cross, so we turned back.

On returning to the main large entrance chamber we had a further look round before descending back down a very exposed route into the doline bottom. It took us a long time but we made it back to the trike and sat back for the long ride home.

This cave needs further investigation and that pitch needs dropping!

We leave the new tarmac and travel on the more familiar rough roads which traverse round the hills and drop us onto lower ground. The cave entrance is only a few 100m from the road, involving losing little height. We pass through a small homestead observing the pig greeting us from below stairs. More startling was the open pit with a pole across it. This was the ultimate "loo with a view". The pole was the seat where you and the contents were in full view. It is at times like this that you wonder why we are so infatuated with cleanliness at home.

Si Fang Dong, if I remember correctly, translates to "Square Cave" as it has a rectangular entrance flat on the ground.

We descended a steepish path to a small free climb which led us down to an open vegetated slope with ways on left and right. Steep mud slopes were observed in the gloom in this large cavern. A few steps in the deep glutinous mud convinced us that we should move back, as the end of the day was drawing near. Given the mud, I hoped secretly to myself that this was my only visit to Si Fang! We retreated back along the road to the local store where we had a few beers. In the absence of a bottle opener, the smiling store keeper opened all the bottles with his teeth!

## SI FANG REVISITED

Ged, I, Mr Chen, Alister, one of our guides, and Mr Dung, whose job was to take underground air samples, scurried around on the mud banks of the now familiar Square Cave.

Memories of this trip are of certain points which stood out for various reasons. The deep sloping mud on the initial parts were very entertaining, and there was no danger of sliding off as you were knee deep in the stuff. Surveying progressed on and upward, and soon the mud became more reasonable and allowed us to move quite well. We christened a lovely straight walk "Middlemarch" as our interest in George Eliot developed. We reached slopes which we traversed, and a splendid mud arête which, if constituted in snow, would be very much at home in the Alps. After this, life became even more exciting as the mud was capable of allowing you to slide off down into the darkness at any point.

The bats were another high point I remember well. They were hanging at our head height on a group of large and (not surprisingly) mud coloured stals. In fact at this point everything was mud coloured, including us, log book, tape and surveying gear. The mud sapped our strength and our lights in the gloom. We called this place Glutin Putin. Mr Chen did a fantastic job of filming though the mud was not doing much for his film ratings. He leapt at the chance of filming me posing by the cute, fawn coloured bats, whose heads bobbed from side to side as if wondering what was going on in their great kingdom of mud. We had lunch at a junction with a ramp going off left; this we called Eliot's Elbow.

Things levelled out for a while as we followed a small stream over the mud - but not for long. We could hear roaring in the distance. Had we really made an exit; were we about to be released from here right next to a village generator? We surveyed on. The noise grew louder as we entered a larger cavern with a long, wet, slowly shifting 40m mud slope dropping down to a wall at its base. This mud was nice - only knee deep, but it moved downwards to a hole, which we named Bedes Hole, from which the roaring of a river could be heard. Ged ventured down towards the hole where the mud slid out of sight. His curiosity was soon quashed by a sense of survival, and he retreated, muttering as he passed me that "it was bloody dangerous". I thought that summed it up quite adequately under the circumstances! Mr Chen, who was half way down the slope and half way up to his neck in the glutinous mass, filmed it all, true to his profession. The villager generator was now just a past dream.

Next we found ourselves in the centre of things, following a shallow creek with upwardly steep slopes - of mud of course. At this point the guide and Mr Chen hung back and were very reluctant to proceed. Ged pushed on, shouting encouragement for them to join us. Approaching a slope in front of us and a dodgy creek

crossing to reach it, we held a pow-wow to decide (a) if we could take any more of this, (b) if was it time to struggle back, (c) whether to just tell everyone we had come to the end, (d) whether to blame it all on the reluctance of the guide, or (e) whether we should just have a look up the slope to see what was ahead. The last of these won, and Ged slurped across the muddy creek (Marner's Creek) and disappeared up into the darkness. Excited calls announced that he was on a firm mud free slope. "Who's he kidding?", Alister and I thought, but the shouting continued. I crossed the creek, faithfully holding our tape of mud and continued with the survey. Captain Scott was still calling us on from above; no turning back now, and we were on some good going for once.

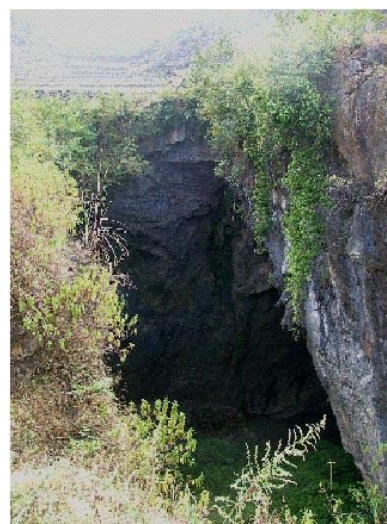
After the creek, a slope ascended and suddenly the mud stopped! We had reached terra firma at last. Our sea legs wobbly, we kept climbing upwards. Surely there will be a top entrance, we thought. Up and up ...we came to decorated passage which at one time must have been a wonderful place. There had been stals here once; now just the bases of once beautiful formations remain. The "treasure" had all been removed. What a sad end to all the effort we had put in to get here. The end of the chamber narrowed down with a big column in the middle of the passage, but Alister recorded no draught and time was short, so we decided to retrace our muddy steps.

Back at the open cave, we surveyed the last bit to the large sump. A local farmer had said he had followed this through in drier conditions but would not do it again. Smart guy! Approaching the homestead, someone was at home. We were greeted by a beautiful smiling Chinese girl who offered us the water out of the stone reservoir next to the "loo with a view", to wash our hands and faces. No transport was in sight so we walked a little way to the bottle opening store keeper, who rushed out with chairs for us and very welcome beers. Here we gave a rendition of some good old Irish drinking songs, much to the pleasure of the small group of locals who had by now heard the row we were making.

Or was the singing done at my first visit there?

Oh well .... does it matter? The main thing is - it did happen and the memories are there!

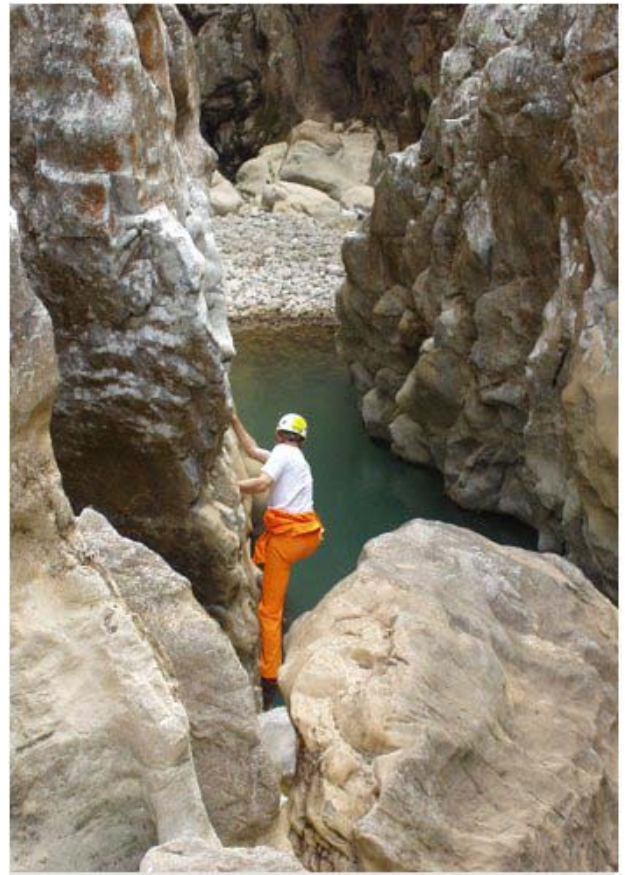
Great fun .... good trip!



Si Fang entrance photo Bruce Bensley



Long Huai (Village) entrance *photo Bruce Bensley*



Canyon into Man Fei Sink

Photo Wen Yuan Tao



Vegetated Tiankeng floor *photo Bruce Bensley*



Jiang Zhou Arch *photo Graham Salmon*



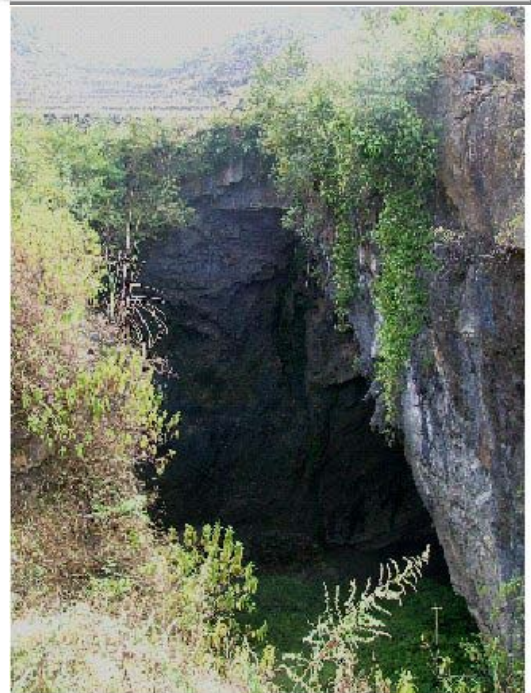
Wan Hur resurgence *photo Bruce Bensley*



Dalu Entrance *photo Bruce Bensley*



Sunrise at Fox in *photo Bruce Bensley*



Si Fang entrance *photo Bruce Bensley*



30 metre pitch *photo Zhou Zhong Jun*



Hei Dong (Ping Shan) *photo Bruce Bensley*



Long Chan viewed from MWD fossil entrance



Wind formed flowstone



Ma Wang Dong show cave



Ma Wang Dong fossil entrance



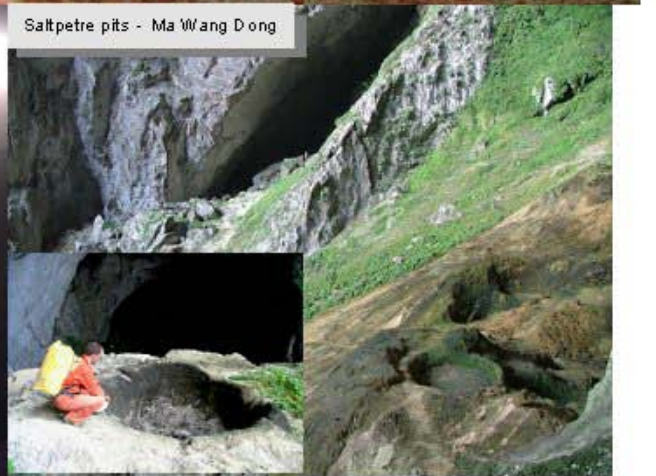
Ma Wang Dong fossil entrance



Ma Wang Dong traverse shaft



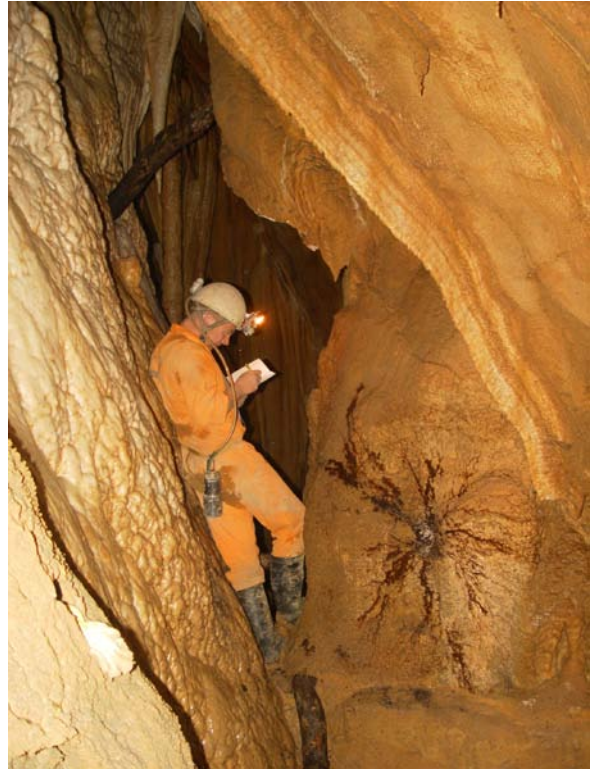
Light floods into Hei Dong entrance



Saltpetre pits - Ma Wang Dong



The spectacular natural arch of Maguai Dong photo Bruce Bensley



Far reaches of Hijack Passage photo Julia Tian



“Up yours!” formation photo Yidian Tang



Jiang Jia Tao entrance shaft photo Chen Lixin

## **CONCLUSION - THE SUCCESSES OF THE EXPEDITIONS** - Tony Harrison

As with earlier China Caves Project expeditions, the expeditions to Tian'e and Fengshan in 2004 were extremely successful in cementing the already excellent personal relationships between UK cavers and their colleagues and friends in China. Everyone who the British members of the team met - government officials, scientists of the Karst Institute, local villagers and their children, and fellow cavers from the large southern cities of Nanning, Hong Kong and elsewhere - was extremely hospitable and made our visit a wonderful personal experience. Friendships were forged which will last a lifetime.

The British and Chinese members of the expeditions can be proud of their underground achievements. The highlight of course was the discovery and mapping of the Jiang Zhou Cave System, at 29.2km now the third longest cave in China and the longest in Guangxi Province. There are good prospects for more finds in the system, and further work needs to be done on the geology and mechanisms of formation of these massive passages.

Many other important caves were discovered, explored and surveyed. Notable among these is No 8 Cave (Ba Dong) near Bala town in Tian'e County, with its massive underground chamber, and the new tiankeng

## **FUTURE PLANS** Ged Campion

The success of the China Caves Project has been built upon a close relationship between cavers from a range of nationalities and the Guilin Institute of Karst Geology, the Academy of Chinese Geological Sciences, and the Committee on Speleology of Geological Society of China. This special relationship has been given a new impetus as the issue on the sustainability of karst environments has become a major concern of recent expeditions in North West Guangxi. It is hoped that local government will continue to work energetically with the China Caves Project in this region.

Our work in Fengshan continues with a planned third visit to Jiang Zhou. It is hoped that the Jiang Zhou Cave System can be further extended and hopefully will soon rank as the second longest cave system in China. There are numerous leads to be pursued, in Hijack Passage, the Colossus area and Long Huai, so this is a strong possibility. Further examination of the Qiaoyin and Xalijiang drainage areas to the east of Fengshan needs to be carried out, linking with the work of the 1989 expeditions when the lower reaches of this drainage area were explored. The potential link between Ma Wang Dong and Green River Cave remains elusive, and the possibility of a major trunk system running east to west in the Poxin and Pingle limestones also requires investigation.

Teams are also expected to visit the Haolong area of

San Gui Shui (or Lao Pung), which has a volume of 457,300m<sup>3</sup>. Jiang Jia Tao in Fengshan County, with a total depth of 250m, was the deepest cave explored by the expeditions, and has a 180m entrance shaft.

As well as the Jiang Zhou Cave System and the closely related Man Fei River Sink, the expeditions surveyed 19 other caves in Tian'e and Fengshan Counties, and produced a total of 48.6km of cave surveys, mostly to BCRA Grade 5B standard. Many of the caves surveyed in Fengshan County were in the Pingle, Xialjian and Poxin drainage area, and these were part of an attempt to link the previously explored (in 1989) Ma Wang Dong system to its upstream sources. Unfortunately an underground link between Ma Wang Dong and the nearby Green River Cave remains elusive.

A major achievement of the expeditions was the raising of awareness in Chinese official circles of the benefits of cave conservation. Numerous areas in many of the caves explored by the expeditions had been devastated by the removal of stalagmites and stalactites by local villagers for commercial sale. The negative impact of these activities on the potential for tourism is increasingly well understood by regional administrators and indeed by the local population itself.

Bama to obtain more data and knowledge of the cave potential that might lie beneath the huge tiankengs in the area. There is also discussion underway about exploration of Huanjiang to the north east of the Hong Shui River. Additionally the karst of Donglan county has been of much interest to our project, but as yet relationships with local government there have not been forged.

The project will continue to systematically explore these fascinating counties of Guangxi in cooperation with Chinese scientists and local government representatives, always mindful of the delicate balance that has to be struck between conservation and acceptable exploitation of karst areas for the purpose of tourism.



Mayo Li Dong (East) photo Bruce Bensley

## THE YRC TEAM

Ged, Bruce, Graham, Alister, Dave and Ernie



## CHEMISTRY

Samples of water were taken from a number of caves explored by the expeditions and subsequently analysed at Huddersfield University in the UK. The chemistry of karst groundwater can tell us a lot about the geology, hydrology and biology of the karst system, and in addition some water chemistry parameters can be indicative of pollution. Of particular interest is whether these analyses can tell us anything about the method of formation of the massive cave systems discovered in Fengshan County.

Five samples of water were taken by the expeditions, four from the Jiang Zhou Cave System and one from San Men Hai Dong. As expected calcium is the cation of highest concentration in all the samples, at levels of between 112 and 144ppm (or mg/l). These are relatively high measurements compared to samples collected from many other karst systems, and they are significantly higher than calcium concentrations observed elsewhere in Guangxi Province, in the Lingyun (28-64ppm) and Leye (40-60ppm) areas. This suggests that the local bio-environment in Fengshan is producing cave waters with  $CO_2$  concentrations some 20 to 30 times higher than that normally achieved in equilibrium with the ambient atmosphere.

Magnesium is the next most important cation, again as is usual in karst systems. The calcium to magnesium ratio in karst groundwater is an important indication of the type of limestone the water has flowed through and can provide information on the geochemistry of the system. In our samples the ratio is high, about 50 in all samples except that from Hijack Passage which is even higher at 170. Many limestones have ratios in the range 7 to 11, and the high ratios in our cases probably indicate that the limestone in these parts of Fengshan has a very low proportion of dolomite and a high magnesium-content type of limestone. This is supported by the measurements of sulphate which are in the 3-6 ppm bracket, quite low for fresh karst groundwaters; sulphate often comes from dissolved gypsum or anhydrite both of which exist as impurities in some dolomites.

The two next most concentrated cations are sodium, in the range 1-3ppm, and potassium, at 0.5 ppm in all samples. These are fairly typical values for uncontaminated karst groundwater.

The level of bicarbonate found in karst samples is important as it is an indicator of whether speleothems will form in caves and whether limestone will dissolve to form caves or enlarge existing caves under water. The concentrations found in Fengshan (360-440ppm) are high, as expected for caves with such wonderful formations and massive passages.

Other anions measured in our samples were chloride and nitrate, the concentrations of which were in the ranges 3-8ppm and 1-3ppm respectively. Both are relatively low by karst standards, indicating fairly pure water. High levels of nitrate can imply a degree of pollution from fertiliser runoff or sewage, and high chloride levels are usually an indication of brackish water (but not necessarily of pollution).

The implication from these groundwater samples is that the rocks of Ma Wang Dong and the Jiang Zhou Cave System have low proportions of dolomitic limestones and also low gypsum levels. This is in contrast to the previously held views of some members of the Guilin Karst Institute that the presence of dolomitic limestone with a high gypsum content may have given rise to easy hydraulic routes in the region, and thus may provide an explanation for the vast sizes of passages (Gypsum and dolomite are more soluble in water than calcite, the most common mineral found in limestone). An alternative explanation may be that there are significant amounts of aragonite in the limestone of these areas.

Aragonite has the same chemical formula as calcite - it is a polymorph of the latter - but it has a different crystal structure or habit and a significantly greater solubility in water.



## **DATA CAPTURE**

For surveying, the expeditions stuck to fibre tapes, compasses and clinometers rather than more sophisticated equipment given these are lightweight, quick and inexpensive. Sketches and measurements were done on water resistant note pads but scanned in at the end of each day. Hand held GPS systems were used to fix locations and record tracks. All data was then fed into AutoCad for processing.

## **BIOLOGY**

Various skeletons, carcasses and live specimens were found in the cave systems. Amongst them the decomposed body of a spotted linsang, the most cat like of the 'weasel cats' closely resembling African genets. Also found was the corpse of a macaque and a live brush-tailed porcupine.

Evidence was seen of giant flying squirrels and several bats and pythons and the much smaller, sunbeam snake.

Barbells, loach and other unusual fish were found together with glow worms and various invertebrates.

## **FURTHER INFORMATION**

Detailed descriptions of these creatures, detailed analysis of the water samples and a full account of the data extracted with cave statistics are included in the full report and can be made available in electronic form.

Detailed survey drawing are also available of:

Tian'e County - Ba Dong (Number Eight Cave), San Gui Shui Tiankeng Cemetery Cave, Wei Dong and Jiang Jia Tao.  
Fengshan County - Chuan Long Yan Dong, Jiang Zhou Cave System, Dong Li Dong, Mayo Li Dong, Green River Sink, Maguai Dong, Si Fang, Ma Wang Dong, Brickkiln Cave, Liang Dong and Yu Long Dong

## **CAVE DESCRIPTIONS**

THE JIANG ZHOU CAVE SYSTEM, GUANGXI PROVINCE, CHINA

Entrance locations (GPS - WGS84 UTM coordinates):

Man Fei	Easting (m)	701276
	Northing (m)	2692625
Long Huai Village	Easting (m)	701571
	Northing (m)	2693957
Dalue	Easting (m)	702389
	Northing (m)	2689956
Snake Choke	Easting (m)	701210
	Northing (m)	2694370

Height of entrances above sea level:

Man Fei	507m (GPS and map readings)
Long Huai Village	551m (GPS reading)
Dalue	523m (GPS reading)
Snake Choke	612m (GPS reading)

Length: 29.2 km (note: further 0.8 km in nearby but unconnected Man Fei Sink)

## **INTRODUCTION**

The Jiang Zhou Cave System straddles Fengshan and Bama Counties in the Duyang Shan hills of Guangxi Province, about 24km south-south-west of Fengshan Town and roughly 50km to the west of the Hongshui He river. The multi-entrance system lies under a typical fengcong ("tower karst") landscape, with individual limestone towers rising to about 800m and the surrounding alluvial plains lying at about 300m. The main entrances and the fossil sections of the system lie between the 450 and 650m contours. The system is believed to be the third longest surveyed cave system in China.

The nearest large village is Jiang Zhou, about 2km from the south-west edge of the system. One of the entrances to the system is within a few hundred metres of the village of Long Huai (which is situated to the east of the Jiang Zhou-Fengshan road), and another is just to the north of the scattered hamlet of Dalue.

The explored system comprises mainly very large fossil passages and chambers, the floors of which are often strewn with massive boulders or decorated with flowstone or stalagmite formations. The typical passage is 30-50m in width and of a similar height. Underlying the fossil series is an extensive active cave system which can be accessed at various points from the fossil passages. The underground river passages, however, frequently sump and an extensive section of river passage has yet to be discovered.

In recent years, and probably for a much longer period, local villagers have explored much of the fossil series, apparently to seek financial gain from the removal and sale of formations for export from the region. This has caused well-worn paths being made in some parts of the system, and has also resulted in some despoilation of flowstone formations and the removal of many large

stalagmite columns. There is no evidence that the system has been used for ritual purposes or for burials, but massive dry-stone walls near the Man Fei Entrance and the Herb Garden doline hint at a possible historical defensive use of these parts of the cave.

The system is described below in six sections. The first two sections are based on the two main entrances to the system: Man Fei Entrance and Long Huai Village Entrance. The next section is devoted to the extensive Hijack Passage and its side passages, best approached from Man Fei Entrance. The following two sections are based on the two entrances at the southern and northern extremes to the system: Dalue Entrance and Allotment Doline. A final short section describes Man Fei River Sink which, although adjacent and hydrologically linked to the main system, is a separate cave. The breakpoints in the descriptions of the main passages between the entrances are at Connection Chamber, Skull and Cross Bones Pitch and The Rubble Hill.

There are several other entrances to the system - notably those in the Terragoata and Herb Garden dolines and that at the Snake Choke Entrance. The passages from these entrances are described in the most appropriate section of the four entrance sections listed above.

#### MAN FEI ENTRANCE

The low-lying river that runs from Jiang Zhou village passes beneath the natural limestone arch and follows the road for 2km before elbowing away towards this impressive entrance. At this point on the road, an obvious footpath runs high above the left hand bank of the river towards the cave. A small grassy area where goats graze is passed before walking up to the entrance lip. Here the path ducks under a boulder "doorway" that often funnels cold, draughting cave air, before descending on to a flat dry mud floor sparsely carpeted with small undergrowth inside the cave drip-line. The large entrance chamber is about 100m wide overall and 25m high. It is guarded by a 2m high wall which has an inside platform running along its length, suggesting it was used for defensive purposes in previous times.

Over on the far right hand side, a short climb leads up to the start of Cave Pearl Chamber (see sub-section below).

#### ENTRANCE TO JUNCTION CHAMBER

The main passage from the entrance chamber heads north-east. After 50m a rock pile encroaches on the right, taking up to half the passage floor. At 200m an obvious 'Y' shaped formation (3m high) which resembles a rude hand gesture will be passed. By wandering left here it is possible to become momentarily confused in a corner around the back of a large central boss feature. A beautiful slender minaret can also be seen at this point.

The passage continues along a relatively level straight corridor between large mud banks. A large boss is to the left of some gours and a shallow mud pool is then passed. The route finding beyond is generally easier by keeping to the right for the next 150m, at which point a subtle left-hand passage heads off (Drawn-a-Blank Passage) which follows the drainage line but soon closes down into several unpromising minor leads. (See separate sub-section below).

The main passage continues up a mud slope to the right where a few large boulders lie across the bottom. Man-made steps rise up the steepest section alongside a boss formation onto easier ground. The dry mud floor then becomes a slope falling leftwards across the passage into a large mud and rock crevassed pit. The smoothly trodden path rises onto higher ground as it traverses to the right of this. A few calcite outcrops are passed before reaching some white gours which can be straddled. Stepping between two large bosses a dividing line of pillar formations is met which link the ceiling with the floor. From here daylight can be seen from a large junction 250m ahead. A gentle walk down onto a level mud floor, with few obstructions, leads to a sturdy man-made wall which extends across the passage from a boss. A path through a gap in the wall enters the massive Junction Chamber, with the route to the Long Huai Entrance heading north and that to the source of daylight, a doline (the Herb Garden), heading south. Beyond the Herb Garden are the routes to Hijack Passage and the Dalue Entrance.

On the far right hand side of the Man Fei Entrance chamber, a short climb leads up to the start of Cave Pearl Chamber which is protected by several short sections of man-made wall, most likely built for defensive purposes. Beyond the walls is a large chamber, with impressive cave pearls ranging in size covering the floor; hence the name Cave Pearl Chamber.

Heading away from daylight whilst keeping the huge stal boss that dominates the chamber on the left, a route up over a slight gour covered slope leads to an uninviting hands and knees crawl. After about 15m, the crawl opens out with the passage on the right leading to a stal blockage. Straight on leads to a pitch and to the right of the pitch a very greasy looking traverse was observed. This traverse was not explored but there is evidence that local villagers have used this route. It is believed that there may be a connection with Gour Hall which is at the end of the Foggini' Passage series. Protection on the traverse would be strongly advised.

#### DRAWN-A-BLANK PASSAGE

This passage continues past the junction in a downward trend until a clean, blank wall is encountered after 70m. A draught at this point suggests a difficult climb could lead to additional passage above. To the left a low arch leads through to a junction with muddy banks. On the right, an awkward climb down from a muddy knife edged rock leads into a narrow and steeply inclined passage. Fortunately this has a clean-washed, flowstone floor which allows a controlled descent for a short way to a pitch.

Returning, a slippery mud arête that stretches across the passage is found, beyond which is another side passage to the right heading steeply downwards. This can be followed as far as a short pitch overlooking a mud-choked drainage pit. From the mud arête the larger of the continuations, generally 6m or so in width, progresses over mud-covered boulders. Some awkward manoeuvres are required to bypass these obstructions. The passage ends after 60m in a mud choke.

#### JUNCTION CHAMBER TO SKULL AND CROSSBONES PITCH

This passage starts at a gigantic boulder slope on the northern edge of Junction Chamber and heads north-east. A height gain of 50m is made by climbing to its summit, followed by a shorter descent on the other side into a shallow boulder-filled valley. Due to the surrounding darkness and distance from the walls, the way on from here is not obvious. A more gradual boulder slope drops down to the left to join the main drag through the passage. It becomes apparent at this point that the boulder slope can be easily bypassed on the left hand side by passing under a relatively small, black archway from the chamber. A bedrock wall briefly separates the two places.

This huge passage is one of the largest in the entire Jiang Zhou Cave System, reaching 70m across. After about 500m from Junction Chamber it turns 90 degrees to the north-west, close to a point where a passage on the right leads to Skull and Cross Bones Pitch.

#### SKULL AND CROSSBONES PITCH

This is located near the elbow of a left hand bend along the main passage from Man Fei Entrance to Long Huai Entrance, approximately 500m beyond Junction Chamber. At the bend dim daylight can be seen and a rocky gully can be entered which skirts around the sloping flowstone surrounding a boss on the right. A climb down lower, underneath a small boulder arch, gives access to a small exposed ledge above the 70m Skull and Cross Bones Pitch. Using a natural belay in the arch, a short ramp along the left wall is descended for approximately 7m to the first bolt. At this point the rock steepens and a further bolt is needed soon after. About 20m below this, a final free hang of 40m drops onto the slippery banks of a stream pool next to a small boulder.

A firm mud floor climbs steeply away towards the incoming daylight. A tricky rising traverse can be climbed to the far end of the lower chamber by cutting steps. The chamber narrows and rises 35m to a step above which is several metres high. Above this is a semi vegetated area which probably steps up again to the foot of the more heavily vegetated daylight shaft.

Beneath the overhanging pitch and at the foot of the mud slope, runs a shallow stream. This disappears under a wall next to a small, muddy drafting aven. The water flows out of a large sump pool and exits this through a submerged slot under a bedrock platform. A 25m swim across the pool leads across to the foot of a rising flowstone inlet. The lower section is coated in a thin layer of slippery mud and some cemented pebble deposits. This can be climbed by cleaning holds and following thin, clean-washed streaks. The rock bank below is sharply eroded, so care should be taken. Further up the flowstone, silty deposits provide fair footing. In one place a short, near vertical step can be passed using a stal formation part way up. Several muddy chutes branch downward to the sump pool on either side, before the flowstone chokes the way on about 40m above the water.

The surface opening of Skull and Cross Bones Pitch can be reached by a pleasant walk over a typical karst landscape from Long Huai village. A descent from the top, however, is not recommended because of the large number of loose boulders completely surrounding the pothole.

#### FISHING POOL PITCH

Travelling from the Jiang Zhou entrance, this pitch is located at Junction Chamber just past the second wall on the left of the main junction (where the passage splits left to Long Huai and right to Dalue).

From the wall, drop down into the bottom of Junction Chamber and follow a path around the right rim of a large shallow pit to a lone boss formation. To the left of the pit ascend a gradient and scramble past a few boulders onto a mud and rock slope that drops steeply downward. By following the left hand wall down this, it is possible to find a natural sling placement some 30m before the pitch head and before the floor becomes clean flowstone. An abseil over the cambered edge reveals a bolt placement where the pitch steepens and a further rebelay is placed 4m below for a vertical hang of 28m to the chamber floor.

The pitch drops onto the lower slopes of a large, mud chamber which ramps steeply up to one end where the walls eventually taper in. It is possible to climb up this slope which is a total of 80m in height from top to bottom. The mud slope consists of minor drainage gullies, mud banks and occasional boulders. A large, deep sump pool is found at the lowest point of the chamber and the sound of running water enters it at the far end. If necessary, it is possible to stretch a rope between rocks either side of the 50m swim. It is not apparent where the water sinks under the surrounding walls but a change in water temperature can be felt whilst swimming. A small mud bank is reached at the far end and a narrow but high rift passage heads off upstream for 80m. Large, angular boulders which have peeled off the walls initially choke the stream. Then a rock bank on the left of the shallow flowing stream leads to an elongated sump pool where a large razor sharp fin of rock looms out of the water.

#### JUNCTION CHAMBER TO DWII PITCH THROUGH THE HERB GARDEN

From the stone wall at the south end of Junction Chamber a vague path leads up to the right and along the chamber wall towards daylight in the Herb Garden doline. If starting from the lowest part of the chamber a similar path heads south along the lowest section of the chamber and meets the upper path shortly before reaching the drip line. An 8m tall boss on the left guards the entrance to the doline.

The Herb Garden is entered beneath a towering 55m roofline and is an impressive feature, square-shaped in plan, about 80m in width, and over half a hectare in area. It is so-called because local villagers have been seen there collecting plants for use in cooking, medicines and twine. A heavily vegetated and soil-covered scree slope peaks close to the right (west) side of the doline which is surrounded by overhanging walls. A cave entrance below the overhangs closes down very quickly to a hole through boulders into a basement area completely choked with boulders and scree. No draught was detected at this point. Behind, to the north, is the massive opening to Junction Chamber, and ahead, to the south, is the similar sized entrance to the Dalue Entrance passage.

To the right (west) it is almost possible to climb out up a short exposed section of cliff. On the left (east) wall, a flimsy bamboo ladder is sometimes present and can be reached by climbing up to a tree growing out of the wall, but its delicate appearance suggests that a shortcut to the surface here is not recommended. A low hole at the foot of the extreme eastern point of this wall, obscured by vegetation, is one of the entrances to the Herb Garden Oxbow passage. The floor is covered with boulders and exotic vegetation which makes progress difficult, and a path to the Dalue Entrance passage is best cut through the left side of the doline where the ground rises less and the vegetation is thinner.

The main trunk passage from the Herb Garden to Dalue Entrance heads initially south-east and then broadly south-south-west for most of its 4km length. Passing under the southern drip line, the path runs along the east wall of the passage, past the boulder strewn slope to the right leading up to Foggin' Passage, and below a flowstone slope with old dusty green formations, also on the right. The vague path moves up to the right wall of the passage, past a 1m deep pit and over boulders, to reach a shallow pool surrounded by dry gourds down on the left, about 300m after leaving the Herb Garden. This marks the entrance to the Herb Garden Oxbow and Beginner's Passage.

The main passage, named Leviathan, continues along a rock shelf and over dry gour pools, and then past a number of large stal formations and a deep hole (Hobbes Hole) on the left. This is an impressive section of passage, typically 30m wide and 50m high. About 480m after leaving the pool and the east entrance to the Herb Garden Oxbow, a level area of hard-packed sediment is encountered, noticeable because there are very few rocks and formations on it. At this point, Hijack Junction, a major passage branches off to the east - this is the start of Hijack Passage.

The main trunk route to Colossus Chamber and Dalue Entrance swings south for 200m before turning south-west of most of the rest of its length. This is the beginning of Diomedes Drag, a passage of similar dimensions to Leviathan, also with a sediment floor peppered with large boulders. Careful inspection underfoot reveals trodden ground, polishing and mudded rocks that indicate a once regularly used route. This inevitably follows the line of least resistance through the undulating boulder slopes which mark the start of Bradshaw's Passage and continue along this and the following Time for Tea Passage.

As the boulders disappear and a more glutinous mud becomes evident, the passage descends to the edge of a large precipitous pit with an arch (Rugean's Arch) which has to be carefully traversed on the right by scrambling up and down arête-like mud slopes (care needed here). These trend up to the right and into a complex of large boulders making route finding difficult. The easiest route onwards can be found by keeping to the right hand side of the passage climbing over boulders until a high promontory is reached which marks the start of Piston Passage. The passage can be mostly followed on easy going sediment floor with occasional gourds and deeply scoured cylindrical holes (piston bores) which can be seen in the rock exposed on the floor of the passage. On the approach to Colossus, a large unavoidable hill of blocks and massive boulders is encountered and picking a route through this is tricky. If the lower left side of the passage is chosen, a landmark feature will be passed (Fingal's Arch) which consists of a large fallen slab on the right resting on boulders and propped up against the sloping walls. Opposite this, towards the middle of the passage and on the top of the slopes, is a tall stal formation (Fingal's Fang). Scaling the boulders onto high ground reveals a steep rock and boulder cliff barring access the gigantic pit that occupies the chamber of Colossus.

To the right the cliffs give way to steep debris slopes which can be descended with care via a gully to the bottom of the pit. The floor at the bottom is generally even with a number of drain holes that are choked. This area will be a major collector of water during the rainy season. A possible lead exists in the far left recess of the pit by climbing up a steep calcited slope to the start of a passage, but the way on to Dalue avoids the pit by traversing across the top of the Colossus slope keeping to the right hand wall via glutinously muddy gullies with man made steps, which eventually give access to the other side of the passage. Easier going passage leads through ancient gourds until one is forced to climb up an awkward slabby, cream coloured boss. Just to the right here is Scrambled Egg Passage (see separate sub-section below). To continue along the main passage, it is necessary to climb the slabby boss to another impressive ancient gour filled passage where the rumble of water can be heard deep below. The sound comes from two elliptical pits, the second of which is the DWII Pitch, the descent of which is described in a separate sub-section below.

#### HERB GARDEN OXBOW AND BEGINNER'S PASSAGE

After proceeding 320m from the Herb Garden along the large passage to Leviathan and Hijack Passage, a shallow pool on the left of the passage (partially surrounded by 1m deep dry gourds) is reached on the left of the passage. Behind the pool lies one end of the Herb Garden Oxbow. This passage heads steeply down over flowstone to the south-west and is well decorated with large bosses and stalagmites. After 80m a gour-covered slope leads up to the right; this is Beginner's Passage.

The Oxbow continues down for a further 110m to a mud bank where a small low passage leads off to the right. This has been followed as a low crawl in mud and water for several metres but has not been pushed to a conclusion. Oxbow Passage then rises up a flowstone slope to an 8m climb which leads back into the Herb Garden doline at the bottom of its northern rim.

Beginner's Passage starts as a flowstone slope which soon levels off as a mud floored passage with occasional sections of dry gour rims. The passage is only about 10m in width and of a similar height - very small dimensions by Jiang Zhou standards! A low draughting passage to the right after about 300m has not been pushed. The main passage continues past a boulder pile from a partial roof collapse to an obvious junction. The short passage to the left leads quickly to a 10m (estimated) pitch which has not been descended. The main passage continues for 120m to a large boss which almost blocks the way on, but which can be passed by a low crawl on the left or by clambering over on the right. The passage leads on for a further 500m along an attractive, straight, mud and gour-rimmed floor, decorated with occasional columns, until the roof drops to within half a metre of the floor. Shortly after, the roof rises again and the passage swings to the left before closing down in a mud choke.

#### FOGGIN PASSAGE

About 100m after leaving the Herb Garden on the path to Dalue Entrance and Hijack Passage, a wide boulder slope can be seen rising to the right. This leads up to a mud and gour-rim floored passage. A pile of boulders from a roof collapse is soon reached, after which the passage narrows with a large flowstone formation on the left, shortly followed by a similar one on the right. Cave pearls can be seen in this area.

After ascending the man-made steps, the passage narrows even more after this, to only 1.5m in width at one point, and continues in a generally south-west direction, passing a canyon and pit in the floor. The side of the passage rises to the right, the best route on being lower to the left. The passage reaches 35m in width and it can be difficult to see both sides at the same time. Mist was present in the passage during the first explorations (hence the name Foggin Passage), and humidity can also significantly reduce visibility in this region of the cave. About 200m from the narrow section, the passage swings left (south-east) at a point where an unexplored slope leads up to the right. A few metres further the passage stops abruptly at a climb down and a low passage leads off to the right which has not been fully explored. The climb is descended for 4m on the right hand side; at the bottom there is a short hands and knees section. A pit with wood debris is passed and then there is a scramble up the other side on a muddy slope. The main passage continues passing several columns to a junction in a further 50m.

To the right (west) a side passage leads past some broken stalagmites to a sharp right turn in 115m. The way on is through some large boulders, soon reaching calcite flows and curtains which mark the end of this passage 230m from the junction.

Turning left (south-east) at the junction, the main passage heads through boulders, over gours and up a dried mud slope to shafts of daylight emerging through holes high up in the roof on the left. The way on is along a flat mud floor, past gours and a blind 3m deep pit on the left. The passage then slopes down over boulders into the Snake Pit at the foot of a big calcite-covered rock on the left. (During the first exploration a 1.5m live snake, which had probably fallen down the daylight shafts, was found in this area). The passage continues past mud covered slopes to an apparent dead-end at a large pit, 20m in depth and 25m wide, which is about 350m from the skylight shafts.

A way on can be found to the right just before the pit, along a passage 40-50m wide and 5m high which heads north-west. The passage leads through boulders and past occasional stal bosses until it widens to about 60m in Sentry Chamber, an area of flowstone and broken stalagmites. 100m further is Gour Hall where the passage ends only about 100m from the end of the crawl after Cave Pearl Chamber near the Man Fei Entrance.

#### SCRAMBLED EGG PASSAGE

This passage, on the right when proceeding south from the Herb Garden, is just before a large slab. The Passage is so named after the surveying team's first name initials - Emma, Ged and Graham - and the character of the start of the passage which involves a scramble.

A careful scramble down a 4m slope over boulders leads to mud banks and a small meandering gully. The gully, which can be followed for approximately 100m, trends to the right of the passage before ending at a pitch. The top of the pitch is surrounded by the continuation of mud banks and appears to be flood prone. The pitch was not explored but a stream could be heard, although the source is unknown. Beyond the pitch, the passage appears to continue in a similar direction.

#### DWII PITCH

This pitch marks the limit of the March 2004 exploration of the system along Piston Passage from the Man Fei Entrance to the system. It is named after Dave Williams (one of two people of this name known to expedition members), who partially descended the pitch on that trip. Approaching from the north, the sound of rushing water can be heard shortly after leaving Colossus Chamber and grows louder as two elongated pits with muddy slopes are approached. These lie on the left hand side of the passage and it is not possible to view the stream that flows 100m below.

The right hand side of the passage can be followed over a slippery mud and flowstone floor that gently rises up over some gours to the right of an eroded enclosure with exposed streambed pebble sides. Beyond this the ground levels out and the clean passage wall can be seen nearby to the right. At this point, the far end of the second shaft, a rock cairn marks the descent route to the stream. A short way down, the descent becomes a muddy gully with a couple of elongated boulders jammed on their ends at its head. Ropes can be rigged down this using a natural boulder belay on the slope above. A bolt is located in the bedrock wall before reaching another boulder jammed in the gully. A short vertical abseil from a bolt at this point drops onto a steeper mud and rock slope which becomes momentarily vertical at a narrowing with an obvious sling placement through an eyehole on the left. A further sling placement on the right gives access onto a small mud ridge formed in front of a central rock. A bolt in the overhanging bedrock on the left allows a drop down to a larger rock island and an opportunity for placing 2 larger slings. Passing this on the right is a narrow pitch-head (30m) which drops vertically into a rift passage from a bolt placement in the right wall. A steep clean flowstone ramp drops to the right into a small but fast flowing stream that can be seen below. The flowstone abseil is bordered to one side by slab weathered into sharply downward flutings. The bottom of the passage is only 3-4m wide and spews from an elongated sump pool, travelling for about 80m northwards through a series of cascades and pools to eventually terminate in another sump.

#### DWII PITCH TO CONNECTION CHAMBER

Going south from DWII Pitch, the droning of the water is soon left behind. The passage remains 30-40m high for a short while before dropping down to 15m or so. A few bosses are passed on the right surrounded by gours and flowstone terraces. Just beyond this is a muddy rock outcrop and boulders aligned with the passage that retain a domed mud bank on one side. Below this is a shallow pool. Beneath an undercut in the right wall at this location are a few stal formations.

After 250m along an easy going undulating mud floor, a passage leads off to the right up a mud and flowstone bank between two bosses. This was not investigated. A little further along on the same side is a smaller possible lead that again requires a slippery scramble. The passage continues with no significant obstructions and is generally 20m wide and 15m high, with level hard mud sediment underfoot and the occasional shallow pool, calcite boss or gour cluster.

At 650m from the DWII Pitch is the Road to Nowhere (described below), the start of which is found opposite a large shallow pool, with small gours leading in at each end, and between two large elongated mud pits. These pits are probably mud choked shafts above the active streamway some 100m below. The muddy sloping rim over the second of these pits is carefully traversed on the left through a clutch of stal formations that join the floor with the ceiling. As Connection Chamber is neared, these pits become more numerous, and in one section a narrow but short pebble-set bridge is crossed between two deep shafts (Peter's Pitfall). Other holes in the floor near here also threaten to swallow the unwary.

Two white bosses with 1m deep gours mark the head of another elongated pit that is avoided by switching over to the right hand wall. A slippery ramp drops back to the passage floor at the other end and a careless slip will deposit the caver onto protruding rock at the bottom.

A small gully is passed pointing to an opening in the right wall where, once again, the river below can be heard. Several stal formations form a line of thin pillars on the left before a final mud pit is reached, marking the end of the passage. This is best bypassed on the left and involves a delicate move over a slippery cambered side slope to a left turn and the gateway to Connection Chamber. The lowest point of this section is a flat, mud floor that leads up to the start of the Boulder Field. If a lone 2.5m stal pillar is reached on the mud floor then the optimal route across the boulders has been passed. The way on is up the boulder slope, and to the left of a large white boss. The general direction is south-east but, owing to large boulder pits and nasty voids down to the stream below, it is not possible to follow a straight line across. Route-finding can be very confusing and it is easy to lose one's bearings whilst scrambling between the boulders which, in some cases, are as large as houses.

Approximately 160m from the start of the boulder field, it is possible to climb off the boulder slope to the right into an adjacent passage 10m lower down. This passage tapers down to a rift pitch at its end (40m to the right of the descent point, to the north-west). The floor is bedrock and rubble for most of its length and the passage appears to have been scooped out of the main chamber's sidewall well above the level of the narrow streamway below. The over-hanging roof has protected it from roof collapses within the chamber, so for most of its length boulder slopes run along the left hand side of the passage. After 100m, the passage pops out on a sandy ledge 6m above the active streamway. A narrow closed rift to the right provides a means of descent onto the stone-covered streambed. The aforementioned passage was initially explored from the Dalue entrance and is known as Railway Passage due to its shape and direct nature heading away from the streambed.

#### ROAD TO NOWHERE

Heading from DWII Pitch towards Connection Chamber, this passage is found about 650m along the upper passage after leaving DWII Pitch. (Although sizable the passage disappointingly closes down after a short distance; hence the name). The obvious mouth of the passage measures some 30m across and is guarded by rock outcrop that stretches from wall to wall. This can be climbed on the left hand side with care. Above this a muddy ramp strewn with rocks leads to level ground 10m above the main passage.

A single flowstone boss and muddy gours are passed before a climb up to a group of bosses 100m along the passage. To the left of these is a large pit against the wall whose muddy flowstone slopes descend to mud.

A further boss almost blocks the passage but can be bypassed to the left through a short muddy stoop. The passage continues beyond, along a small slippery mud ridge, into a chamber area with an obvious boss feature that is surrounded by a handful of damaged stals and rock clusters. The muddy floor domes away from this towards a mud pit in a canopied alcove on the opposite side. Some mud flowstone carpets its slopes. Within the chamber the way on appears to follow a gully in the floor but this becomes mud choked. The floor rises out of the chamber at the far end over calcite flow into short section of narrow passage which eventually chokes with flowstone bosses.

#### LONG HUAI VILLAGE ENTRANCE

Long Huai Village Entrance is the easiest of the main entrances to reach and is the most convenient for access to the northern part of the complex. It lies just to the right of the track from the Jiang Zhou-Fengshan road to Long Huai village, about 100m before the first houses in the village are reached. A bamboo grove leads down a boulder-strewn slope for 40m to the low, wide unobtrusive entrance. Under the drip line the slope continues for a similar distance to a flat section containing a low stone retaining wall which has housed a small reservoir.

#### ENTRANCE TO SKULL AND CROSSBONES PITCH

After passing the wall and a short narrow section of cave, a large mud floored chamber is reached. Here the passage splits. To the north is the main passage and the route to the Allotment Doline. To the east, and keeping close to the retaining wall of the cavern on the right along a mud-bank, is the way to Skull and Cross Bones Pitch and the Herb Garden doline. For the next 500m, the passage heads east and consists largely of mud-banks that ramp down from the side walls. One or two large bosses can be found rising up from the flat areas below them.

A section of calcite wall is passed, next to a shallow slippery mud pool and a sheltered alcove. The path then avoids a large pit by following the left wall above a cliff. The well worn path works its way along the passage until it reaches the passage on the left leading to Skull and Cross Bones Pitch, from where dim daylight can be seen.

## ENTRANCE TO THE RUBBLE HILL

At the passage split in the chamber 100m in from the drip-line, a path heads north over the compacted mud floor. The dimensions of the passage at this point are about 40m wide and 10m high. 100m from the split a side passage can be found on the left.

The side passage heads west and has been explored for some 250m. Initially easy progress is made along a level, dried mud floor. After 75m a short side passage on the right leads to a depression and an apparent end in 40m. The main route swings left and passes some formations and low inlet tubes on the left. High mud slopes on both sides lead to a further apparent end at a point which lies under the Long Huai Village track, but a way on for another 50m or so can be found up on the left. A 3.5m climb up followed by a 10m climb down leads to a pit and the end of the easily accessible passage.

Back on the main Long Huai Entrance/Allotment Doline passage, the route, after an initial rise, heads north-east over a mud floor strewn with boulders and calcite bosses. In 100m it turns to the north but retains similar dimensions. After a further 150m rock columns are passed on the left. Flowstone covered walls then reduce the width of the passage to only 9m, before a 12m high boss is reached. Here the passage has regained its normal width of about 40m, and shortly after it widens still further to about 60m, with boulder-strewn slopes rising on each side of the vague path. High up to the left, after a long scramble up the large boulders, lies Snake Choke Entrance (described in a separate sub-section below).

The main passage continues under a low section of roof to an area of flowstone. A side passage up to the right near here has not been explored. Two prominent bosses are passed on the right and soon after another passage heads off to the right from some mud-coated gours some 280m from the start of Snake Choke Entrance. This is Two Towers Passage (described in a separate section below). The main passage, which angles slightly upwards, continues over boulders and compacted mud and retains an impressive width of 40-50m. An obvious, free-standing stalagmite column on the left is passed on a flat mud plain before the passage starts to rise. After a strenuous scramble up boulders, another impressive 7m high stal is attained - the Totem Pole - at a distance of about 600m from the Snake Choke Entrance junction.

At this point the highest part of a cross-section of the 40m wide boulder strewn passage is on the left, with a slope down to the right. The passage continues laboriously upwards for a further 200m from the Totem Pole to the top of The Rubble Hill. The continuation of the route to Allotment Doline, past the Piste and through the Terragoata Doline, is described in the Northern Entrance section of this description.

## SNAKE CHOKE ENTRANCE

Some 530m along the main passage from Long Huai Entrance to Allotment Doline, at a wide section where boulders rise on both sides, a passage can be found on the left. This runs broadly west and has been explored for a distance of about 500m to another entrance to the system near Long Huai village. From the main passage a boulder slope liberally decorated with calcite bosses rises steadily to the west for 100m. At the top the route swings to the left and drops down a similar boulder-strewn slope for 90m to a dip. The slope on the other side passes through more boulders and over stretches of calcite flowstone. It soon steepens, the floor changing to hard packed clay covered with rock scree, progress up which proves difficult. This is Snake Choke Entrance. About 200m up from the dip the slope rises to within 2 or 3m of the roof in a chaotic boulder-filled area. Beyond this the slope widens but the roof remains low. Precariously perched boulders make the going both difficult and dangerous, but soon the roof rises and a short vertical wall is reached. This is climbed past a hole which may contain a snake (*care!*). Further climbing through boulders allows the Snake Choke Entrance to the system to be reached. Beyond the heavily vegetated boulder slope at the entrance are cultivated fields and a path to Long Huai village.

## TWO TOWERS PASSAGE

About 280m beyond the junction with the Snake Choke Entrance lies another side passage which heads off to the right from some mud coated gours and which has been explored for some 300m. The passage rises briefly over boulders and then drops in a narrowing section which reduces to a width of about 10m and a height of 5m at some gours and columns. After a short rise over further gours the passage then drops and widens significantly. A slope to the right has not been explored. The main way on heads north-east, then turns to the south-east after 40m, and to the south after a further 30m. Only 20m later the passage swings back left (east) and reaches an area of flowstone which has not been pushed further.

## HIJACK PASSAGE - HIJACK PASSAGE TO GLOOPSVILLE JUNCTION

The start of Hijack Passage, Hijack Junction, is at an impressive point on Leviathan where the flat mud floor stretches 40m from one side of the passage to the other. Hijack Passage heads due east and is initially of similar dimensions. It continues for 120m until a pile of boulders is reached and the floor starts to descend towards further groups of boulders. A discernable path leads along the left wall of the passage, the right hand side being at a higher level. Soon a large mud pit appears in the floor ahead, but a route can be found around to the right by traversing across a steep mud slope. Care is needed as a slip could be inconvenient.

The main passage turns left from here up a low muddy arête, cut with man-made steps. An opening up to the right on this bend heads along a narrowing passage for about 150m but does not look promising. It was not, however, concluded. The main passage continues along a vague central path with mud slopes rising on both sides. About 180m from the large pit, boulders and rocks in the floor can be easily bypassed on the left by proceeding along a sloping bedrock shelf for a while. Follow this onto a large boulder-strewn mud slope that leads up to the western end of Backtrack Passage, or, take a possible shortcut through Gunk Sump by dropping off the shelf and passing under the Gateway (a rock arch formed by larger boulders that are jammed between a bedrock shelf and the right hand wall). Beneath the arch is a small vertical solution at floor level. From here, keep to the right hand wall over a slippery mud floor. Vague steps lead down to a low arch, and on to the seasonal Gunk Sump. This narrow and low passage is steep, and an awkward descent over sticky mud and rocks drops to a low section 15m below before breaking out into a chamber beyond. From here, an equally difficult ascent up a glutinous mud slope is required before a short climb onto an easier

flowstone ramps is reached. These lead up towards a junction on the left, where the eastern end of Backtrack Passage comes in. This is Gloopsville Junction. Just like the other end, it is situated at the top of a mud slope and can be passed by unnoticed.

#### BACKTRACK PASSAGE AND TURKISH DELIGHT PASSAGE

Some 540m along Hijack Passage from Hijack Junction, and in an area where boulders litter the mud floor, the start of the Backtrack Passage can be seen up a boulder-strewn slope to the left. This oxbow proceeds in total for 750m, first to the north-east, then south, and finally west, before returning to Hijack Passage only about 200m from its starting point - but at the far side of the awkward, mud trough called Gunk Sump.

After climbing the boulders, the passage continues up a calcite and mud slope to yet more boulders. The top of the slope is reached after 120m, and a slight descent then follows to an area of flowstone, with an unexplored side passage to the left. The oxbow, which now descends over boulders, trends gently to the right. Until this point the roof has been about 20m high, but it now starts to drop until, at a point about 420m from the start of the passage, it comes to within 1m of the hard, mud floor. The width of the oxbow has similarly reduced, from about 20-30m over most of its length, to only 5-10m. Soon the roof rises again and the passage reaches a junction where a wider passage, aligned east-west, is met. A small pool is seen in the middle of the passage at this point. To the left is Turkish Delight Passage, and to the right, the route back to Hijack Passage. The latter continues along an essentially flat, cracked-mud floor, Gloopsville, for 250m to a short slope which drops over boulders to meet the main passage again at Gloopsville Junction. From the small pool, Turkish Delight Passage heads uncomfortably down to the east through deep mud to an area of flowstone and stalagmite dripping with water. Beyond here the muddy slope continues to a mud-filled sump where the passage closes down about 250m from the small pool. This is Turkish Delight Sump (full of eastern promise!).

#### GLOOPSVILLE JUNCTION TO THE SNAIL

Hijack Passage continues, rising up a steady mud flowstone slope to a wide shallow-domed boss after which the passage becomes more or less level. A mainly mud floor continues for a further 450m, first to the south and then south-east, until a long 450m section of beautiful gour pools is reached. The larger pools stretch across the full width of the passage and are interspersed by smaller ones. Progress is made by walking along the gour pool rims but care is needed to avoid damaging this delightful section of passage. Towards the end of this section, a mud bank that slopes down from the right wall leaves the pools behind and continues alongside shallow gour rims that are also muddy. The sound of spouting water can be clearly heard some 100m further ahead; its source a spring at the top of a massive flowstone formation that nearly blocks the passage. The formation can be passed by a wet crawl under an overhang and along the left wall, or by clambering up the wet streaming flowstone, using steep steps cut by local villagers. A large flowstone slope descends more easily on the other side and is also fed by the spring above. A nice minaret formation is seen on this slope.

Beyond this point, a mud-floored section leads to a large boulder slope that can be climbed to flowstone and stal formations at the top. The chamber wall curves round, and it then becomes apparent that the way on is actually under a graceful, wide and relatively low arch at the foot of the boulder slope. The ascent/descent can therefore be avoided by staying close to the low left wall of the cave low down. It is not too difficult, however, to descend to the arch from the top over a steep flowstone slope. Through the archway, a mud-floored area leads to the foot of a further chamber with boulder slope to the right. The cavern divides at this point with two routes passing either side of a massive stone pillar. To the left, the passage stays low over level mud floors and soon reaches a prominent calcite formation on the right and at the end of the divide, called The Snail. This feature, combined with the curvature of the surrounding roof, resembles the inside of a broken snail shell. The Snail can also be reached by climbing up and over the boulder slope on the other side of the dividing wall partition.

#### THE SNAIL TO HO CHI MINH TRAIL

At The Snail, Hijack Passage divides. Over a wide bank of dried mud to the left (north-east) is one end of Size Matters Oxbow (described in a separate sub-section below), while to the right, beyond the bottom of the slope dropping down from the Arch, is the on-going route to the Far Reaches of Hijack Passage. The route is initially along a largely triangular or semi-circular shaped passage of relatively narrow width (10-12m) and height (10-12m) by Jiang Zhou standards. The passage, which has a distinctive rippled mud floor, proceeds past a stal column to reach an area of flowstone about 400m beyond The Snail. Here the roof drops to within 4m of the floor and another junction is reached. The flat passage to the left is the other end of Size Matters Oxbow, and the slope to the right is the way ahead to the Far Reaches.

The mud floored slope soon changes to a boulder pile resulting from a roof collapse. The descent down the far side leads to gour pools and stals on the left. The flat mud floored passage soon leads to another boulder pile (Pink Pyjamas) with a rock arch near the top on the right. At the bottom on the other side is a massive chamber with a cracked mud floor and occasional piles of boulders. A possible lead exists far to the left (east) of this chamber and has not yet been explored. The way on is to the right along the Ho Chi Minh Trail, a largely flat mud floored passage about 30-40m in width. A water spout can be heard near flowstone on the right after 200m from the chamber, and in another 100m a prominent group of desecrated stalagmites - Custer's Last Stand - will be found. 250m further along the passage, after it narrows to a width of 15m and after a small dip in the level mud floor, a massive scree slope looms in the distance.

Two routes have been explored from this point, the end of the Ho Chi Minh Trail. It is possible to traverse round the scree slope at its foot to the right for about 200m, past a crawl at the foot of the right wall which has been pushed for 40m and which continues thereafter, to the far end of the slope where both sides of the passage can be seen. The remains of a camp fire are to be found here. The passage to the south has been followed for 100m or so, and appears to continue further. However the way on to the Far Reaches lies up and beyond the scree slope.



## SIZE MATTERS OXBOW

This is described from east to west, the direction of the original survey. From the junction just past the area of flowstone at the eastern end of the rippled-mud floored passage, a level, mud floored passage leads to the north east. There is a high mud slope on the right of the passage, but this soon ends and mud slopes appear on both sides. Some 200m from the junction the passage appears to split, but progress to the right is almost immediately halted by a pit with an estimated depth of 25m. It is possible that progress could be made beyond the pit. Size Matters Oxbow continues to the left, up a mud slope to an area of attractive stalagmite columns, the Size Matters Stal Factory. Unfortunately, as the name implies, its attractiveness has been reduced by the commercial activities of stalagmite collectors. The passage, now level, swings through the north to the west, past more stal columns to a downward slope. The mud coated floor descends past Split-Splat Corner, where water drips down flowstone on the left, and The Wishing Well, a pool on the right, to a boulder field. At the bottom of the slope more boulders lead up, past a 5m climb and mud coated flowstone towers on the left, to a mud slope back down to The Snail at the western end of Size Matters Oxbow.

## HO CHI MINH TRAIL TO THE FAR REACHES

From the end of Ho Chi Minh Trail the enormous scree slope is ascended on the left. Great caution is required whilst negotiating this slope which is very steep and loose in places. It must be carefully ascended with no obvious paths to follow due to the continuous movement of the rocks and shingle. It is recommended near the left-hand wall of the slope as steep calcite flow on the slopes further to the side of the slope after 50m.

Continue ascending and go to the left of the first boss from where the main calcite flow starts. Pass the boulders and descend slightly, passing an unexplored passage on the left. Here, a strewn trend slightly to the left is followed before the passage continues ascending steeply once again. The nature of the passage soon begins to change, becoming much smaller with rock walls, and changes suddenly once more as a mud floored, shaped passage is entered for about 100m.

Beyond this point, short ascent leads to an area of roof collapse and then to a ledge with a very steep 10m scramble before a slope. The safest place to descend is the left hand corner of the ledge and should be exercised as it is very loose. After a short distance, head towards the large boulder, descend to the right of this, and then traverse across to the right hand side of the passage wall to descend the remainder of the slope. Go past an unexplored passage bearing of 225 degrees on the right near some broken and a pitch. At the bottom of the slope is a pitch and a passage on the left which leads to a canyon series known as Snow Flake Meander due to the white helictites. The canyon series has not been fully explored and has a number of leads consisting of a few and smaller passages.

Once past Meander, an interesting obstacle is - The Mother of All Slopes - which is the main way on. The Mother of All Slopes is a 20m; a rope is advisable for all but the most confident of climbers as many of the handholds are loose. A rope is also essential for a safe descent. Small man-made steps are visible at the start of the climb. The route trends left into a slight gully and up to a ledge. A natural belay can be used at the top of the climb to assist the remainder of the party and for the abseiled descent.

From The Mother of All Slopes, the passage continues more easily, passing the remains of broken, before descending a calcite slope with man-made steps to Sinking Feeling. (Note that there is a hole on the right which was used safely for boiling drinking water). At the bottom of Sinking Feeling, the passage widens with a pitch noted, but not explored, on the right. A pitch on the left side of the slope is the way on to The Far Reaches.

## THE FAR REACHES

The pitch is an elongated and relatively narrow feature descended on the right hand side (looking down the shaft). A medium sized boulder lying on the floor at the top of this shaft provides an adequate anchor for the hang and a rope protector is advised over the lip of the shaft. Polished vertical flowstone on the right side of the shaft bears testament to the efforts of numerous local climbers who have ventured this far into the system. THIS PITCH SHOULD NOT BE FREE-CLIMBED. The pitch lands on a sandy floor and the passage dimensions are large once again. A long ramp descends to the top of a short but steep climb down of approximately 2m, marking the start of Dan-yr-Ogof passage, a dusty and dry corridor similar to passage found in South Wales. At the base of the climb a sandy passage leads to the second climb, this time upwards for about 2m where the passage continues horizontally to the top of a steep slope. The slope is descended steeply through tall stals down to a pleasant sediment floor area where a tall, solitary stalagmite marks Tape Handle Junction. Left leads towards The Yorkshire Way and right towards The Stal Factory area.

The passage leading towards The Yorkshire Way is of impressive dimensions at first, with a trickling stream on the left, until it breaks off up a muddy sediment slope past an oxbow on the right and under a low roof to the top of the huge descending ramp. This is The Yorkshire Way. It descends very steeply over loose rubble at first, then active gours, and eventually awkward mud arêtes towards what appears a sump area. Quicksand mud makes it difficult to progress further.

Back at Tape Handle Junction the right passage leads off impressively and reaches a flat floored area with the occasional large stalagmite. The wider dimensions give way to a narrower canyon type passage which appears to end in a near vertical wall. Up on the right an awkward, narrow, slippery chimney, "Graham's Grunt", (rope useful here) provides access to a balcony with shelves which overlooks the preceding passage. Continuing along the passage, a steep flowstone slope is reached which has to be climbed on the left hand side using a series of undercuts. The flowstone ramp continues at an easier angle until a stal barrier is reached. Here a useful slot through the stals provides access to a stal grotto and the start of a crawl, The Dig, where the passage has been artificially enlarged. Fractured debris littering the floor bears testament to this. These passages are uncharacteristically small compared to the average size of Jiang Zhou passages. After 4m the roof of the passage rises above head height, marking the start of The Stal Factory, where tightly packed forests of stals lead to the top of a stal chamber. This spirals down to a brief horizontal passage and the top of a 6m pitch (needing tackle to descend). This was not descended during the initial exploration of the system.

A continuing rift can be seen leading away at the bottom. This is the furthest extremity of the Jiang Zhou Cave System, just under 8km from the Man Fei Entrance, and is believed to be close to the surface in Bama County. No major draught was detected here. There can be no doubt that these grottos represent some of the best of the higher, well decorated galleries in the system. Despite the distance from the entrance, there is ample evidence that they have been savagely plundered by local stal stealers.

#### DALUE ENTRANCE

The impressive Dalue Entrance to the system is a wide (35m) square-cut opening at the foot of a south-facing vertical cliff near the hamlet of Dalue, into which flows a substantial stream. The cave is accessed across paddy fields and over boulders along the stream bed.

#### ENTRANCE TO CONNECTION CHAMBER

Once in the cave the stream occasionally sinks into the gravel bed (depending the season and the volume of water). The obvious way on is along the stream bed which passes through a low canyon. After about 400m and beyond an impressive 5m stal boss, the cave widens with shelves rising on the right. Here it is possible to climb up flowstone to the highest shelf and proceed along this. It is equally possible to continue down the streamway.

After a further 100m or so, a similar high-level shelf develops on the left of the passage. The right shelf leads through boulders and closes down at a point about 200m from its start. A 20m climb down flowstone on the left near here leads back to the stream where it sinks into gravel in a chamber with a large smooth detached boulder in the floor - this is Connection Chamber.

There are two ways on from this point. The first is to the left (facing downstream) of the detached boulder where, 6m above the streambed, a high shelf can be seen. This is the start of Railway Passage, the route to Colossus and eventually the Man Fei Entrance to the system. This route is described under the Man Fei Entrance section of this document. The second is the route down to the River, described next.

#### CONNECTION CHAMBER TO THE RIVER

Hazard warning: even in dry periods, this passage is known to flood without warning. This can cause shingle beds to move substantially, sealing some low passages and changing the ground-level topography significantly.

At the far end of Connection Chamber, a scramble and descent through car-sized boulders leads to a large and chaotic boulder-strewn chamber. A mud slope to the right leads to an aven. The main chamber slopes steeply downwards and the climb down requires care. At the bottom the cave narrows and its shape alters to that of a typical phreatic passage - narrow, with a high ceiling. After 100m access along the passage is stopped by a large drop. However at the start of this horizontal section, a parallel rift on the left, varying in width from just 1 to 3m, can be reached by a scramble down one of several short linking passages (rope useful). The parallel passage leads through two deep pools to a 2.5m climb down (rope needed for return) back into the main rift below the large drop. The narrow rift is floored by shingle and leads to a four-way junction. The passages straight ahead and to the right are blocked, but a way on can be found by crawling through narrow vadose tubes low down just to the left of the passage leading straight on. These tubes are known to block with gravel under some water conditions. An alternative route is to follow the rift to the left which, after 30m, turns right to run parallel to the main rift. A pitch (10m) on the right at the end leads back to the main rift and a shingle slope. This drops and then rises to reach the top of a boulder slope in a large chamber where the sounds of a large watercourse can be heard. A 100m descent of the boulder slope (estimated distance; slope not surveyed) leads to a large stream flowing from left to right over mud banks. The streamway has not been explored but undoubtedly is a continuation of that at the foot of the DWII Pitch.

#### ALLOTMENT (NORTHERN) ENTRANCE

The Allotment Entrance to the system is about 2km north-east of Long Huai and can be reached from the village across the fields. It is in typical karst countryside and lies below a vertical cliff behind some small fields. It faces due south and is an impressive, roughly semi-circular shaped opening, 40m wide and 25m high, floored with boulders.

#### ENTRANCE TO TERRAGOATA DOLINE AND NORTHERN SHAFT

Below the drip-line the cave slopes steeply downwards in a northerly direction. The initial section, 240m long, reaches Terragoata doline, and daylight from the doline can be seen before entering the cave. The passage in this section is impressively wide (40-60m), and the roof is generally 35-40m high. A patch of dry gour is met two-thirds down the slope. Near the entrance to the Terragoata Doline a mud floor is encountered, which soon changes to luxuriant vegetation at the drip-line. The doline slopes downhill to a vertical rock wall between two further cave entrances. One is almost straight ahead and runs north-west; the other, on the right and at a slightly higher level, heads due east. To the left (west), the slopes of the doline rise gently and contain a number of fields. These, however, do not appear to have been cultivated for some years. It is possible to climb out of the doline to the north-west above the fields. This provides a further accessible entrance to the Jiang Zhou Cave System.

The cave entrance straight ahead, at the lowest part of the doline, is reached from the Allotment Doline cave slope by a strenuous struggle through the high vegetation, and is about 35m wide and 40m high. The passage from the entrance, which initially drops down a slope, heads north-west past a small skylight high on the right. The passage then rises over boulders, turns to the right, and drops steeply over a calcite floor. Some way down this slope, at a point 170m from the doline, another passage leads off to the left. The slope continues over gour rims for a further 50m where it closes down. A narrow rift on the left here also appears to close down. The passage which starts part way down the slope drops steadily over boulders and mud to a low point after 100m where a tide mark on the wall indicates seasonal flooding. The passage, which averages about 5m in width, then rises for 15m before dropping again to a closure. A deep, small pitch on the right at the end, the Northern Shaft, has not been descended but

looks to be a poor ongoing proposition. This is the northern-most point in the currently explored Jiang Zhou Cave System.

#### TERRAGOATA DOLINE TO THE RUBBLE HILL

The large cave entrance to the east of the lowest point in the Terragoata Doline is of typically impressive dimensions (about 50m wide and 45m high). It leads, over a distance of more than 2.5km via the Piste and the Rubble Hill, to the Long Huai Village Entrance to the system.

The passage initially drops slightly over boulders and then, after 30m, rises gently over more boulders to some large stal bosses. The large passage, which occasionally exceeds 50m in width, continues in grand style steadily downwards to a low area where a flowstone-floored passage leads down to the left. This slope rapidly steepens and has not been followed beyond 35m from where dropped stones can be heard landing in water. A further 40m up the main passage, another lead heads off to the left. This rises up a mud slope for slightly over 50m to where a stal column completely blocks the passage. The main passage continues up in a south-west direction for 100m to a mud-floored T-junction. To the right is the passage to Shaftlands (see sub-section below), whilst that to the left leads to the Piste. Initially the left-hand passage goes to the north-east but after 100m it starts to swing to the right. At the first turn there is a pit on the right and a passage up to the left which has not been pushed. The swing to the right continues and about 200m after the Shaftlands passage junction, the main passage heads south-east for a short distance to the muddy slope leading up to the Piste.

The Piste is a complex area presenting three options to the caver arriving from the Terragoata Doline. Immediately to the right, and heading down due west, is Sump Passage, described in a separate sub-section below. A little further up the slope and to the left (east) is the descending East Piste Passage, also described below in a separate sub-section. The main highway continues up to the south, past two impressive stal pillars and over boulders, to the top of The Rubble Hill in a distance of about 300m from the Piste. The route from The Rubble Hill to Long Huai Entrance is described under the Long Huai Village Entrance section of this document.

#### EAST PISTE PASSAGE

East Piste Passage has been explored for a distance of 300m from its start at the Piste. The passage descends past a depression on the right and a low, unexplored opening on the left to a flatter area where it starts to rise gently. After a narrower (10m wide) section where cave pearls can be found, a 3m climb leads to the end of the easily accessible passage. Straight on, to the east, a narrow high passage can be seen beyond a 3m pit. To the right an 8m drop bars a possible way on to the south, and a flowstone formation to the left may also reward further exploration.

#### SUMP PASSAGE

Sump Passage initially descends due west from the Piste. It steepens and narrows after 100m at a point where an 8m climb down on the right reaches an eyehole. A little further, beyond a low tube on the left, a junction is reached. The main way on is to the left, but it is also possible to proceed straight ahead down boulders to a point where water emerges and sinks near a shelf on the right. Just beyond, after a climb up and down mud slopes and in a high, narrow phreatic rift passage, a sump pool is reached. This appears to be about 15m long and further progress may be possible beyond. The main route left at the junction descends past a low crawl on the right, and large calcite curtain formation also on the right, to a fork in the passage. Right here leads to a deep sump pool in about 40m, the end of current exploration down this passage. The pool is at least 20m long and has not been crossed. The same pool can be reached by turning left at the fork and descending in a spiral to the right.

#### SHAFTLANDS

This side passage has been explored for 740m from its start at the T-junction which is 460m from the Terragoata Doline on the main route to Long Huai Village Entrance. About 50m from the junction a 1m deep canyon in the cracked mud floor leads to another junction. The canyon follows the passage to the right which ends after 70m at a steep mud slope descending to deep pits. These appear to be at least 20m deep, possibly much more.

The main passage to the left continues along a largely level floor and is generally about 50m wide. A gour floored section is traversed, past stal drapes and columns, to a high aven on the right about 220m from the junction. In another 100m, at another gour floored section, a high level tube is reached on the right. The way on is up to the left past a fine stal column to a steep slope covered with gours. At the top of the slope is an aven on the right and a side passage on the left. The slope becomes mud covered and soon reaches a deep shaft beyond which further progress is difficult. This point is under the main Village Entrance/Allotment Doline Entrance highway at The Rubble Hill.

The side passage on the left slopes down steep mud, past a rock pillar, to another deep pit where progress was halted. A possible way on may exist beyond the pit.

#### MAN FEI RIVER SINK

Entrance location (GPS - WGS84 UTM coordinates):

Easting (m)	701110	Length: 0.8 km
Northing (m)	2692610	Height of entrance above sea level: 476m (map reading)

Man Fei River Sink is close to the Man Fei Entrance to the Jiang Zhou Cave System, and lies approximately 200m south-south-west and 40m vertically below Man Fei Entrance at the lowest point of the wide river valley. The Sink is undoubtedly hydrologically

linked to the main Jiang Zhou Cave System, but the accessible cave has not been connected.

The Sink can be approached by following a track down from the path to the Man Fei Entrance. Easy climbing over big boulders through the canyon style river leads to progressively more difficult climbs down big boulders to a point where it is necessary to either swim or climb a vertical wall on the right side of the river. The swim is for only 10m to a pleasant pebble beach. The river is followed easily for a short distance to a 10m pitch which has to be turned on the right (rope advised). This lands in deep water resulting in a swim for 2m. It is possible to reach this point via a climb down through rifts in a doline above, a route used by local fishermen. This also starts from the Man Fei Entrance path but closer to the Entrance than the approach described above.

It is at this point that the canyon becomes a cave, with a roof feature forming part of the doline. Easy going in the river leads to a large confluence with an upstream tributary flowing in from the right (see below).

#### DOWNSTREAM

The main river is followed easily through shallow pools and rapids until a lake forces a swim for about 20m. A large beach is reached and prominent shafts of light radiate the passage through a portal on the left. The river passage continues with dimensions in the range of 10x10m. Large boulders litter the river bed until a wide corner is reached where another entrance is met by climbing up steep sediment and flood debris.

The river continues trending right and a long uniform passage of superior quality, Butler's Boulevard, is followed until the river flows into an impressive sump pool that prevents any further progress. This closure is only 450m from the entrance at the confluence. This river passage is the most extensive part of the active system of Jiang Zhou that has been accessed to date and is almost certainly part of the same hydrology encountered at the bottom of DWII Pitch, the bottom of the pit in Scrambled Egg Passage, and the bottom of the Fishing Pool and Skull and Cross Bones Pitches.

#### UPSTREAM

Shortly before reaching daylight at the roof feature in the doline, the upstream tributary emerges from the foot of a slope of mud and boulders. A short 6m climb up a rock face above the slope leads to an eyehole and a knife-edged rock ridge. A 14m descent (Jane's Pitch) from the ridge by ladder or rope (8mm spit in place) leads back down, via an intermediate ledge, to the stream close to where it disappears into the other side of the mud and boulder slope. Upstream, the water runs past mud-banks and over a glutinous mud floor in a narrow passage for 30m, and disappears again in a boulder slope. Beyond the boulders is a deep pool (the Plunge Pool) which can be passed by an exposed traverse across the steep mud-covered bank to the right or by a short swim. The pool is home to numerous small fresh-water crabs. Another boulder pile follows; the descent on the other side leads immediately to a mud choke and the end of the accessible cave, disappointingly only 160m from the cave entrance.

#### MA WANG DONG CAVE SYSTEM, GUANGXI PROVINCE, CHINA

Entrance locations (GPS - WGS84 UTM coordinates):

Ma Wang Dong (Fossil Entrance)	Easting (m)	705229	Heights of entrances above sea level:	
	Northing (m)	2700825	Ma Wang Dong (Fossil Entrance)	628m
Ma Wang Dong (Showcave Entrance)	Easting (m)	705950	Ma Wang Dong (Showcave Entrance)	424m
	Northing (m)	2701295	Hei Dong	545m
Hei Dong	Easting (m)	703430		
	Northing (m)	2698384		

#### INTRODUCTION

The Ma Wang Dong cave system is situated in the Fengshan County of Guangxi Province about 15km south of Fengshan Town. The system has extensive fossil and active passages which were first explored and surveyed by a Sino-British team in 1989. The active cave, known to the Chinese as San Men Hai or Shui Yuan Deng and to the British as Andy's Water Cave, has since been opened as a show cave and now welcomes about 10,000 Chinese visitors a year. The fossil series, however, was not revisited by cavers until 2004. Over 2-3 November 2004, members of the Expedition re-explored the fossil series, entering both of the two (northern and southern) entrances as two separate teams, with the aim of photographing the cave and adding a description to the 1989 survey.

#### MA WANG DONG (EASTERN FOSSIL ENTRANCE)

This is located in the hills behind and above the show cave river entrance. It is best reached by a track which branches off the main Pingle road and zigzags up to an obvious limestone arch (a short section of truncated fossil passage that passes through the hillside). The road emerges on the other side of this feature and continues for a few hundred metres before a left hand turn leads into the small village of Long Chan. A few houses are passed before the road ends at a footpath that climbs up to the right, on the flanks of a large enclosed valley. Towards the top, the path branches left around the shoulder of a surrounding peak before descending onto the lip of a huge cliff-side entrance. Several dusty terraced fields step down into the entrance and become more barren as they head under the overhanging entrance canopy. A couple of stagnant drip ponds and a flimsy shelter are found a little further down the upper slopes. At this point the small terrace walls fizzle out and the slope steepens into loose rock rubble, gravel and boulders scree. No established path remains and a steep scramble is required. Lower down, it is necessary to cut across to the right hand wall, where a short exposed traverse and down-climb is found that uses foot and handholds cut in the outcropping bedrock. This route avoids a cliff at the foot of the entrance slope that drops into a massive pit that fills the passage. Proceeding with care, access is gained onto a ledge that skirts around the crater, passing through a stone-walled defensive gateway built up against the right hand wall. From here, a descending path cuts across the crumbling soil slope that funnels down into the crater on the far side and heads over to the centre of the passage. To the left is a large, level passage that, after a few metres, descends

to the left into darkness. The descent was not explored on this trip. On the more gentle slopes beyond the crater are several clusters of salt-petre pits, evidence of nitrate filtration. The light is dingy here but supports a sparse carpet of ferns and grasses.

The passage rises up onto the level, passing a couple of old bosses that are coated in moss and lichen before entering into a large dark chamber. Within the chamber, a boulder slope climbs high up to the right. On its lower slopes, a pair of impressive boss formations tower up into the darkness. The larger of these is approximately 27m high.

Leaving the formations behind, the boulder slope is descended out of the chamber and onto a section of flat floor where cave pearls are scattered and a very unusual flowstone feature is found. Aligned with the passage and probably formed by strong through draughts is an elongated 'rib' of white flowstone measuring approximately 6m x 1.0m x 0.8m. The passage now opens up with a high roof and square sides. The roof is approximately 70m high at this point. There is a depression in the floor to the right of the passage. The floor around this hole overhangs the drop in places. The hole can be skirted easily on either side. The passage continues with a level floor, making for easy walking to a boulder hill.

A little way on the boulder hill is climbed and then descended on the other side. The passage then narrows and becomes a long, clean flowstone ramp leading down a huge pit with flowstone sides. Although there is a little guano peppered over the floor, there are plenty of millipedes to clear it up. Friction is particularly good and it is possible to traverse part way round the pit on the right. Without rope and gear safe progress cannot be made. The original explorers of this cave managed to rig a rope around the traverse to a bolt placement on the far side. A few bats were spotted at this area, feeding on the insects that were attracted by the cavers' lights.

#### HEI DONG OR BLACK CAVE (SOUTHERN ENTRANCE)

From Andy's Water Cave, a rough village track can be followed over many hills and valleys in a vehicle for about an hour until the end of the road is encountered at a village. The walk from here follows a clear path that climbs the over the col to descend along the edge of the valley, skirting rough terraced fields past a couple of farms to climb again over another col and a junction in the paths.

Following the obvious well-worn path which descends into the steep, open doline Hei Dong, the southern entrance to Ma Wang Dong becomes obvious across fields in the opposite side of the doline. Regrettably there is no evidence of an obvious continuation to the Ma Wang Dong fossil series on the south side of the doline.

There are several entrances into the main cave, and above these are the remains of an old bamboo ladder which was used to gain access to an upper series which has been used extensively as a burial site. The main cave entrances emit an extremely strong draught where streams of cold air can be visibly seen blasting out as the damp cave air meets the warm outside temperatures.

All the cave entrances lead into the large passage where a vague path can be followed down over flowstone and calcite bosses for the first 100m. Care is required as the calcite is covered in a deposit of black 'slime' which can be extremely slippery and is possibly soot from fires made by the locals. This continues to descend gradually passing large (white) calcite bosses, flowstone and dry gour pools until progress is stopped by a 6m drop bounded by flowstone. The way on is to climb again to the left up flowstone and boulders keeping the steep slope on the right. This slope may be descended over flowstone and large boulders to reach the bottom of the earlier drop and a narrow side passage between calcite flows heading east. This narrow rift descends a calcite ramp with calcite flows on either side causing the passage to narrow to less than 1m in places, until the ramp steepens after 60m to drop into a pool 20m below. (There was evidence that local villagers have descended this far). No further exploration was performed. This was also the limit of the 1989 survey.

The main route descends a debris slope and continues over flowstone with passage dimensions of 30m. Eventually the flowstone gives way to more rock breakdown and a blind continuation up a calcite slope is ignored where an exposed canyon leads off to the north. The canyon can be descended but leads into the bottom of a 12m deep dry calcite pool with no way on at the far end (although holds have been chipped out of the flowstone to enable a very steep climb up avoiding the traverse). The canyon is traversed on the left side along a narrow ledge which eventually gives way to an awkward and exposed bold step down and across the left wall on small muddy hand/ footholds. It is possible to protect this with a rope traverse line anchored on natural rock flake belays either side of the traverse. Once across the bold step, the traverse continues along and up slippery calcite flows bearing right at the top of the ramp, with the passage narrowing to 18m wide.

The passage descends again over more calcite flows to a junction where the main passage appears to cross. To the left the passage continues up calcite flows past stal bosses to terminate with no way on after 130m of 40m wide passage. Continue down over gour and then through a 40m high passage, with a boulder-strewn floor with many stal bosses and walls covered in calcite flow, until the doline is reached on the left.

The cave exits to a large, well vegetated doline whose sides rise in excess of 100m. Opposite the exit, at a high level is an entrance, which according to the survey has not been explored. Local legend states that it was inhabited by a mad man who was brought food by local villagers.

Below the exit to the east is a steep sided loose and vegetated depression which drops to an obvious entrance. This leads down a slope over boulders to lakes. The doline funnels all water in deep channels into this depression.

# Jiang Zhou Cave System Fengshan County Guangxi China

EXPLORED BY:

17th Sino-British China Caves Project Expedition, March 2004  
Ged Campion, Bruce Bensley, Dave Williams, Dave Appleing, Ernie Shield, Ruth Shield

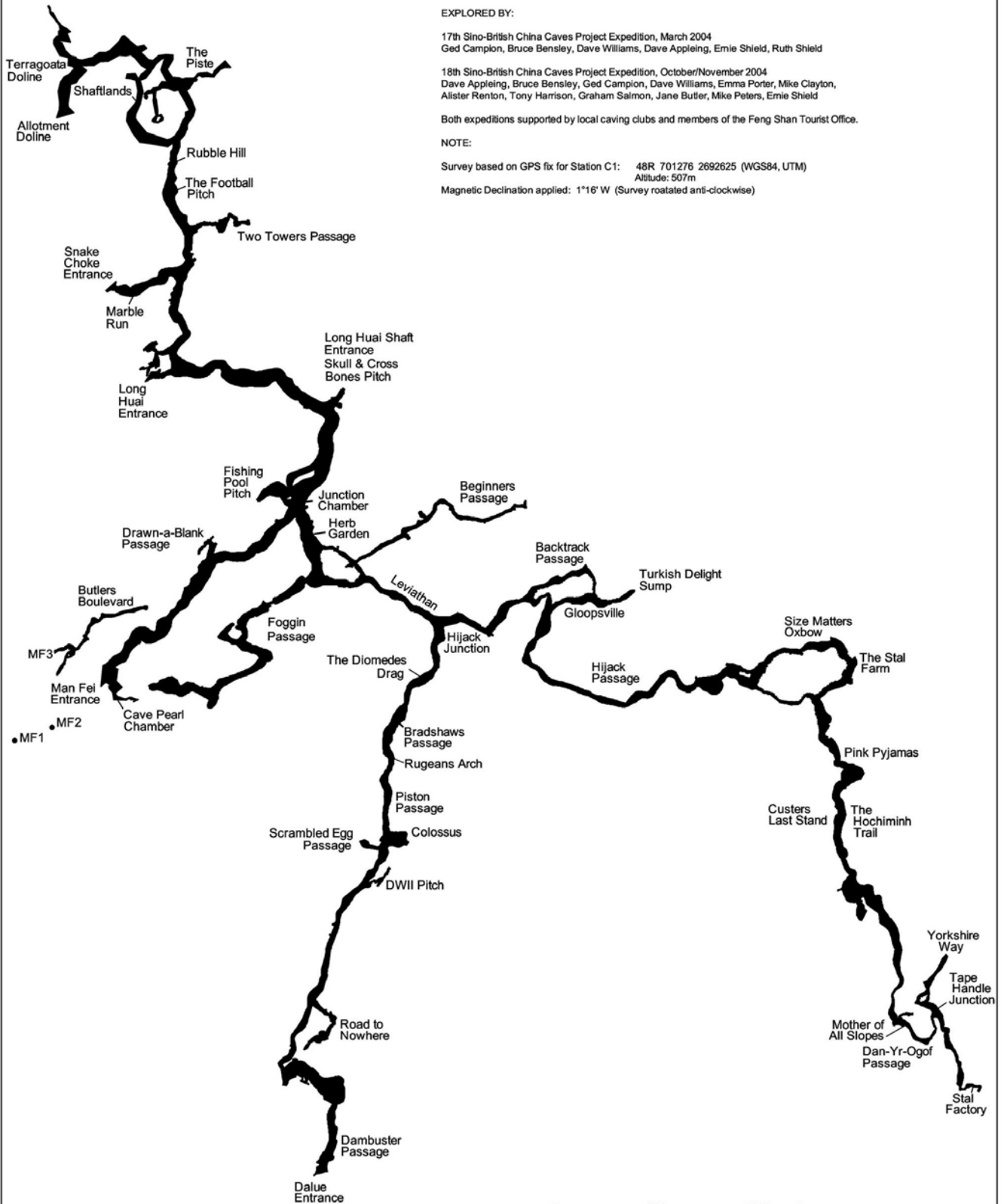
18th Sino-British China Caves Project Expedition, October/November 2004  
Dave Appleing, Bruce Bensley, Ged Campion, Dave Williams, Emma Porter, Mike Clayton, Alistair Renton, Tony Harrison, Graham Salmon, Jane Butler, Mike Peters, Ernie Shield

Both expeditions supported by local caving clubs and members of the Feng Shan Tourist Office.

NOTE:

Survey based on GPS fix for Station C1: 48R 701276 2692625 (WGS84, UTM)  
Altitude: 507m

Magnetic Declination applied: 1°16' W (Survey rotated anti-clockwise)





**YRC** - The Yorkshire Ramblers Club was set up in 1892 but has always been far more than a 'rambling' club. Indeed, as that word is understood in today's world, it could be said that its members do very little rambling.

The membership are now spread throughout Britain and indeed a number live abroad.

The Club aims to organise caving, mountaineering, walking and skiing excursions and expeditions, to encourage the exploration of caves, potholes and the more remote parts of the world, and to gather and promote knowledge of natural history, archaeology, folklore and kindred subjects.

The Club organises regular meets throughout Britain and expeditions etc., to distant parts of the world. Details of Club and members' activities as reflected in articles in our twice yearly journal, are given on the next page.

The Club owns two climbing huts and has reciprocal arrangements with numerous other clubs.



LOW HALL GARTH, LITTLE LANGDALE, CUMBRIA



LOWSTERN, CLAPHAM, NORTH YORKSHIRE



## Contents Journal Series 12

### Issue 24 Winter 2005 includes:

China, Great Wall  
Mauritania  
Skye  
Kibo, Kilimanjaro  
The Dolomites  
Lakeland 3000s  
Newby Moss Cave  
History of the Lyke Wake  
Nepal  
The Monroes

### Issue 23 Summer 2005 includes:

Demirkazik, Turkey  
Yosemite  
The Sudetenland  
Paine Circuit, Chile  
China caving expedition update  
Walking in Nidderdale  
North York Moors  
Wanderings in Scotland

### Issue 22 Winter 2004 includes:

The High Sierra and Appalachians in the USA  
Caves in Ethiopia  
Early exploration of Alum Pot  
The history of Carabiners  
Caving Expedition to Tian'e, Guangxi, S W China  
High level walking in Scotland  
The Lakes  
French Alps

### Issue 21 Summer 2004 includes:

Caves & Karst of Madagascar  
The History of Dunald Mill Hole  
Erta Ale & The Danakil  
Sailing off Croatia  
Walking Morecambe Bay  
Climbing on Clogwyn  
Activities in Sardinia

### Issue 20 Winter 2003 includes:

Activities in Mongolia & Crete,  
Galloway,  
Ireland  
Switzerland  
The Prehistory of Saddleworth

### Issue 19 Summer 2003 includes:

Drakensberg Trek  
Fong Yen, China  
Alderley Edge Mines  
Sardinia  
Ben Alder  
The Haute Savoie

### Issue 18 Winter 2002 includes:

The Hidden Valleys China Caves Expedition  
Pic Du Midi D'Ossua,  
Activities in Wales  
Scottish Highlands  
Dartmoor.  
The John Muir Trail  
Sailing a Square Rigger

### Issue 17 Summer 2001 includes:

John Muir Trail full report  
Morocco Expedition Report  
Madagascar caves  
Lundy  
Iceland  
Newby Moss Sink  
Ski traverse La Meije  
Gentiana

### Issue 16 Summer 2001 includes:

Nanda Devi Inner Sanctuary Expedition Report  
John Muir Trail  
Skye  
Sinai  
Scawfell

### Issue 15 Summer 2001 includes:

Guangxi Caves 2000 Expedition  
One Cave in Palawan and three in Laos  
The Bradford Caving Community a Century Ago  
Fantan B  
Gondogoro La and The Karakoram

### Issue 14 Winter 2000 included:

Corbetts Meet, Spring Bank 2000  
Svalbard  
Ingleborough Cave Box and Giggleswick School  
Mount Kinabalu in Rainy Season

### Issue 13 Summer 2000 included:

Travel in the Valleys of the Assassins, Iran  
Rambling in Australia, 1975 to 1999  
Hiking in the South-West USA  
Hurricane, Kohl Larsen Plateau, South Georgia  
Orion Face Direct, Ben Nevis

### Issue 12 Winter 1999 included:

Cordilleras Cocapata and Real, Bolivia  
Table Mountain  
Weissmies & the Lagginhorn  
The Julian Alps  
Lundy  
The Cullin  
Kanchenjunga  
Seana Bhraigh

### Issue 11 Summer 1999 included:

Catamite Hole  
Macedonian Caves  
Blue Mountain Peak, Jamaica

### Issue 10 Winter 1998 included:

Iceland Expedition Report  
Cycling in the Dolomites  
Goyden Pot & the Pudsey Rambling Club  
Eli Simpson

### Issue 9 Summer 1998 included:

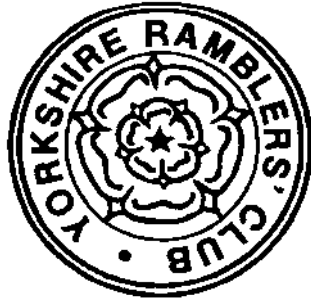
Climbing in Wales  
Cullin, Knoydart  
Activities in Bulgaria,  
South Africa  
Australia  
Himalaya report  
Life and times of E E Roberts  
Gaping Gill

### Issue 8 Winter 1997 included:

Telemarking on Piz Bernina  
Andalsnes, Norway  
Bungle Bungle Massif, N W Australia  
Climbing Volcanoes, Sulawesi, Indonesia  
Mountain of God, Tanzania  
Caving in the Dales  
Fell walking in the Eastern Cairngorms  
Trekking up the Khumbu, Nepal

### Issue 8 Winter 1997 included:

Roumanian winter  
Potholing in Ireland  
Caving in Oman  
New Zealand  
Pic de Monné  
Monte Baldo - Lake Garda  
Trou de Vere  
Nepal



# The Yorkshire Ramblers Club

Established 1892

The mountaineering and caving club

Club Member of  
The British Mountaineering Council

[www.yrc.org.uk](http://www.yrc.org.uk)

Secretary - Gordon Humphreys, Mountbegan, Hornby, Lancashire LA2 8JZ

Editor - Roy Denney, 33 Clovelly Road, Glenfield, Leicestershire LE3 8AE  
Editor@YorkshireRamblers.Org.UK

The opinions expressed in this publication are not necessarily  
those of the YRC or its Officers.

The YRC Journal is published twice a year and is free to members and certain kindred clubs.

First published July 1899

Supplement on caving in China issued with Journal Series 13 Issue 1, summer 2006

Printed by Alfred Willday & Son Ltd, Unit 1, Dunns Lane, Leicester LE3 5LX - 0116 251 8478