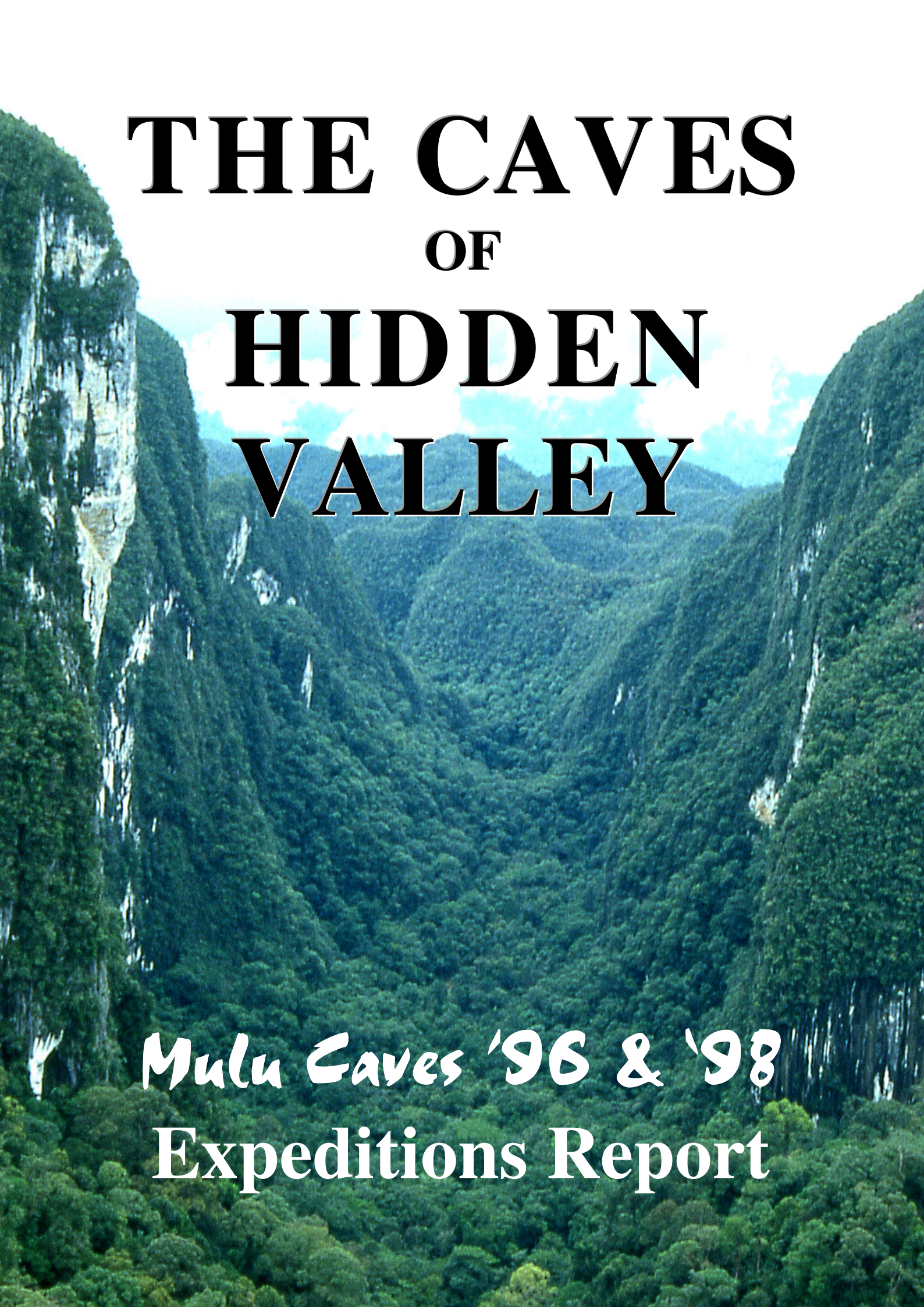
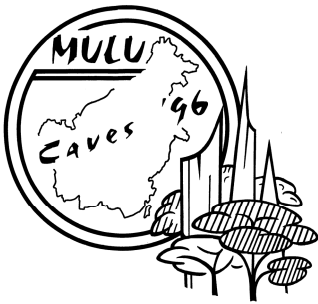




THE CAVES OF HIDDEN VALLEY

Mulu Caves '96 & '98
Expeditions Report

REPORT
on the findings of
THE MULU CAVES '96 & '98
EXPEDITIONS
to the
HIDDEN VALLEY AREA
of
GUNUNG MULU
NATIONAL PARK
SARAWAK



**During October 1996
&
February 1998**



Edited & Produced by Matt Kirby FRGS.

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Towering cliffs above Prediction Cave

CONTENTS

ABSTRACT		1
INTRODUCTION		
Location	.....	2
History of Exploration in Mulu	.....	2
HIDDEN VALLEY		
Topography	.....	6
Access to Hidden Valley	.....	7
Background to the Expeditions	.....	8
THE EXPEDITIONS		
Mulu Caves '96		
Introduction	.....	9
Objectives	.....	9
Access to the Valley	.....	9
Hidden Valley Camp	.....	10
Access to the Caves	.....	10
Surface Searching	.....	11
Expedition Discoveries	.....	15
Expedition Members	.....	17
Mulu Caves '98		
Introduction	.....	19
Objectives	.....	19
Nasib Bagus Camp	.....	19
Access to the Caves	.....	19
Surface Searching	.....	21
Expedition Discoveries	.....	24
Expedition Members	.....	25
CONCLUSIONS	.....	26
ACKNOWLEDGEMENTS	.....	27
REFERENCES	.....	28
APPENDICES		
1. Cave Descriptions		
Index	.....	30
Wonder Cave	.....	32
Prediction Cave	.....	32
Damocles Cave	.....	33
No Name Cave	.....	35
Arch Cave	.....	35
Yellow Viper's Pit	.....	36
Perseverance Cave	.....	37
Bridge Cave	.....	37
Cloud Cave	.....	43
Helicopter Cave	.....	45

Highest Cave in Mulu	.....	45
Western Front Cave	.....	45
Tiger Water & Tiger Back Caves	.....	46
Clearwater VI & VII Streamways	.....	47
Invader Streamway (Cobra Cave)	.....	49
2. Accident in Wonder Cave	.....	50
3. Caves of Api, Chart	.....	53
4. Access to the Park	.....	55
5. Topographical Map	.....	61
6. Aerial Photograph	.....	63
7. Cave Surveys	.....	65

LIST of FIGURES

Figure 1.	S.E Asia Plan	.....	2
Figure 2.	Northern Sarawak	.....	3
Figure 3.	Caves of Api Plan before 1988	.....	4
Figure 4.	Caves of Api Plan after 1991	.....	5



Lee Cartledge; Drunken Forest Cave

LIST of PHOTOGRAPHS

Towering Cliffs above Prediction Cave	<i>Matt Kirby</i>	.....	Frontispiece
Lee Cartledge in Drunken Forest Cave	<i>Matt Kirby</i>	.....	II
Gunung Api from the south east	<i>Dave Gill</i>	.....	IV
Gunung Api from the south	<i>Unknown</i>	.....	1
Hidden Valley from the west	<i>Tony Waltham</i>	.....	6
Hidden Valley from the east	<i>Matt Kirby</i>	.....	8
Helicopter landing in the gorge	<i>Tim Allen</i>	.....	9
Hidden Valley Camp	<i>Tim Allen</i>	.....	10
Climbing out of the 1 st Doline	<i>Matt Kirby</i>	.....	12
Looking down on the 2 nd & 3 rd Dolines	<i>Matt Kirby</i>	.....	13
Cloud Cave Entrance	<i>Tim Allen</i>	.....	14
Looking south over the Dolines	<i>Matt Kirby</i>	.....	15
White Cobra; Bridge Cave	<i>Matt Kirby</i>	.....	16
The '96 Team	<i>Matt Kirby</i>	.....	17
Climbing to an entrance above Prediction	<i>Matt Kirby</i>	.....	18
The Melinau Paku River	<i>Matt Kirby</i>	.....	20
Martin Holroyd; Drunken Forest Cave	<i>Matt Kirby</i>	.....	22
Nasib Bagus Camp	<i>Matt Kirby</i>	.....	23
The '98 Team	<i>Mark Wright</i>	.....	25
Scalloped Walls; Bridge Cave	<i>Matt Kirby</i>	.....	27
Thunder Pitch, Damocles Cave	<i>Matt Kirby</i>	.....	29
Syria; Prediction Cave entrance	<i>Matt Kirby</i>	.....	32
Damocles Entrance Passage	<i>Matt Kirby</i>	.....	33
Syria on Thunder Pitch; Damocles Cave	<i>Matt Kirby</i>	.....	34
Bridge Cave 'Bridge'	<i>Matt Kirby</i>	.....	38
White Cobra; Bridge Cave	<i>Matt Kirby</i>	.....	39
Cloud - Cobra Connection	<i>Mark Wright</i>	.....	44
Pete Smart Stitching Nick	<i>Tim Allen</i>	.....	52



Gunung Api with Gunung Benarat in the distance

*“It is almost impossible to
conceive the difficulty of
ascending this Mountain”*

Spenser St. John, F.R.G.S., F.E.S., 1862

ABSTRACT

During October 1996 members of the Sarawak Forestry Department together with 8 British cave explorers visited the Hidden Valley area of the Gunung Mulu National Park in northern Sarawak. Seven new caves were discovered and a total of 10.5km of previously undiscovered cave passages were explored and surveyed in the deep dolines beyond the Hidden Valley gorge. The Expedition entered totally unexplored areas of the Park which, due to the inhospitable nature of the terrain, had never before been visited by man.

During February 1998 a return was made to the same area to continue exploration. A camp was established outside Lubang Nasib Bagus. Access to the caves was via Cobra Cave. 8.4km of caves were explored and surveyed and a connection was made between two major systems to bring the Cobra/Cloud/Bridge system to 15.5km in length.

The El Nino year caused a severe drought allowing exploration of both the Invader Streamway, beneath Cobra Cave, and also Clearwater VI Streamway, which had been inaccessible to expeditions since its discovery in 1990.

The harshness of the karst landscape in this area of Gunung Api undoubtedly made these two expeditions the most physically demanding of any in the series of 'Mulu Caves' expeditions. Although there is little doubt that further entrances lie unseen, beneath the forest canopy, it is likely that many may never be discovered due to the impenetrable nature of the surrounding landscape.



Gunung Api and Hidden Valley from the South

INTRODUCTION

LOCATION

The Gunung Mulu National Park is situated in north-eastern Sarawak, with its northern boundary forming part of the border with Brunei, (Figs. 1 & 2). It was officially constituted in 1974 and opened to visitors in 1985. Lying 4° N. of the equator it covers an area of 528sq km.

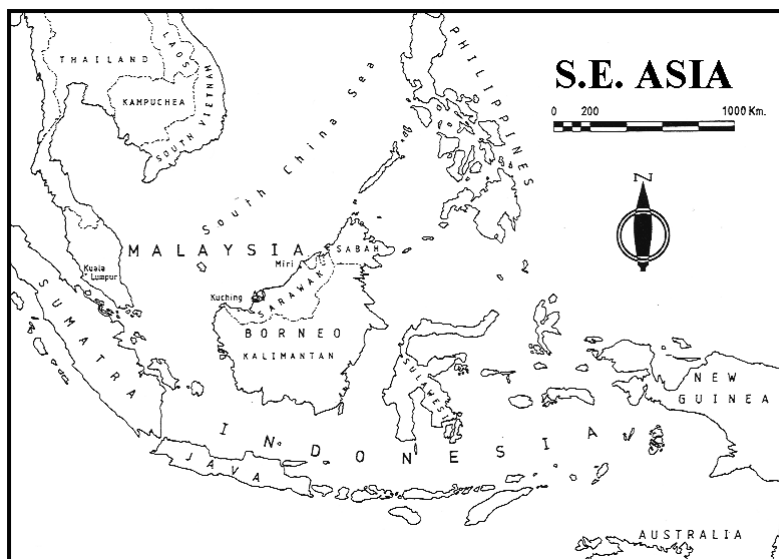


Figure 1

The Park is dominated by the sandstone mass of Gunung Mulu, which rises to 2376m. To the west of Mulu, and on its flank, lies a band of 'Melinau' limestone, which forms the lesser peaks of Gunung Api and Gunung Benarat. The lower slopes are covered in dense tropical rainforest, which rises to meet the montane forest of Mulu's upper slopes.

Mulu is a rich mixture of plant and wildlife and in the limestones, beneath the forest canopy, lie some of the world's most impressive caves.

HISTORY of EXPLORATION in MULU

The existence of large caves in the Gunung Mulu area of Northern Sarawak has been documented for over 140 years. In 1858 reference was made to "Detached masses of limestone, much water-worn, with caverns and natural tunnels" around the base of Mulu by Spenser St. John in his book *'Life in the Forests of the Far East'*, (St. John, 1862).

St. John was 'Consul General in the Great Island of Borneo' and made some of the earliest exploratory journeys of any European into the interior of Sarawak. His attempts to reach the summit of Mulu were thwarted by limestone cliffs, dense forest and sharp pinnacles of rock and he says, "It is almost impossible to conceive the difficulty of ascending this mountain". Mulu was to keep the secrets of its summit for a further 74 years until Edward Shackleton successfully climbed the mountain during the Oxford University Expedition of 1932, (Harrison, 1938).

In 1961 G.E. Wilford, of the Malaysian Geological Survey, visited the area to explore its caves. His work included the surveying of Deer Cave and parts of Cave of the Winds. He

predicted that Mulu would yield many more caves in the future, (Wilford, 1964).

During 1977-8 the Royal Geographical Society spent 15 months in the area studying many aspects of the rainforest. This was the largest scientific expedition ever to leave the UK. Included in the team were six speleologists who, in three months, explored and surveyed 50km. of cave passages including parts of Clearwater Cave, Green Cave and others, (Brook & Waltham, 1978).

During the expedition a forest camp was established in Hidden Valley from where two major caves were explored. 'Wonder Cave' on the north side of the valley was found to have some of the largest passages in Mulu. 'Prediction Cave' on the south side also contained enormous passages which were almost filled with river sediments, (Meredith, Wooldridge & Lyon, 1992, p.10).

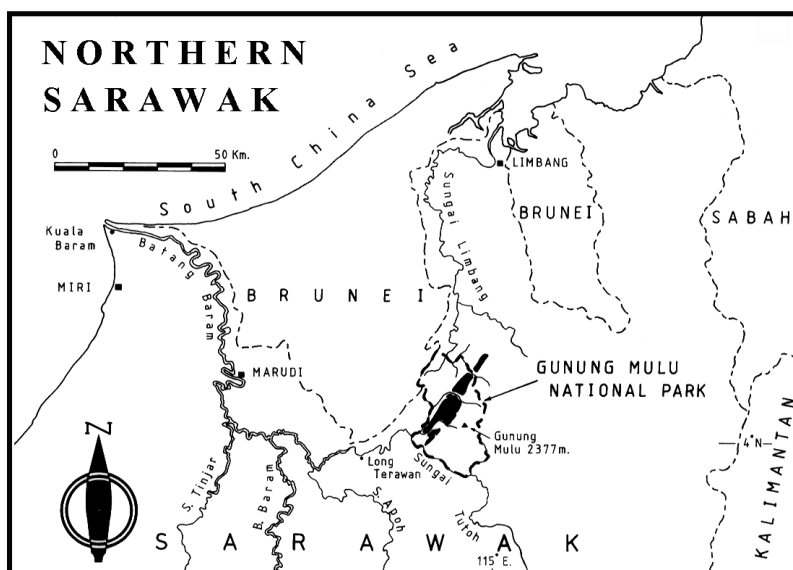


Figure 2

It was obvious from these findings that Mulu ranked as one of the World's foremost caving regions.

As a result of the RGS expedition two large scale caving expeditions were mounted in the early '80s. The 'Mulu '80' expedition explored and surveyed a further 50km of cave passages including the largest underground cavity, in the world, 'Sarawak Chamber', which forms the final chamber of 'Lubang Nasib Bagus' or 'Good Luck

Cave', (Eavis, 1981). The end of this chamber lies very close to the end of Prediction Cave in Hidden Valley and tantalising draughts at the end of each cave suggest a connection.

These two expeditions carried out a great deal of scientific research associated with the caves including dye tracing, geology, geomorphology, ecology, cave mineralogy, etc. However, although 150km of some of the largest caves in the world had been surveyed, some very significant areas of limestone remained totally unexplored presenting enormous potential for further exploration, (Fig 3).

During late '87 and early '88 plans were made to mount another caving expedition to the area. This would be the first expedition to visit the park since its opening to the public in 1985 and was primarily aimed at exploration, surveying and photography. Unlike the previous expeditions this was to be a lightweight venture with only six team members. The 'Mulu Caves '88', expedition once again proved the potential of Mulu with a further 16km of passages explored. It was also shown that exploration in Mulu using a small team was both feasible and successful.

The major discovery of this expedition was Blackrock Cave lying to the north of Clearwater and almost certainly part of the same system, (Kirby 1989, p.28).

As a direct result of this discovery an eight strong group, including five of the 1988 team, returned to the Park exactly one year later to continue exploration with the '*Mulu Caves* '89' expedition. Once again a lightweight venture proved to be successful with over 24km of passages explored and surveyed in only one month. Major extensions were found in Clearwater Cave totalling 15km and the gap between it and Blackrock Cave was brought to within 90m. The Clearwater V streamway was discovered and explored for over 1km.

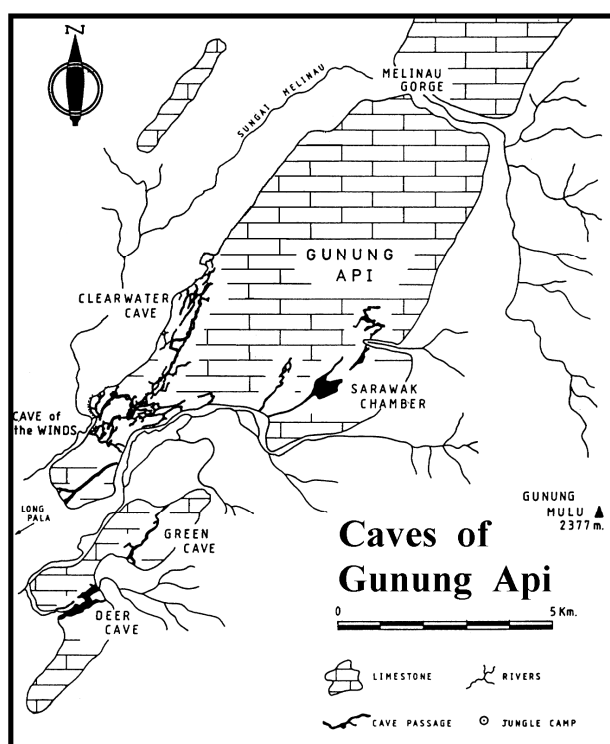


Figure 3

A new cave, provisionally named 'Simon's Cave' but later named 'Racer Cave', was discovered and explored and water tracing experiments proved a hydrological link from the Melinau Gorge through Blackrock and into Clearwater Cave, (Kirby, 1990). The discoveries made by these two expeditions had greatly altered the map of Gunung Api's caves.

During 1990 another British team visited the Park and continued the exploration of Racer Cave. The Clearwater 5 streamway was explored to an upstream sump. Although a sump bypass was found to lead into Clearwater VI, rain caused the bypass to sump which prevented further exploration. A link was established between Drunken Forest Cave and the 1989 extensions in Clearwater, (Weight, 1991).

During February 1991 a Korean Team visited the Park. Some minor discoveries were made, unfortunately these findings were not published.

In 1991 a group of six explorers, five of whom were from the '88 and '89 expeditions, returned to the Park to continue exploration in the Blackrock/Clearwater area. A connecting passage was discovered which linked the two caves. This discovery made the Clearwater System the seventh longest cave in the world at over 102km. This was the '*Mulu Caves* '91' expedition, (Fig 4).

A vast amount of work had, by this time, been carried out on the western flanks of Gunung Api and although discoveries were by no means exhausted it was becoming increasingly difficult to find major objectives which would justify another expedition to that side of the

mountain. The remaining significant lead, the Clearwater VI Streamway, was weather dependent and, therefore, could not be relied on as a sole objective.

Attention now focused on the more challenging eastern flank of Gunung Api with Hidden Valley as the first objective. This area was less accessible than the west as there were no major rivers which could be used for transport of stores and equipment.

Tentative enquiries were made in 1990 to see whether it would be possible to visit the Valley during the '91 expedition. A positive response was received and this became one of the secondary aims of that expedition. Unfortunately this was not achieved as other discoveries closer to park headquarters took priority. Instead, part of the '91 team returned approximately one year later with the sole objective of carrying out a lightweight reconnaissance of Hidden Valley.

The reconnaissance expedition proved a success with potential for further discoveries to be made in the two known caves within the Valley and a new cave discovered in the dolines to the west. Other entrances were noted for further investigation and surface reconnaissance suggested even greater potential further south in the deeper 'Third Doline', which was not entered.

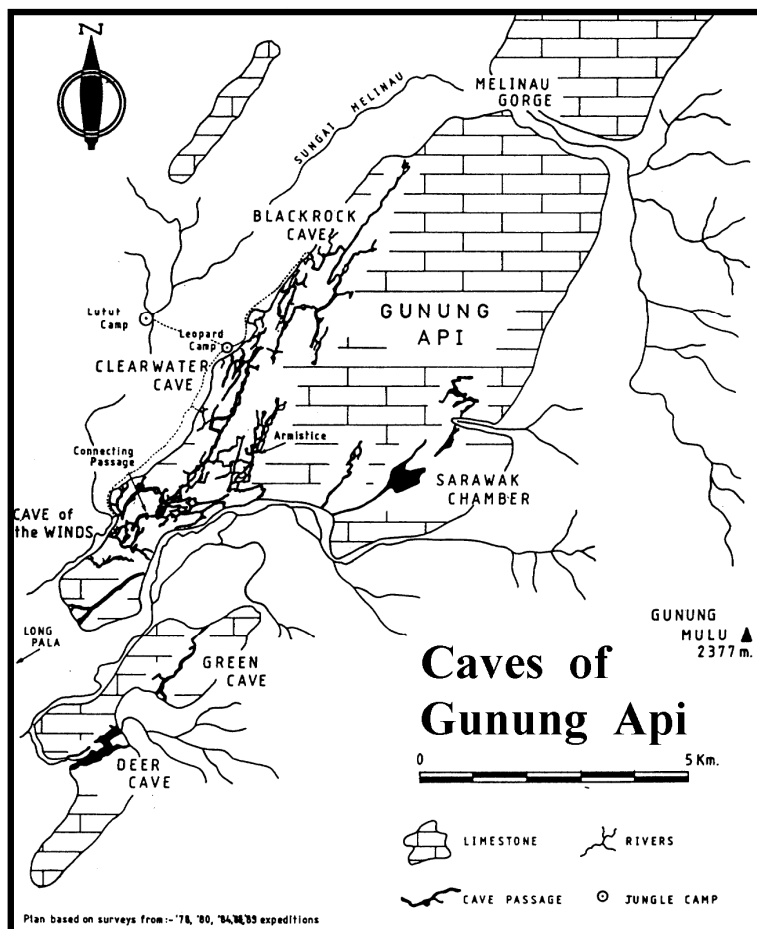


Figure 4

HIDDEN VALLEY

TOPOGRAPHY

Hidden Valley forms a striking feature on the eastern slopes of Gunung Api. With vast limestone cliffs towering 500m above its floor it cuts westwards into the eastern side of the mountain as a deep gorge providing drainage for the slopes of Gunung Mulu. All the modern day water entering the valley sinks into the limestone to follow underground routes through the mountain to the Melinau Paku River but the valley continues its westward trend beyond the sinks rising up onto pinnacle karst before turning to the south and leaving the cliffs.



Hidden Valley from the West

to form the Hidden Valley river. The river enters the valley very steeply, tumbling down a bouldery, log strewn, gorge. As it leaves the sandstones of the Mulu Formation its gradient reduces dramatically and the lower part of the gorge is a flood plain, approximately 400m long, formed by alluvial deposits from the sandstones of Mulu.

Although the feature known as Hidden Valley is normally associated with the deep gorge on the east of Gunung Api the valley does in fact continue southwards as a dry valley to drop into the Melinau Paku Valley above Nasib Bagus. This section of the valley runs through a landscape of cone and pinnacle karst but its route is dominated by deep dolines which provide great potential for cave exploration. The ground here presents an extremely harsh terrain which is totally different to the flat alluvial plain in the gorge or the sandstone slopes of Gunung Mulu. Due to the severity of the ground even the nomadic Penan have never ventured beyond the alluvial plain of the valley, to hunt or gather fruits, which has left a vast area of karst landscape totally unexplored by man.

Above Hidden Valley, and to the east, the steep slopes of Gunung Mulu provide an excellent catchment for the many streams which join

In low flow conditions the river sinks almost as soon as it reaches the sandstone/limestone interface leaving the flood plain dry. However, the steep slopes of Mulu provide a rapid run off and the river responds very quickly, following heavy rain, to spread out over the flood plain at times forming a large lagoon. Sinks have formed at the margins of the flood plain but these are generally choked with sediment and vegetation washed in by floodwaters.

ACCESS TO HIDDEN VALLEY

Hidden Valley is classed as 'Wilderness Area' and is therefore not open to the general public. Although the RGS used tracks right around Api in '78, which became well established with use, these followed Penan hunting tracks, (Meredith, Wooldridge & Lyon 1992. p10). Since that expedition the tracks had not been maintained by the park and had reverted to their former use. It was therefore necessary to employ Penan porters who were familiar with the area to guide and re-cut tracks where necessary.

Without guides, navigation through the forest is extremely difficult. This is mainly due to the density of the forest canopy which only rarely allows a view of distant features by which one can take bearings. Following Penan guides through the forest can be an interesting experience. Their sense of direction is second to none and, just when you think they are hopelessly lost, you arrive at your destination ahead of time. Their pace is gentle but relentless, they are constantly in tune with their environment. They follow tracks which, at times, appear invisible but which have been established over the years to provide the easiest access to their hunting grounds.

The normal route to Hidden valley is via camp 1, to the east of Batu Nigel then over the north west ridge of Mulu and into the valley (Briggs 1988 p108). The first section, from park headquarters to Camp 1, follows an official Park track and takes approximately three hours of steady walking.

From Camp 1, at 150m altitude, the Sarawak Chamber track is followed for a short distance to a small stream. After crossing the stream the track cuts across country to a major river crossing east of Batu Nigel. This is part of the Melinau Paku river and in normal flow conditions is easily forded, however, during floods it would become impassable. Immediately downstream of the crossing is a spectacular waterfall.

Following the river crossing the route leads northwards to a stream crossing. This point is at 450m altitude and is the last source of water before Hidden Valley. After the stream the track climbs steadily up to a col, at 950m altitude, on a spur off the north west ridge of Mulu. This is probably the most strenuous section of the journey. Following the ridge to the east eventually leads up to Mulu summit but this route is seldom used.

The col is narrow, and beyond, the ground drops very steeply into the Hidden Valley. From here it is just possible to make out the cliffs on the far side of the valley through the dense forest canopy.

The descent into Hidden Valley is steep and slippery and takes approximately 1 hour to the stream which is at 450m altitude. From there a more gentle descent crosses the river and leads to the camp after approximately 40 minutes.

BACKGROUND to the EXPEDITIONS

With the connection of Blackrock and Clearwater Caves in 1991 the exploration of Gunung Api had reached a turning point. Blackrock Cave had filled in the large blank area north of Clearwater and was now part of the same cave. Although some leads still existed in both caves these were either remote or presented some other difficulty which alone did not justify another major expedition.



Hidden Valley Gorge from the East

Another area of the park had to be found which would have sufficient potential for another major expedition.

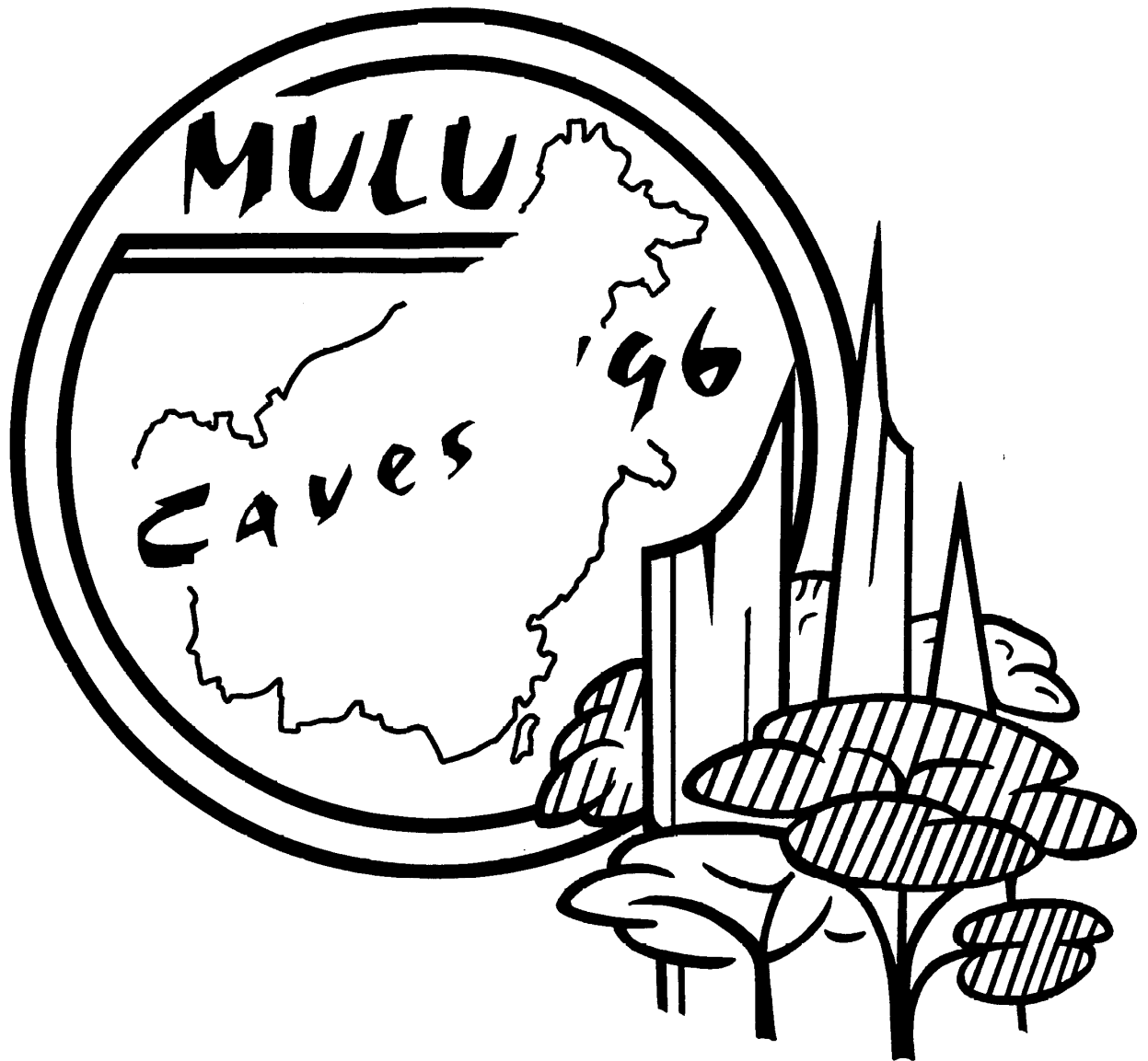
It was fifteen years since the RGS expedition had visited the Park and the last cave exploration had been carried out in Hidden Valley. Experience on the western flank of Api had since shown that the RGS

discoveries there had only scratched the surface and that many more kilometres were to be discovered over the following years.

Was it possible that open leads existed in the two known caves in Hidden Valley, as had been found in Clearwater, or could other cave entrances be awaiting discovery?.

The potential within Hidden Valley was clear. With its general trend westwards its downcutting had intersected the predominant trend of cave passages in Api which follow the strike at approximately 30°. This had already been demonstrated in Wonder Cave where the entrance had been left 100m above the valley floor and its major passages appeared to end close to the valley walls.

As Hidden Valley was far more remote than the western flank of Api the logistics of mounting an expedition to this area would be far more difficult. The 1993 reconnaissance expedition had proven the potential within the Valley so this was to be the venue for the next major expedition.





MULU CAVES '96 EXPEDITION

Introduction

With the results of the reconnaissance expedition indicating that further discoveries within Hidden Valley were possible, it was decided to return to Hidden Valley during October 1996 with a full exploratory expedition. An expedition camp was to be established at the same location as the '93 camp. It was hoped that this would provide a convenient position from which to explore the caves. Unfortunately the major discoveries were fairly remote from camp which imposed some long, arduous and hazardous surface trekking to reach the caves.

Objectives

- To continue the exploration of leads discovered during the '*Hidden Valley '93 Reconnaissance Expedition*'
- To continue exploration southwards into the remote and inhospitable terrain of the dry valley and dolines.

Access to the Valley



Helicopter landing in the Hidden Valley gorge

Although the Forest Department had arranged for helicopter assistance it was unknown whether it would be possible to land or carry sufficient supplies for the expedition. One week prior to the main team arriving in Sarawak a party of park guides and porters walked into the valley in order to construct a camp and cut a heli pad. This was in approximately the same location as the 1978 heli pad, which had been constructed in an emergency to evacuate a team member. Park guides made an inventory of all trees, which were felled during the construction.

The helicopter, a 'Bell Jetranger', was chartered from 'Hornbill Skyways' based in Miri. With the available flying time limited to approximately one hour in Mulu it was decided to make best use of this by ferrying in supplies only. With this in mind the main party walked into Hidden Valley the day before the helicopter was due to arrive. This ensured that

sufficient people were available for offloading the helicopter to minimise turn round time. A small team was left at Park Headquarters to assist with the loading. Supplies had been divided into helicopter loads previously. All supplies were carried in a cargo net underslung beneath the helicopter. This allowed the helicopter to drop loads without landing. In the event, weather conditions were good and the delivery of supplies took less time than expected. This allowed team members time to carry out a brief aerial reconnaissance of the expedition area.

Hidden Valley Camp

The camp was situated at approximately 410m altitude on high ground to the north of the stream, approximately 100m above the site of the 1993 camp. This provided a central position from which to explore. To camp any further into the valley would run the risk of being flooded out or cut off during heavy rain. From the streambed, excellent views of the surrounding cliffs could be gained. From the camp the main route onwards into the valley was to follow a track past the site of the 1993 camp, and onto the valley's alluvial plain. During the '93 reconnaissance the dry stream bed provided the best 'road' available through the alluvial plain, however, during 1996 the stream was never dry and new tracks had to be cut.

The camp had a very dark aspect, under the forest canopy. The adjacent stream provided adequate water for drinking and bathing. Mosquito nets were found to be essential as sand flies became unbearable under the camp sheets following heavy rain.



Hidden Valley Camp

Access to the Caves

Hidden Valley Camp to Arch Cave

From the camp a track leads down onto the Valley's alluvial plain and the heli pad.

From there the river is followed to the end of the alluvial plain. Beyond this point the ground rises up onto a karst landscape. To the right through undergrowth leads to Damocles Cave.

Climbing up from the alluvial plain leads to the col between the main valley and the first doline. It is from this point that the track to 'No Name Cave' heads upwards to the left. Onwards the track leads steeply down to the base of the first doline. The base of the doline is crossed, over boulders and fallen trees, before rising again to a small cliff where tree roots make good handholds. From there the route continues to climb and eventually rises up to the top of the doline from where a dry valley continues south westwards. The dry valley gently undulates and the track passes the lip of Yellow Pit Viper's Pit. Beyond here fairly level ground leads to a very steep climb down into the second doline. At the bottom of this slope is Arch Cave.

Arch Cave to the 3rd Doline

Beyond Arch Cave the ground falls slightly and the track passes through some very sharp limestone. A narrow valley leads on and the track passes over a deep pit before passing through a small cave which lies at the narrowest point in the valley. The cave entrance forms the way ahead and beyond the ground drops away into the upper levels of the third doline. After approximately 100m the track to Bridge Cave leads off to the left. From the point where the Bridge Cave track starts to contour, straight on leads to a steep descent into the 3rd Doline. Approximately 50m from the base of the doline a climb up the cliff to the right leads to the Perseverance Cave entrances.

The Track to Bridge Cave

The Bridge Cave track climbs up before contouring around the east side of the third doline. The ground is made of scree which is held together by tree roots and vegetation. In places this is highly unstable and great care should be taken. Eventually the track rises up very steep ground, opposite Perseverance Cave, and leads onto a narrow arête. The arête is, in fact, a bridge which can only be seen from below. A daring step leads to climbs down tree roots into the Bridge Cave entrance.

Bridge Cave to Cloud Cave

From Bridge Cave the track passes over difficult pinnacle terrain to descend into the Fourth Doline and Cloud Cave entrance.

Surface Searching

Introduction

During the expedition a considerable surface survey was carried out which tied together all the newly discovered entrance and linked them to the previously known caves. The total length of surface traverses was 3.5km with over 257 survey legs. Details of these traverses are shown on plan MC96/001

Upstream from Hidden Valley Camp

Upstream from Camp the river divides. The left hand (southerly) branch emerges from a resurgence in huge limestone blocks. Climbing uphill, a marginal drainage channel, along the foot of the cliff, is choked at the end. Continuing into a huge alcove under the

valley wall, two entrances were seen both with swifts emerging. The entrances were not entered but appear to go down the back of the boulder pile at the foot of the cliff.

Cliff wall entrances

Two of the most promising cliff wall entrances which were identified during the '93 recce were investigated by Mick Nunwick and Tim Allen at the beginning of the expedition.

The first site, 'Triple Entrance', had been located in '93 when a strong draught was detected falling down to the dry stream bed below the camp. Steep cliff walls had prevented further exploration. Subsequently an entrance had been seen from camp at this point which appeared, through the trees, to be three entrances aligned at 45°. During 1996 an entrance was clearly visible from the helipad on a bearing of 220° in the approximate position of the Triple Entrance site. This was assumed to be associated with the same feature. The entrance was situated 150m up the southern cliff wall of Hidden Valley and appeared to have a prominent large flat roof. Full modern climbing techniques were employed to reach the site but unfortunately all that was found was a very large alcove.

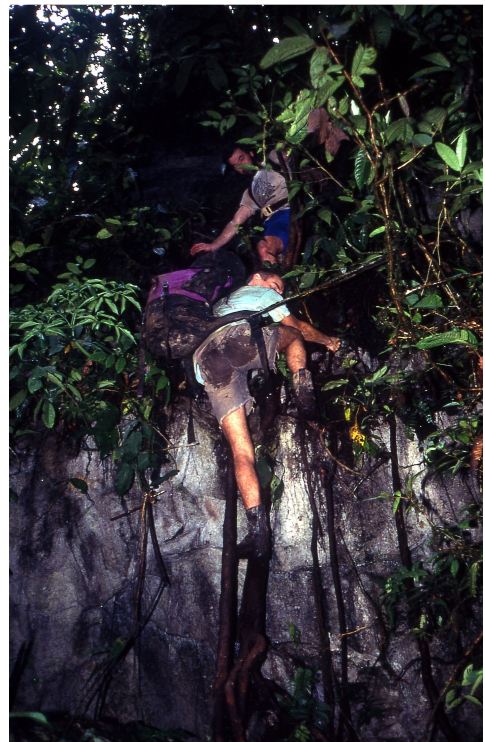
The second entrance was located 70m above the valley floor on the northern side of the valley on a bearing of 30° from the helipad. The entrance had a grill of stalactite fangs. Full climbing techniques were employed to gain access, however, no passages were discovered.

Several other cliff wall entrances were spotted in the Hidden Valley gorge, notably in the northern wall, these were not investigated due to the difficulty of gaining access and the failure of the most promising to yield results.

Above the 1st Doline

At the western rim of the 1st Doline a track was cut north westwards. This led into a small valley running parallel to the main route to the 2nd Doline. Crossing the valley led to steep ground which was ascended until the slope became impassable due to the dense vegetation, steepness and loose ground. From the base of the slope the parallel valley was followed westwards. Some small cave entrances were discovered but with no passage to explore. Eventually the valley joined the main route just before the rim of the 2nd Doline. No significant discoveries were made.

Climbing out of the 1st Doline



Above the 2nd Doline

From the high point between the 1st and 2nd dolines a climb was made up the northern

side of the valley, just to the east of a steep walled depression which runs up from the 2nd Doline. 200m of ascent led to a break of slope with good views. A traverse to the northeast through stunted moss forest led onto a ridge. Topography in the valley bottom to the north was very difficult with high dense pinnacles. The ridge trends at 220° and provides a spectacular overview. To the north west a large cave entrance was seen in a depression but access would not be easy from the ridge.

No further work was carried out in this area but potential clearly exists. It was noted that access may be better via a valley/depression to the north west. This has higher trees and may have less developed pinnacles. Minor depressions are very steep sided and difficult to get in and out of. A subsequent helicopter flight, in 1999, over the 2nd doline revealed that this unexplored valley climbs very steeply out of the north side of the 2nd Doline as a continuation of the general trend of the doline.



Looking down into the 2nd/3rd Dolines

Discovery of Perseverance Cave

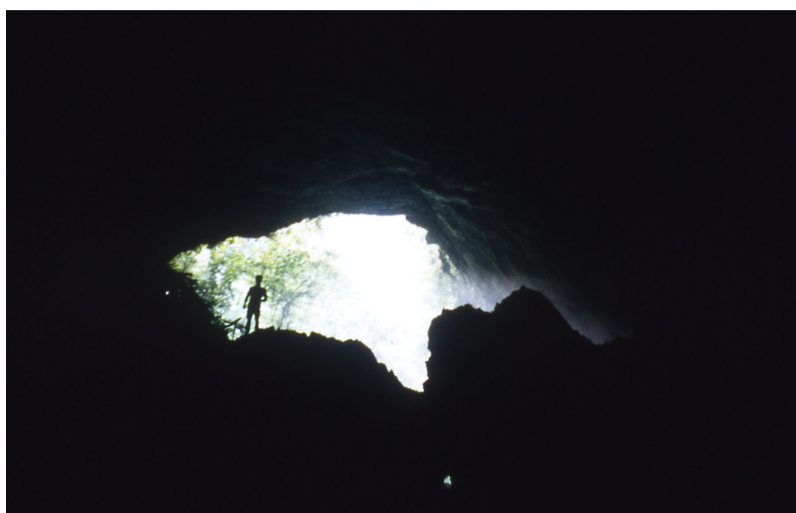
The 'Western Valley' had been identified as a large dry valley which runs from the end of Hidden Valley over Api to the Leopard Cave area. In fact this runs from the western side of the 3rd doline. In an attempt to gain access to this valley an ascending track was cut upwards from the rim of the 3rd Doline. This route was thwarted by cliffs and steep ground so a track was cut downwards, through unexplored ground, into the doline. Almost at the base of the doline a small cliff on the western side was climbed to a series of cave entrances. This was Perseverance Cave.

Discovery of Bridge and Cloud Caves

During a helicopter flight over the dolines a large entrance had been seen high above the 3rd & 4th Dolines in the western head wall. In an attempt to reach this entrance Tim Allen, Mick Nunwick and Mark Wright cut off southeast from the Perseverance track

and began a contouring route around eastern side of the 3rd doline. The plan was to cross the ridge between the 3rd and 4th Dolines and head up to the general area in which Helicopter Cave was thought to be. Soon, however, an entrance was found. This was choked with stal but a little further around the doline another entrance was sighted. Getting to it proved to be difficult as the ground comprised steep rocky scree covered with a tangle of vegetation. The entrance was in the side of a gully and a spectacular narrow rock bridge spanned the gap. This was crossed and a descent down tree roots gave access to the Bridge Cave entrance.

Continuing up towards the ridge, over worsening ground, limestone pinnacles became more prolific and each metre was hard won. The top of the ridge was eventually gained but all attempts to cross it were beaten back by desperate pinnacled ground. Serious track cutting in, out, over, around and down 5m high pinnacles eventually gave access to the 4th doline. Close to the bottom, the team was rewarded by the discovery of the 40m wide by 25m high entrance to Cloud Cave.



Cloud Cave Entrance

Helicopter Cave

From Cloud Cave entrance a track was cut back onto the ridge between the 3rd and 4th Dolines near its western end. Again no progress could be made along it but by climbing a 10m high pinnacle ('The Inhospitable Pinnacle') a rare commanding view of the area could be seen. It was determined that the best approach to the Helicopter Cave area would be from the western side of the 3rd doline.

Later in the expedition several attempts were made to reach the entrance from an overnight bivi at Perseverance Cave. From a single location at the Perseverance entrance Helicopter Cave could be seen and a bearing of 216° (+15°clino) taken; the same entrance could be seen from Cloud Cave on a bearing of 286° (+25° clino).

Several tracks were cut up the western wall of the doline but in that direction all ended in an impenetrable, pinnacled ridge. Helicopter Cave was put on the back burner for the rest of the expedition. On the positive side, however, it was determined that from these tracks a route could be forged into the remote Western Valley.



Looking South over the Dolines

Expedition Discoveries

The following are brief descriptions of the expedition discoveries. For a further details of each cave refer to Appendix 1.

Wonder Cave; *Gua Ajaib*. Length 4,970m, vertical range 104m.

Second entrance discovered. Exploration of the main draughting lead, left in '78, at the end of the cave, led to approximately 200m of passage. Discovered that the entrance series sumps during wet weather and that the sump can remain for some time following heavy rain, further exploration should be carried out during dry conditions.

Prediction Cave; *Gua Ramalan*. Length 652.1m, vertical range 46m.

Exploration of sediment ramps in the main passage led to chokes. A bolt route to a small entrance in the cliff above the main entrance led to solution tubes of no great extent.

Damocles Cave; *Gua Damocles*. Length 244.9m, depth 78.86m.

Discovered within the gorge of Hidden Valley during the '93 recce but not explored until '96. The Cave was found to take flood drainage from the alluvial plain. Exploration abandoned due to unstable weather conditions which made the lower reaches of the cave flood prone.

No Name Cave; *Gua Tanpa-Nama*. Length 70m.

Discovered above the 1st Doline and found to be blocked by a calcified choke after 70m. This is a large and very significant entrance which may be part of the Cloud/Bridge System.

Arch Cave; *Gua Gerbang*. Length 980.5m, vertical range 105.99m (inc. Yellow Pit Viper's Pit).

Discovered in the 2nd Doline during the '93 recce. Explored and found to be 1km in length.

Yellow Pit Viper's Pit. Length 124m, depth 67.37m.

Discovered during the '93 recce on the track to Arch Cave. Explored to a depth of 67m and found to connect with Arch Cave.

Perseverance Cave; *Gua Ketabahan*. Length 953.1m, vertical range 26.88m.

Discovered near the base of the 3rd Doline and found to contain two active streamways. The Entrance proved to be a useful bivi site with a reliable water supply.

Bridge Cave; *Gua Jambatan*. Length 6,053.3m, vertical range 165.54m.

Discovered on the eastern slope of the 3rd Doline. Old entrance is a remarkable natural bridge, caused by partial collapse of the entrance passages. Classic Mulu style cave formed on bedding at different levels. Large fossil phreatic passages. Enormous shaft discovered which may connect with Cloud Cave. Exploration led to a second entrance in the 4th Doline 80m from the entrance to Cloud Cave and at the same level. Explored for a total of 6km with great potential for further discoveries.

Cloud Cave; *Gua Awan*. Length 2,192.5m, vertical range 220.13m.

Discovered in the 4th Doline and explored for 2.2km. A cave of Deer Cave proportions with a major strike controlled main passage, terminating just short of the Hidden Valley Gorge. Connection made with Cobra Cave making the Cobra/Cloud System 5.6km long with a vertical range of 330m. Great potential left for further discoveries and a connection with Bridge Cave.

Helicopter Cave. *Seen from the air; not visited*

Discovered from the air but not reached due to the severity of the terrain. A very large and significant entrance, which requires further investigation.



*White Cobra South;
Bridge Cave*

Expedition Members

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Richard Chambers
Tim Allen
Pete Boyes
Pete Smart
Mick Nunwick
Mark Wright
Nick Jones

From Sarawak

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The '96 Team on the Hidden Valley Heli Pad

Matt K, Dave G, Tamajarau, Mark W, Pete S, Tim A, Syria L, Richard C, Charlie, Pete B, Rambli A, Mick N, Lawai K, Christopher J



Climbing to an entrance above Prediction Cave





MULU CAVES '98 EXPEDITION

Introduction

The '96 expedition had demonstrated the potential for further discoveries to be made in newly discovered caves and the dolines of the dry valley between the Hidden Valley gorge and Nasib Bagus entrance. However, it was known this area would not be best served by a camp in Hidden Valley.

Not only would a camp in Hidden Valley be remote from the caves, it would also be almost impossible to supply without helicopter backup, which could not be relied on. Experience in '96 had shown the track to the dolines to be potentially hazardous especially in the dark and in wet conditions, with a travel time to the caves of anything up to two hours. Because the main area for exploration was equidistant from Hidden Valley and the Melinau Paku a gamble was taken on being able to reach the 4th Doline from the Melinau Paku Valley via a route, over the surface, which had never been explored. Aerial photographs suggested that a valley above Nasib Bagus led to the 4th Doline where Cloud Cave was located. In the event of this route being unsuccessful it was known that the connection with Cobra Cave, which was established on the last day of the '96 expedition, could be used to enter Cloud Cave and thus gain access to the Dolines. It was thought that the route through the caves would be used only as a back up, however, the severity of the climb up from Nasib Bagus, together with the surface terrain proved to be far more difficult than the underground route, which soon became the main thoroughfare.

Objectives

- To continue the exploration of Bridge and Cloud Caves.
- To continue the exploration of Perseverance Cave
- To investigate the surface terrain between Nasib Bagus and the 4th Doline
- To investigate Helicopter Cave
- To investigate access to the 'Western Valley'.

Nasib Bagus Camp

The expedition camp was situated on the banks of the Melinau Paku just upstream of the Nasib Bagus confluence. This position was on the main 'tourist' route to Sarawak Chamber. The camp had a sunny aspect with a good water supply. From Camp to Nasib Bagus entrance took approximately five minutes and the walk back to Park headquarters took 1.5 hours

Access to the Caves

Following the Melinau Paku

Due to the extremely low water levels, which prevailed throughout the expedition period, access to the caves downstream from camp could be made by following the

Melinau Paku. This provided an excellent road with easy going along the pebble banks and occasional wading through deep pools. Flood debris was abundant and in places some very interesting clambering was required to negotiate this. The route provided an extremely pleasant walk through primary rainforest scenery with the massive cliffs of Gunung Api dominating the northern side of the valley.



Returning to Camp along the Melinau Paku

To Tiger Cave

From Nasib Bagus Camp the usually dry stream bed can be followed upstream to a large sink, the cave sink being totally choked with debris. The dry stream passes a large entrance approximately 10 meters above on the true Right Bank. 40 meters above this is another massive entrance which is impossible to reach without a serious bolt climb. This large entrance is almost certain to connect to Tiger Back Cave but is choked at the other end.

Nasib Bagus Camp to Cloud Cave Overland.

The overland track to Cloud Cave was cut for three reasons. Firstly as a possible transit route to the caves of the Hidden Valley dolines. Secondly, to rig the pitch down into the Cloud/Cobra cave system should the overland transit route be impractical. And thirdly to explore that area for caves. It was also essential as an escape route back to camp should Cobra cave sump as had happened during the '84 expedition.

In the event the route over the surface proved too long and rugged to be used as a transit route compared to relatively easier Cobra cave trip. However, it was used to rig the pitch down into Cloud's main passage, and also the 'Highest Cave in Mulu' was discovered.

From the rear of the Nasib Bagus Camp the track climbs the steep forest covered limestone scree slopes. The route leads to the eastern of the two hanging valleys to the north of Batu Nigel. Entering the valley two large dolines are crossed before the high point of the route is reached. The route is extremely hazardous comprising very rough terrain covered in dense vegetation which hides sharp limestone pinnacles and leg breaking clints which are encountered with every step. The view from the high point is deceptive as the route on the ground passes approximately a dozen hidden dolines before the 3rd and 4th dolines of the Hidden valley are reached. Even then the natural line of the valley skirts around to the east and it is necessary to cut out westwards before the 300m descent down to Cloud cave can be made. The view from this point is spectacular and allows a rare glimpse of the surrounding landscape with the massive dolines below and the western valley opposite, and at the same altitude.

Below here, the ridge between the 3rd and 4th dolines is dominated by a tall lonely pinnacle. This is a useful landmark to locate the way down to the Cloud cave entrance.

Surface Searching

The Western Valley

The 'Western Valley' is a dry valley feature which runs from the 3rd Doline over known passages in Clearwater Cave and leads to the ground above Leopard Cave. It was thought that this might lead to entrances into high level series' of Clearwater or Blackrock Caves.

Only one serious attempt was made to penetrate the Western Valley. Climbing up the western slopes of the 3rd Doline led to a cave entrance; 'Western Front Cave'. From here a track was cut which continued out of the 3rd Doline until a col was reached. Beyond the col was another large doline with razor edged pinnacles and even more inhospitable terrain than had been met hitherto. No sensible way down into the bottom of the doline could be found and the track was abandoned. The final day of surface searching in this area gained only 50m horizontally, in approximately 10 hours, which testifies to the impassable nature of the landscape.

The 5th Doline

The topography in the area of the 3rd and 4th Dolines is very difficult to comprehend from the ground due to its complexity and the limited opportunities to view the surrounding landscape. In order to interpret the topography further aerial photographs were used.

The ridge, which initially separates the 3rd and 4th dolines near Cloud and Bridge Caves, continues right up to Helicopter Cave. However, approximately one third way along its length another ridge joins from the south which separates the 4th Doline from a smaller doline, lying to its west. This is referred to as the 5th Doline. The main ridge continues up to Helicopter Cave as the 3rd to 5th Doline ridge. Unfortunately access was not gained from this direction due to the severity of the pinnacle karst.

The 5th Doline is situated at the end of another, more complex, valley which runs in

from the south and appears to run parallel to, and to the west of, the valley which was used to gain access to the 4th Doline from the Melinau Paku valley.

The 5th Doline was entered during the attempts to gain access to Helicopter Cave. The terrain was very rugged and the base of the doline revealed no cave entrances.

Access to Helicopter Cave

Following on from the tracks cut up the western side of the 3rd Doline during the '96 expedition gave access to the pinnacled ridge between the 3rd and 5th Dolines. This was followed upwards, through desperate pinnacle karst, directly to the large overhanging entrance of Helicopter cave in the headwall of the dolines. An 8m climb up led to only 30m of passage before the route became choked with sediment.

Drunken Forest Cave Area

Drunken Forest Cave had been well explored by previous expeditions and following the discovery of Clearwater V in 1989 it was revisited by the Api '90 team and proved to connect to Alexandra Palace. However, the connection was very small and not possible for a human to pass. This left the Clearwater V area a very remote part of the system although tantalisingly close to the surface. If an alternative entrance could be found, the exploration of the Clearwater V upstream sump would be far easier and a lot safer.

During the exploration of this area in 1989 it appeared that there might be a connection with the surface. In the low streamway, which leads to 'Alexandra Palace', a draughting choke was found which hangs above a small climb.

The downstream sump of the Clearwater V streamway is dominated by a steep boulder slope which rises up to calcited chokes. It was reasonable to assume that if this choke had run to surface there would be evidence of its position on the ground.



Knowing that it was not possible to pass the constriction at the end of Drunken Forest Cave an attempt was made to understand the surface features which lie above its connection with Clearwater V with the potential of discovering a new entrance.

Martin Holroyd; Drunken Forest Cave

From the entrance of Drunken Forest Cave a bearing was taken for Clearwater V downstream sump. This track followed the valley side and climbed gently. After approximately 300m a valley shaped doline was discovered. This corresponds with the terminal chokes in Drunken Forest Cave. After a further 200m a much deeper, steep

sided, round doline was discovered. This is believed to correspond with the position of the collapse above the Clearwater V downstream sump. The base of this doline was not thoroughly searched owing to the very dense ground cover. No entrances were seen.

Berang's Entrance (Clearwater Cave)

In order to explore the Clearwater V1 streamway it was necessary to enter the cave via Berang's entrance. This entrance is rarely visited by park guides and unfortunately the guides who were with the expedition were not familiar with its location. A search was carried out down the Melinau Paku, almost as far as the Park Headquarters track, without success. The following day a more scientific approach was taken. The approximate location of the entrance was known from the Clearwater survey which showed it to lie downstream of Drunken Forest Cave. Searching eventually revealed other entrances which were identifiable on the survey so a distance was calculated between there and Berang's entrance and a simple tape survey carried out along the river bed, finally pinpointing Berang's entrance.

Cliff Wall Entrance; Melinau Paku Valley

From a pebble strewn beach along the Melinau Paku, approximately 20 minutes below camp, a cave entrance could be seen in the cliff approximately 150m above. Several attempts were made to gain access to this entrance, however, the dense vegetation and complex ground prevented this. This entrance remains unexplored and a possible open lead.



Nasib Bagus Camp

Expedition Discoveries

The following are brief descriptions of the expedition discoveries. For further details of each cave refer to Appendix 1.

Highest Cave in Mulu. *Length 280m, depth 70m.*

The route over the surface had passed by a shaft which was explored to -71m and led to 280m of passages. This is one of the highest known cave entrances in Gunung Api at approximately 580masl.

Western Front Cave. *Length 30m.*

Located high above the third doline at the gateway to the western valley. An entrance chamber (20 x 10m) quickly closed down to a crawl and climb up to a higher chamber with a skylight entrance above.

Cloud Cave; Gua Awan. *Length 2,209.9m, vertical range 220.13m.*

Known leads were explored in Cloud Cave with no significant discoveries made. The Abyss in Bridge Cave was proven to connect with the main passage near Crab inlet. Total passages surveyed during the expedition were 17.4m. This brought the total length of surveyed passage to 2,209.9m.

Bridge Cave; Gua Jambatan. *Length 9,896.4m, vertical range 205.62m*

Exploration of Bridge Cave was continued. 3.2 km of passages were surveyed and a new entrance discovered which emerged in the 2nd Doline, approximately 40m from the entrance to Arch Cave. An undescended shaft (The Abyss) was investigated and proved to connect with the main passage in Cloud Cave with an approximate depth of 95m. This connection together with discoveries in Cloud Cave brought the Cobra/Cloud/Bridge System to 15.5km, with a total vertical range of approx. 450m

Perseverance Cave; Gua Ketabahan. *Length 1,578.8m, vertical range 49.37m*

Further work in Perseverance Cave revealed 600m of new passages, which lead to another entrance in the third doline.

Invader Streamway. *Length 618.6m, vertical range - at water level throughout.*

Streamway beneath Cobra Cave resurveyed to grade 5b for a length of 600m. This cave was originally explored for 100m during the '84 expedition. Two loops surveyed. Upstream passages led to sump which was not explored. Small passage near upstream sump became too tight.

Tiger Caves; Gua Harimau. *Length (combined) 1,582.5m.*

Tiger Caves were originally explored during the RGS expedition in 1978. However, surveys were carried out to grade 2. The system was re-surveyed to Grade 5b and further explored to a total length of 1.5km.

Clearwater V1 Streamway; Gua Air Jernih. *Length 1,476.4m (1998 only).*

Low water levels allowed access to the Clearwater VI streamway via Watergate. A further sump was bypassed into Clearwater VII which branched and ended in a terminal sump and a choke. Another dry bypass to the Clearwater V sump was discovered.

Expedition Members

From the UK

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Rupert Skorupka
Peter O'Neill
Martin Holroyd
Peter Hall
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From Sarawak

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The '98 Team

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CONCLUSIONS

Discoveries made during 1998 completed another chapter in the exploration of the caves of Gunung Api. Determined efforts tied up most of the loose ends in the Cobra/Cloud/Bridge Cave system and demonstrated beyond doubt that further surface exploration in this area would range from 'exceptionally difficult' to 'totally impossible'. It is possible that the Mulu Caves '98 expedition brought the major exploration of Gunung Api to a conclusion but, given the lure of the Mountain, this seems unlikely.

In the absence of any significant underground objectives it would be difficult to justify another major expedition to the mountain, without returning to old ground on the off chance that something had been missed. Speculative exploration of this nature would undoubtedly lead to new discoveries, however, the chances of these gaining access to major leads is now slight.

Without major underground leads to explore, surface searching remains the only potential for new discoveries. However, with vast areas of the mountain covered in pinnacle karst there is limited opportunity to penetrate unexplored ground.

The words of Spenser St. John "*It is almost impossible to conceive the difficulty of ascending this mountain*", have great significance for the future exploration of Gunung Api. This was no overstatement. In 1862 St John attempted to reach the summit of Api but was totally defeated by the terrain. In a landscape dominated by trees, where only the tallest pinnacles are visible from the air, little advantage is gained by carrying out an aerial reconnaissance, other than to gain a general idea of the topography and spot major features; it could never be used to plan a surface route. The true advances can only be made at ground level amongst the pinnacles and undergrowth where trial and error is the best method of advance.

The obvious goal must be the Western Valley with potential to drop in to the high levels of either Blackrock or Clearwater in the blank area between the two caves. However, the '98 expedition proved that entry to the valley, from the east, is impossible. This leaves exploration from the west over unknown ground. Exploration of the lower western slopes of Gunung Api in 1988, around Leopard Cave, suggested that it might be possible to gain access to the Western Valley from the West. However, it is likely that once the valley is reached the topography will be pinnacled making progress very difficult.

Prior to any major surface expedition it would be advisable to carry out a small-scale reconnaissance of the area to establish a means of access and to determine the logistics of supporting an expedition in the remote and inhospitable terrain where water supply is scarce.

Although there is no doubt that many kilometres of cave passages remain hidden, the potential for these to be discovered is slight. It is certain that the full extent of the complex labyrinth beneath Gunung Api's slopes will never be revealed but its lure will undoubtedly entice explorers back to the area for many years to come.

It is without doubt that determination will be the major requirement for any future expedition to this area.

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Richard Hii & his staff at Tropical Adventure, Miri

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Scalloped Walls; Bridge Cave

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APPENDICES



Richard Chambers, Thunder Pitch, Damocles Cave

APPENDIX 1.

Cave Descriptions

Contents

Wonder Cave		
Introduction	.....	32
Second Entrance	.....	32
The Far End	.....	32
Prediction Cave		
Sediment Ramps	.....	32
Nasib Bagus Lead	.....	33
Upper Entrance	.....	33
Damocles Cave		
Introduction	.....	33
Re-discovery	.....	33
Entrance Passage	.....	34
Thunder Pitch	.....	34
No Name Cave		
Location	.....	35
Entrance	.....	35
Arch Cave		
Introduction	.....	35
Entrance Doline	.....	35
Main Passage Upstream	.....	36
Swan Song	.....	36
Raw Deal	.....	36
Yellow Viper's Pit		
Introduction	.....	36
Description	.....	36
Perseverance Cave		
The '96 Passages	.....	37
The 1 st Entrance	.....	37
The 2 nd Entrance	.....	37
The '98 Extensions	.....	37
Bridge Cave		
Location	.....	37
Entrance Series	.....	38
Tom Tom Passage	.....	38

White Cobra South	38
Promenade Passage	39
Pipped to the Post	40
White Cobra North	40
Twin Towers Series	41
The Abyss	41
Twin Waterfalls	41
Tomraider	42
Conclusions	42
Cloud Cave	
Introduction	43
Location	43
Main Passages	43
Golden Syrup Spoon Series	43
Crab Inlet	43
Cobra Cave Connection	44
Last Tango in Mulu	44
Conclusions	44
Helicopter Cave	45
Highest Cave in Mulu	45
Introduction	45
The Entrance	45
The Main Shaft	45
Western Front Cave	45
Tiger Caves	
Introduction	46
Tiger Water Cave	46
Tiger Back Cave	46
Tiger Top Cave	47
Clearwater VI	
Introduction	47
Access to Watergate	47
Clearwater VI	48
Clearwater VII	48
Sump Bypass Bypass	48
Conclusions	48
Invader Streamway (Cobra Cave)	
Introduction	49
The '98 Extensions	49

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WONDER CAVE; *Gua Ajaib*

Introduction

Wonder Cave was discovered during the RGS expedition of 1977-78. A full description of the cave is detailed in 'Caves of Mulu' (Brook & Waltham 1978). Descriptions detailed in this report are limited to the discoveries made during the 1996 expedition.

Second Entrance

On the first trip to relocate Wonder Cave a new entrance was found. This was a shaft entrance which entered the known cave near to the original entrance. Several small leads in the immature entrance series were checked out at various times during the expedition but these either led nowhere or rejoined the known route. On one trip Mick Nunwick and Nick Jones found the muddy crawl to be sumped. This was after heavy rain the night before. On several other occasions the crawl was partially filled with water.

The Far End

The most promising lead in Wonder Cave was the draughting aven at the end of the known cave which had been left in 1978. Towards the end of the expedition Mick Nunwick, Mark Wright and Tim Allen managed to climb the aven via a circuitous route and gained access to continuing passage. The 15m by 10m passage rose steeply for 200m before ending at an impenetrable choke. Half way back to the climb a side passage was found near a small roof inlet. This also choked but a steep ramp near the choke was left unclimbed.

PREDICTION CAVE; *Gua Ramalan*

Sediment Ramps

The main passage of Prediction Cave is an enormous sediment filled tube, some 100m wide, with a very flat roof. The going is mostly stooping height but this does not reflect the true height of the original passage before it became overwhelmed by water borne sands and gravels. At the margins of the passage shrinkage of the sediments has allowed access down the sidewalls, at times for a considerable distance, and this allows a closer investigation of the passage's true dimensions.



In the southernmost section of the passage the shrinkage is most pronounced and here the sediments mirror the roof profile. There is much evidence of mammals living in the cave with abundant claw marks where they have scratched to climb the steep sediment walls.

Syria Climbing up to the Upper Entrance

A steep climb down on sediment ledges leads to a very steep drop where a line is essential for the return. A small inlet has eroded the sediment into steep cliffs but it is possible to descend to a gravelly floor next to the main passage wall where the water drains away. This point is 28m below the sediment floor of the main passage above which suggests the true height of the passage, at this point, to be in excess of 60m.

The Nasib Bagus Lead

Although this passage was located it was not explored beyond the pitch discovered in 1978.

Upper Entrance

Four entrances were visible in the overhanging cliff wall directly above Prediction Cave. The most promising was approximately 40m above the left hand side of the main Prediction Cave entrance. A tree was climbed and tensioned over to the cliff wall. From here Mark Wright and Tim Allen completed a strenuous bolt route eventually reaching the entrance after two days. Two draughting climbs led to the base of an aven. This was also climbed with no way on at the top. The total height inside the cave was approximately 30m. The other entrances were not investigated.

DAMOCLES CAVE; *Gua Damocles*

Introduction

Damocles Cave was originally found by National Park guides during the reconnaissance expedition in 1993 but was never recorded. The large entrance is situated in a small doline just beyond the final stream sink of Hidden Valley; approximately 20 minutes walk from base camp. It was re-discovered by the '96 expedition.

Re-discovery

The rediscovery took place on the 9th October 1996, during a cave hunting trip by Gunung Mulu National Park Guide Christopher Jantan ak Ngalang and Dave Gill. The two set off to search the northern wall only discovering a number of small blocked caves with many paw prints, which were thought to be the tracks of a spotted leopard. Beyond the end of the valley the cliffs degenerated into heavily forested limestone



scree slopes and the usual desperate pinnacle karst. The pair headed downwards into the dolined area as they started to make their way back to base camp. A collapsed doline was found and the first indication of a cave entrance was a flight of cave swiftlets.

*Entrance Passage
Syria on boulder*

Entrance Passages

The main track to Arch, Bridge and Cloud Caves just skirts the Damocles Doline as it rises from the alluvial plain. The cave entrance could not be seen from this track; the reason why it had not been spotted previously. A quick reconnaissance of the large phreatic entrance tunnel revealed footprints of possibly three human visitors that confused the explorers, as there were no records of any previous exploration.

The team decided to leave this cave as a Park Guide project, for them to explore and survey with a little supervision from Dave. Two days later accompanied by Park Guides Syria and Lawai, also joined by Rambli, Louise and Kristina, the group surveyed in to a choke of boulders with a small highly calcited by pass at a higher level. Unfortunately this was completely choked with calcite.

Thunder Pitch

Below the boulders the passage continued to another choke but a draught was detected coming from a small heavily calcited passage to the left. A stream could be heard beyond. A couple of short rope pitches later revealed a stream inlet dead ahead appearing through a boulder choke, this was obviously originating from the second



down stream sink at the end of Hidden Valley, above. The stream fell immediately down another pitch which was deep and wet. With smooth water worn limestone walls, the pitch obviously took a massive stream in wet weather, which appeared to be every afternoon.

The following day more rope, a couple of Park Guides doing their first rigging and a couple of bolts, reached the bottom, 39 meters below the first traverse line out to the head of the pitch. A good bit of practice for the Guides. A fine water washed draughting streamway was explored for approximately 100 meters before prudence and a worried Dave called a retreat. Without doubt the pitch would become impassable when the next rain started, which was due any minute.

Syria on Thunder Pitch

As a Postscript; a few days later the cave was de-rigged during a photo session with Syria hanging around and looking tough for the pictures. Richard found the bottom rope completely shredded and trapped which must have occurred during the last rain. He cut the rope and beat a hasty retreat.

The surveyed length of the cave was 245 metres, depth; 79 meters. From the correlation of the survey and surface traverse, taking into account the dip, it appears that this stream is in fact the main inlet for the Cobra / Cloud Cave stream and may be worth pursuing in very dry and settled conditions.

NO NAME CAVE

Location

From the col which lies between Hidden Valley alluvial plain and the 1st Doline a track heads off to the south west rising up the valley side. This leads to the entrance of No Name Cave.

Entrance

An impressive entrance portal leads down into a large boulder floored passage which dips down to the west. Clambering over enormous boulders leads to a low section which enlarges slightly before becoming completely blocked by a calcited collapse. A number of large bats were noticed in the cave.

This passage, although not extensive, is of considerable proportion which testifies to its importance. It would appear that this may have been part of a cave which has been truncated by the downcutting of Hidden Valley. Entrances which may correspond with this have been seen, but not entered, in the cliff face opposite, (Kirby, 1993, p.17)

ARCH CAVE; *Gua Gerbang*

Introduction

Arch Cave was discovered during the 1993 Hidden Valley reconnaissance expedition when park guide Lawai Kumpang was exploring the lower section of the 2nd Doline. Swifts were noticed flying into the 10m entrance shaft. Unfortunately a lack of rope prevented further investigation. This was to be one of the main objectives of the 1996 expedition.

Entrance Doline.

The entrance doline can be descended with the aid of a rope to a 5 metre vertical drop. This lands on a ledge overlooking a further pitch of 18 metres. From the ledge a low phreatic tube to the south divides, both ways being blocked with sediment while to the southeast a larger passage leads to another doline entrance and a high passage blocked with debris. From the ledge the 18 metre pitch lands on a descending boulder strewn passage leading down to Raw Deal.

Main Passage Upstream

From the base of the 18 metre entrance pitch a low passage with boulders leads beneath the doline to a further pitch of 11 metres. A high passage leads down a scree slope to a small streamway. This can be followed upstream for approximately 150 metres passing large re-excavated sediment banks. The passage becomes low with a sediment roof and terminates at a complete sediment blockage. The small stream appears to originate from a high aven just before the termination.

Swan Song

Approximately 60 meters upstream from the 11 metre pitch a phreatic tube to the east leads to a climb up boulders into a fine large tunnel. Right divides and arrives back in the main Upstream Passage at roof level, while to the north along the strike a large boulder strewn tunnel terminates at a low calcite blockage. Just to the right a low crawl upwards, through boulders, joins a boulder floored passage terminating in a climb up with loose-looking boulders above. The climb was not attempted but a few weeks later this point was reached during the exploration of Yellow Pit Viper's Pit.

Raw Deal

This was explored by Tim Allen, Mick Nunwick and Nick Jones. From the bottom of the 18 metre entrance pitch a boulder slope leads down to the small streamway. This is followed a short distance to where the water sinks down a narrow slot in the floor. This was partially descended to where it became very narrow and very wet. Above the sink the passage continued over a large stalagmite flow, past a blind pit until the sediment eventually rose to the roof blocking the way forward. Survey data shows this point to be close to surface within the 3rd Doline.

YELLOW PIT VIPER'S PIT

Introduction

Yellow Pit Viper's Pit is situated on the track to Arch Cave which teeters around the lip of the main shaft on loose pinnacles. It had been ignored for three weeks, thought to be a blind pit, as more exciting discoveries in the 3rd Doline had attracted greater attention. The cave gained its name from the Yellow Pit Viper that hung on a vine directly above the shaft for almost 3 weeks without moving. It was certainly not dead, merely resting. The Park Guides eventually took the bait and on the 20th October they could not resist their curiosity any longer.

Description

A delicate 20m pitch with much highly dissolved rock leads to another pitch which required more rope. Unfortunately only sufficient had been taken for the entrance shaft.

Next day joined by Richard Chambers and Mark Wright with the promise that the viper had disappeared (which of course was a lie) the next 10-meter pitch was dropped. Lawai then announced that he had found one of Dave Gill's survey markers. This position was at the base of the final choke and the loose climb in Arch Cave which had been found two weeks earlier.

PERSEVERANCE CAVE; Gua Ketabahan

The '96 Passages

The cave was discovered by Pete Smart and Matt Kirby whilst investigating the depths of the 3rd Doline. Approximately 30m from the base of the doline a climb up a cliff on the right (northwest) leads to the first of two entrances.

The 1st Entrance (Bivi Entrance)

Owing to the soft sediment floor of the entrance alcove, and the reliable water supply, this became the site for all the 1996 and 1998 advanced bivouacs. Unfortunately the entrance was a through route for many nocturnal visitors which held no respect for sleeping cave explorers.

Behind a large sediment lined alcove a 7m wide passage heads north. A branch to the right eventually chokes but the main route follows a small stream to pools at a junction. To the right ends at a sediment choke with a small drafting passage leading onwards. Following the main passage connects with the 2nd Entrance.

The 2nd Entrance

From the 1st Entrance a stooping passage leads off to the left following the cliff line. This soon emerges in a slightly larger entrance alcove with a streamway which disappears into the floor before reaching the cliff. A tall passage leads off following the stream. After 100m a passage leads off to the right, this connects with passages from the 1st Entrance. Continuing in the main passage a tall canyon passage is entered at a tee junction. To the right soon chokes but a smaller passage can be seen continuing in the roof. To the left a tall 'T' section canyon passage leads off. After 90m the route is blocked by a steep calcite flow. At the base of the flowstone is a small pool which appears to continue as a sump under the calcite. This was investigated but no access was possible. A continuation of the main passage could be seen heading off above the flowstone but attempts to gain access to this via climbs and ledges were unsuccessful during 1996. This became an objective of the 1998 expedition.

The '98 Passages

Returning to the flowstone blockage in 1998 it was found to be 12m high and unclimbable due to the frail nature of the calcite/rock. However, a climb up onto ledges some 70m back down the passage on the left hand wall allowed a roof level traverse to be made. Once over the blockage a short pitch down led to a 20m wide passage with a flat mud floor. After six 30m survey legs the passage came to an entrance back out to the 3rd Doline.

Another side passage led past some impressive rock formations to a smaller side lead which eventually choked.

BRIDGE CAVE; Gua Jambatan

Location

From the point where the main track starts to drop steeply into the 3rd Doline, a climb, then traverse, around the eastern side of the doline leads to the Bridge Cave entrance

doline. This stands on the high ground between the 3rd and 4th Dolines, directly opposite, and above, the entrances to Perseverance Cave

Entrance Series

Following the discovery of the Bridge Cave doline a party returned to the site to investigate further. A climb down tree roots leads into the entrance collapse with a fine view of the natural rock bridge ahead.

Down to the left leads to a climb down into a T shaped passage where a handline is essential. Beneath the climb is a 30m pitch which was descended in very sharp limestone until it became tight and muddy. Onwards in the main passage a small climb up on the right leads to the '96 bivi site which is in the end of a loop passage and heavily used by swifts and other mammals

*Bridge Cave 'Bridge';
note Christopher silhouetted on the
skyline*



Tom Tom Passage

At a tee junction straight ahead eventually chokes but to the left a strong draught signifies the extent of the cave ahead. Continuing along this passage, across blind gravely pits and over hollow calcite floors leads to low sections where crawling is necessary. The hollow nature of the floors and the drumming noises which they created gave the passage its name. This passage eventually ends in a large sloping rift which chokes, however, just back from here a small passage leads off to the right which passes over more hollow calcite floors before emerging in the main passage, 'White Cobra'.

White Cobra South

This passage gains its name from the cobra shaped rock formation, which emerges from its sediment floor.



White Cobra

On entering White Cobra its scale is immediately evident. At this point a bend in the passage and large scree slope opposite create an impressive chamber. The floor is of flat sediment and provides an excellent road southwards. The passage follows the strike at 210° with steep climbs up dip to the left leading to a parallel high level series,

‘Promenade Passage’. After 300m the passage turns right then reduces in size. A beautifully scalloped passage leads to a climb down into a tall bouldery passage. Immediately before the scalloped passage a climb up on the left into a large window leads down into a tall guano floored passage which eventually leads into ‘Pipped to the Post’.

Right at the climb down leads through boulder strewn passages to an enlargement at a junction. To the left a smaller passage eventually chokes but a pit on the right was not investigated, this is thought to be close to the slopes of the 4th Doline.

Continuing on through more bouldery passages leads to a massive calcite flow which almost blocks the passage, however, a crawl over the left hand side emerges in a fine passage which ends at an entrance which emerges in the 4th Doline 80m to the south of the Cloud Cave entrance.

Promenade Passage

From White Cobra two passages lead up dip into a parallel passage which lies 40m above, this is Promenade Passage.

To the north leads over a muddy floor to an 8m climb up; ‘The Mud Falls’. Above this

climb connects with the chamber at the Tom Tom Passage/White Cobra junction via a bouldery ramp.

To the south from this point a climb up through boulders leads into a sediment floored passage which provides easy going for 200m to a junction. Right leads to 'Pipped to the Post' but ahead leads to a loose climb which was abandoned in 1996.

The 3m climb leads over sharp flakes into a crawl before opening up into a large descending passage with numerous oxbows. A large chamber is crossed, and beyond, a calcite slope leads to a pitch as the main route is intersected by a much larger canyon passage 20m high by 20m wide. Straight ahead, at the far side of the canyon, the passage continues but is choked with sediment after 30m.

A 10m pitch drops onto the mud platform. Northwards leads to climbs up, over calcite, which choke after 30m. This point is very close to the calcite choke in Pipped to the Post and almost certainly the same passage.

To the south from the pitch leads to a stal lined 15m pit which drops into an immature streamway, this is choked by massive calcite deposits in both directions. Over the top of the pit, near to roof level, a way on was visible but to gain access would require a lot of climbing. This is the most southerly point in the cave and represents the most significant, if not most difficult, lead in the cave.

Pipped to the Post

Pipped to the Post was so named when the exploration party, whom had promised to survey north from White Cobra, had sneaked southwards and 'stolen' the main southerly lead from under the noses of their colleagues. When the southerly party emerged into a large upper series they were amazed to find a survey cairn from the day before, they had been Pipped to the Post.

Heading south in Promenade Passage a junction is met. To the right is Pipped to the Post. This continues in the same grand scale as Promenade Passage and after 60m a passage joins from the right. The floor at this point is made of fossil gour pools. This is the connection back to White Cobra from where the southerly party emerged to find the survey cairn.

Continuing onwards in grand passages another junction on the right ends after 200m at a 15m pit which was not descended. Onwards continues past a tall calcited aven, with an oxbow on the right, to an area of extensive stalagmite coral and fan formations at the head of an 8m pitch. Beyond the pitch a canyon passage is choked with stal in both directions after only 20m, this is very close to the southern end of Promenade Passage.

White Cobra North

Northwards from the junction with Tom Tom passage, White Cobra continues with a mud floor, as a tall canyon, before the roof lowers to a squeeze with a howling draught. The squeeze is impassable but a bypass back on the right leads to a continuation, which soon meets a larger passage at Twin Waterfalls chamber.

Directly across Twin Waterfalls Chamber White Cobra continues, to meet a large passage at the 'Zipper', a cascade, which resembled a zip fastener.

Twin Towers Series

From Twin Waterfalls Chamber a large passage, Twin Waterfalls Passage, rises to the north east to a four way junction.

To the left, downslope, leads to the Twin Towers, two enormous stalagmites, and a steep climb down boulders to connect with White Cobra at the Zipper.

Straight ahead leads into Arête passage and a tee junction. To the right a large passage rises, past an undescended shaft on the right, to a boulder choke which appears to have run from surface. Another passage leads back to Twin Waterfalls Passage at the four way junction. To the left at the tee junction leads into Arête Chamber and an awkward descent down a gravel slope and loose boulders to the Zipper. A passage heads northeast from Arête Chamber past pools to terminate at a large gour cascade.

The Abyss

Continuing north east from the Zipper a low level passage terminates at the lip of an enormous shaft, 'The Abyss'. This awe inspiring shaft is circular and in excess of 30m diameter. It connects with Kamikaze Passage in Cloud Cave and is approximately 95m deep. An attempt was made to descend the shaft to prove the connection, however, loose flakes proved highly unsafe so the connection was proven by dropping a Mars Bar wrapper which was later recovered in Cloud Cave. Another passage from Arête Chamber connects with the Abyss at a much higher level.

Twin Waterfalls

From the complex junction at Twin Waterfalls chamber a traverse from the left leads into a continuing passage. From here a 35m traverse follows the steeply sloping left wall of the passage. A 5m pitch down and short scramble over water worn flakes leads to a level sandy floor in a 30m x 20m passage. This passage leads to a junction.

A 3m high arch on the left leads into a 50m high vaulted aven. A small alcove at the side of the aven is an obvious way on, however, this leads to a small passage and a sloping calcited pitch which connects with passages north of Twin Waterfalls Chamber. Ascending the steep back wall of the aven led to a series of small dusty phreatic tubes 2m in diameter, which led back over the main passage.

Continuing on in the large passage leads into an impressive gallery, which slopes up a ramp of blocks to a terminus. A way down between calcite leads to a choke after 100m. The other way at the terminus leads up an awkward 3m climb. This leads for 100m to a junction.

To the left continues as a 2m x 3m passage adorned with increasing amounts of calcite, which is unusually cracked and broken with massive columns completely cracked off. After approximately 350m a small daylight entrance is reached which leads into the 2nd Doline just above the entrance to Arch Cave. This entrance is known as a 'Rat in the Kitchen'. To the right follows a small stream over some interesting traverses and lovely gour pools to where ascending tubes lead to a flat out crawl over mud where a draught

was noticed. The stream emerges from a small vadose trench more typical of a Yorkshire cave. Two awkward 3m climbs up flowstone lead to where the stream emerges from a tight tube. A small squeeze to one side leads into the Tombraider series.

Tombraider Series

Emerging from the squeeze leads up to a three way junction in much larger passages. Directly ahead a large descending tube heads off both ways. Behind the squeeze a rift passage ascends a 3m climb over cemented pebbles to a calcite choked chamber with high level passages which appeared to be choked.

The descending slope quickly chokes in both directions but up the slope a steep stalagmite is used to climb a 5m climb which is tricky to reverse. This leads to a draughting passage which immediately passes over a hole in the floor. The hole can be dropped as a 9m pitch to a series of choked chambers and tight crawl to the downslope branch of the descending tube.

Continuing with the draught, two more climbs are ascended, the second opening directly into a huge chamber, over 30m across. Passages lead both left and right and up a calcite slope.

To the right 200m of fine passage lead up a calcite boss to the only continuation, a 20cm hole from which, during exploration, as emitted the sound of a washing machine.

To the left, the chamber closes down slightly before continuing in a passage of staggering proportions. A boulder slope is ascended for 100m in a chamber where the roof is out of sight. The boulder slope becomes calcited and continues upwards to where it becomes vertical. 20m above a large passage is visible. Contouring round gains access to a large passage which enters near the head of the slope. The passage continues through magnificent formations to end in a calcite choke. This was named 'Dalek's Way' due to the numerous stumpy stalagmites.

Up the calcite ramp a draughting 4m x 10m passage leads to a tricky 5m climb. Beyond this a junction is reached, with the draught entering from the left. Following this, a slippery 3m climb up leads to a walking sized passage and a window overlooking a very large steeply descending passage. A 5m climb down enters a 20m x 20m passage which leads down to a total choke in the floor. A short side passage here also closes down within 20m.

Up the slope reaches a 10m shaft up to daylight, used as an entrance by swifts. There is no other way on.

Following the right hand branch, from where the draught come from the left, a slope of calcite soon leads to another entrance.

Conclusions

The discovery of Bridge and Cloud caves and their connection to Cobra Cave has demonstrated the extent of continuous vertical development in the caves of Gunung Api. Although the survey data from Cobra Cave is no longer available the total vertical range from the Cobra resurgence to the highest point in Bridge Cave is in excess of

450m. This establishes the system as the deepest in Gunung Api, exceeding both Clearwater and Nasib Bagus.

It is not strictly true to say that Bridge Cave overlies Cloud Cave. Although this is the case in some areas, such as the Abyss, the second entrance to Bridge is in the 4th Doline and is at exactly the same elevation as the entrance to Cloud which is in the same doline. It is also interesting to note that the entrance to Perseverance is also at exactly the same elevation, in the 3rd Doline. All three are 50m below the main entrance to Bridge Cave.

CLOUD CAVE; *Gua Awan*

Introduction

Cloud cave was explored by Tim Allen and Mick Nunwick together with park guides Lawai and Chris and takes its name from the layer of mist found rising out of the entrance.

Location

The entrance to Cloud Cave is situated on the north eastern side of the 4th Doline. From Bridge Cave a track was cut over harsh pinnacled terrain to drop down the side of the doline to Cloud Cave.

Main Passages (Kamikaze Highway)

From the entrance a boulder slope leads down to a pitch of 37m into the main passage. This leads both up and downstream and at its maximum dimensions is 80m high and 45m wide. Upstream the route begins with a steep climb up a massive boulder slope. At the top a spectacular view of the entrance can be seen behind. The passage continues large to a short boulder choke where a climb up, and squeeze between blocks, is the easiest route through. Beyond the route continues over boulders and sediment to a point where a large aven soars upward. This is the base of the 'Abyss', an undescended pitch discovered in Bridge Cave, which crosses over this point approximately 95m above. Behind a forest of large stalagmites, a 10m pitch down an overhanging false floor leads to the ascending terminal boulder choke approximately one kilometre from the entrance.

Golden Syrup Spoon Series

At the top of the pitch in the entrance series a passage led into the Golden Syrup Spoon Series. This series of passages and potholes spiral down below the entrance passage and was not fully explored.

Crab Inlet

Beneath the large aven (The Abyss) in the main passage a smaller passage hidden behind sediment banks on the right leads to Crab Inlet. A small stream is followed in large passage to a vertical wall of boulders. Climbing this leads to a 100m steeply ascending boulder slope. This ends at a total blockage at roof level. Two small side passages lead off for approximately 350m in total.

Cobra Cave Connection

Downstream from the entrance pitch a steep scree slope descends for several hundred metres to a 10m pitch. Water is heard and, below a further short pitch, a large stream is met. This follows an immature passage and its exploration was abandoned due to the risk of flooding. Above the last pitch a traverse along the wall reaches a side passage which leads to the connection to the furthest reaches of Cobra Cave.



Cobra-Cloud Connection

Last Tango in Mulu

In the entrance passage several side leads on the right join at a 30m pitch into the Last Tango in Mulu. This crumbly fossil route led for 500m to a 5m pitch where the passage ends in calcited boulders. Above the boulders, a black void was seen which would require a very serious climb to enter. Below the 5m pitch another short pitch led down to a huge hading rift where rocks thrown down took ten seconds to clatter to the bottom. This was not pushed but is believed to connect to the upper levels of Cobra Cave, which lies directly beneath this point.

Conclusions

The main passage of Cloud Cave is truly immense; of Deer Cave proportions. It heads directly for the lower end of the Hidden Valley Gorge but is completely blocked by a massive collapse just 100m short of the gorge. Generally the passage lies 105m below the modern day ground level in Hidden Valley. It is unknown what depth of sediments lie in the valley bottom. It is possible that the passage pre-dates Hidden Valley and continued beyond the gorge to take drainage from northern Api, however, it is almost certain that at some time there has been a hydrological connection between the main conduit of Cloud Cave and the Hidden Valley Gorge. It would appear that Cloud Cave continued to drain the valley until the massive collapse occurred.

HELICOPTER CAVE

This impressive cave entrance can be clearly seen from the air, standing in the cliff above the western end of the pinnacled ridge between the 3rd and 5th Dolines. A difficult climb out of the 3rd Doline gains access to the impressive entrance portal, however, only 30m of passage is gained before a total sediment blockage.

HIGHEST CAVE in MULU

Introduction

The entrance to the cave was found on 28th January 1998 by Tim Allen, Robert Gani and Peter O'Neill whilst cutting a track from Nasib Bagus Camp to Cloud Cave. It is situated in the deep valley, which connects the Dolines to the Melinau Paku Valley. The entrance is in an obvious doline next to the track. As the major objective of the day was to reach Cloud Cave before nightfall the cave was only given a cursory glance.

Following a four-night bivi in Perseverance Cave a return was made to the entrance. This was to be the last time the surface route to the dolines was used as the underground route, through Cobra Cave, proved far easier.

The Entrance

A track leads down the south side of the doline to a large rift like entrance shaft. A climb down the south side leads to a bouldery floor. To the east the rift opens up and forms a daylight entrance chamber, which contains large calcite formations. A small passage leads downwards through low arches before closing down in calcite and silt blockages.

The Main Shaft

Down the slope from the entrance a 20m high rift leads to a 47m pitch, which is best rigged in a series of re-belays. The shaft is a continuation of the entrance rift and at approximately half way down a continuation of the rift can be seen heading westwards. This area was not reached and remains unexplored.

From the base of the main shaft a 10m pitch, in the same rift, lands in the corner of a large chamber, approximately 100m across. A large passage to the left of the pitch is silted up after 30m.

Down the steep slope of the chamber another 8m pitch leads into an area of several descending passages all of which close down in breakdown with no sign of draughts.

WESTERN FRONT CAVE

Located high above the third doline at the gateway to the western valley. An entrance chamber (20 x 10m) quickly closed down to a crawl and climb up to a higher chamber with a skylight entrance above.

TIGER WATER & TIGER BACK CAVES; *Gua Harimau*

Introduction

Gua Harimau or Tiger Cave was first recorded in 1978 but only a grade 2 sketch was published and little was known about it. Tiger Back Cave, a large obvious entrance directly above was looked at in 1984 but not surveyed. It was decided to explore and survey these two caves due to their close proximity to camp and claim them as ours.

Batu Nigel is a small-detached block from the main Gunung Api Mountain with a pinnacle ridge connecting the two. From the air the block is very obvious.

Tiger Water Cave

To distinguish it from Tiger Cave in Gunung Benarat, the name Tiger Water Cave was given to this fine stream system. The cave was explored and surveyed by Mulu National Park Guide Syria Lejau, Peter Hall and David W Gill during the course of the 1998 expedition.

From the large dry entrance, a good bivouac site, the passage descends to a choked downstream sump. The inlet stream originates from a fine sculptured flood sink cave heading north-west and another entrance. To the south-east a low phreatic tunnel can be followed to a muddy inlet passage on the right. Left leads over sandstone cobbled floor to the main stream junction. 25 meters upstream another junction is met, right leads to a sump while left to a nice waterfall and 150 meters of fine passage to a high aven. To the east a passage over some breakdown can be followed to a small waterfall inlet at the top of a climb. Both the sump and this inlet are situated close to the main choked sink upstream of the main entrance.

From the main stream junction a nice streamway, with many fish, leads down stream in a high passage. This passage appears to be on a major joint heading north. A large cobbled chamber is met after a distance of 80 meters. Left is choked but a climb up reaches a further climb with a passage above. This passage may well connect to a draughting shaft on the surface above the resurgence, which was recorded in 1984. Right, above the first short climb, is a 25-meter long mud and calcite choked passage. From the large chamber the main stream sumps, but a flood overflow by-pass on the right leads to a low duck, a sump in wet weather. A roof tube bypasses the duck. Beyond, a nice cobbled river passage can be followed to the resurgence entrance and the surface stream followed back to Base Camp.

Tiger Back Cave

This imposing 80 meter wide entrance can be clearly seen from Cobra Cave and can be reached by climbing 60 meters or so above the resurgence. Originally explored in 1984 but not surveyed, a partial survey was undertaken by Syria and Dave during the course of the 98 expedition.

20 meters above the resurgence a small entrance was found to a pitch. The river could be heard below and most probably drops into the entrance resurgence passage. Following a gully upwards another small entrance was found, again leading to a pitch. This was recorded in 1984 as leading back down to Tiger Water Cave.

Tiger Top Cave

Tiger Top Cave can be reached via a steep sandy climb to a balcony under the overhang with fine views of the forest canopy. Massive stalagmites guard the way on to a large passage heading south and a steep climb up a sediment bank. This passage was not surveyed to the end choke, which presumable leads towards the other large high level entrance seen above Tiger Water Cave. Close to the large stalagmites a squeeze on the left leads down to a pitch over crunchy calcite flowers, a passage could be seen below but was not reached. To the right and left of the main entrance a few other possible leads were noted but not followed. At the rear of the balcony, and close to the top of the arch of the cave roof, a further passage was surveyed to a pitch down through a massive sediment bank. In 1984 this again was recorded as leading to a choke. This cave is worth a further visit.

CLEARWATER VI & VII STREAMWAYS; *Gua Air Jernih*

Introduction

The descriptions contained in this report are limited to the discoveries made beyond the Clearwater V upstream sump during 1998. For more information about Clearwater Cave please refer to previous expedition reports.

Clearwater V is a very remote area with no communication with the surface. Explorers must take great care when in this area as rainfall can cause sudden rises in water levels which could strand cavers for a considerable time. Fortunately during the '98 expedition the El Nino year almost guaranteed stable weather conditions. Even so, great care was taken and this was the main reason for the explorations, beyond the sumps, to be carried out as quickly as possible.

Access to Watergate

There are two routes to the Clearwater V upstream sumps. The original exploration of the Clearwater V streamway, during the Mulu Caves '89 expedition, was via Armistice South, the Big Uee, Rampage and into the streamway near the downstream sump. An epic one mile swim, wade and walk through deep water failed to reach the upstream sump during 1989, however, the Api '90 expedition continued the exploration of Clearwater V, in much lower water conditions, and reached the upstream sump at the base of an enormous boulder slope. On that occasion a sump bypass, 'Watergate', was discovered which led into Clearwater VI. Unfortunately, bad weather caused a rise in water levels, which flooded the bypass and prevented further exploration.

During the Mulu Caves '91 expedition a series of passages, which followed the dip from Armistice North, were connected to the boulder slope above Clearwater V upstream sump via a 43m pitch. This provided an alternative route to the sump which avoided the streamway. Whether this is a better route to Watergate in dry weather is debatable.

During the '98 expedition the original route, up the streamway, was used to gain access to Watergate. The exceptionally dry conditions brought on by the El Nino year had taken water levels to an all-time low, which made the streamway an easy stroll.

Clearwater VI

From the end of Watergate a scramble leads down into the Clearwater VI streamway which is approximately 50m long. Upstream leads to the large deep pool of Sump VI. Swimming across the sump pools leads to a slippery climb to a tee junction in a dry sandy oxbow. To the left and upstream the passage rises and gypsum crystals on the floor indicate this to be above the flood level. The oxbow ends at a sandy choke, however, approximately 50m from the end, a hole down through blocks with a strong draught leads back to the streamway.

Clearwater VII

Dropping down through the boulders from the sump bypass leads to an 8m pitch into the Clearwater VII Streamway. Immediately downstream is the sump and upstream is a small cascade. Upstream the passage enlarges to 10m wide by 20m high. After approximately 400m of easy going a crossroads is reached and the size of the passage reduces. After a further 50m another passage joins on the left. 50m beyond this is the upstream sump which forms a large, deep, clear pool.

The discovery of the Clearwater VII upstream sump brings the Clearwater and Blackrock streamways to within 980m of each other.

50m downstream from the sump the side passage leads to boulders. A spiralling route through these emerges in the vastness of 'Baby Sarawak Chamber'. The chamber is approximately 100m across and rises up boulders to end 77m above the streamway. Approximately half way up the boulder slope a side slope leads back down a loose scree slope to the streamway at the crossroads.

Across the streamway leads into a large dry passage which appears to be a sump overflow. The floor is made up of large slippery cobbles, which gave this passage the name 'Cobble Valley'. After 60m a dry plunge pool stands at a junction. To the left a small sandy passage soon closes down in narrow draughting rifts but, to the right, the main way on rises up a steep slope of cobbles to end at a cobble choke.

This passage must be an awe-inspiring sight in flood conditions with water cascading over the massive cobbles and thundering down to the main streamway past the plunge pool.

Sump Bypass Bypass

South, from the tee junction in the oxbow between Clearwater VI & VII, an ascending passage leads in the direction of Clearwater V. This climbs, past gour pools, cave pearls and boulders, to emerge at the side of the main boulder slope which rises up from Sump V, almost at the base of the pitch in from Armistice. The passage provides a convenient, all weather, bypass to Watergate.

Conclusions

Watergate forms an occasional dry bypass to the Clearwater V upstream sump. It had, for eight years, been the upstream limit of exploration in the Clearwater streamway. When discovered in 1990, (Weight, 1990), it had been dry and had allowed the explorers a tantalising view into the Clearwater VI streamway. On that occasion the

team had passed through Watergate and looked into Clearwater VI, however, they decided not to venture further that day as they were running out of carbide. Instead they intended to spend the night at the Scumring bivi and return, refreshed, the following day to make a full day in Clearwater VI. Unfortunately rain during the night had caused Watergate to sump off and it did not open again during the expedition.

Watergate was visited again by the *Mulu Caves '91* expedition during the discovery of Edwin's Long Cut, which connected Armistice with the Clearwater V upstream sumps area. On this occasion the water levels were high and the sump bypass was emitting a considerable flow of water. Once again it was not possible to enter Clearwater VI.

The discovery of the bypass to Watergate provides an all weather bypass to sumps V & VII. Had the previous expeditions found this passage, the Clearwater VI streamway may have been explored eight years earlier.

INVADER STREAMWAY (Cobra Cave; *Lubang Lipah Sileh*)

Introduction

During the 'Sarawak '84' Expedition and the discovery of Cobra Cave, a stream resurgence was explored at the base of the slope up to the main entrance. Owing to the high water conditions at the time, it was only possible to explore 100m of passage. During the '98 expedition, with the main camp at Nasib Bagus and extremely low water conditions, it was possible to revisit the cave and explore further.

The '98 Extensions

This cave is highly flood prone and should only be entered during dry conditions.

The cave is at water level throughout and forms a canal, with deep water, which made surveying very difficult as most readings were taken whilst treading water. The passages explored followed a predominant trend of 60° with cross passages at 82°.

Two loops are formed which return to the main passage at a major junction. The eastern most loop ends at chokes which are close to the surface, to the south of the main resurgence. A continuation of the western loop also ends in a choke heading north east in the direction of Cobra Cave.

The main passages lead to an upstream sump which was not explored. A small flood prone passage near the sump continues but was not pushed to a conclusion. In the same area is a calcite choke with a small aven above.

APPENDIX 2.

Accident in Wonder Cave

Early in the '96 expedition a trip was made into Wonder Cave to investigate the draughting aven at the far end which had been left as an open lead during the 1978 RGS Expedition. Several orange polypropylene ropes had been left in the cave as handlines. Whilst Mark Wright was climbing up the sediment bank out of Calgary the handline snapped causing Mark to fall. Fortunately for Mark this damaged nothing more than his pride.

The significance of this incident was not fully appreciated and resulted in a far more serious incident a few days later. The following extract, from the expedition log book, describes what happened:

“9th October 1996; Set off to try to reach the end to see the draughting aven and its climbing potential. Straight forward trip to the squeeze, a little surprising from what we had been told of Mulu’s large passages. On to the muddy crawl which was now a wet crawl with ducks and finally a sump. A powerful draught just gurgled through at the top. It seemed a little too serious to dive.”

“10th October 1996; Another attempt to reach the end. On arrival at the sump it had opened enough to duck through so we placed a line on it in case it comes up again. Beyond we followed the description to Calgary and found the crawl to the Elephant’s Graveyard. The passage beyond took us down a pitch and on to a breakdown chamber on a cross rift. A piece of old rope showed the way to avoid a pitch by a traverse. Remembering Mark’s tale of snapping rope, I traversed using rock hand holds then called to Nick that I was clear of the rope.

I was just looking for a way to get down the steep ramp below when I heard a shout from Nick, then I heard some groans from below. Shit, he must have fallen. I guess he had clipped the rope with a cow’s tail and weighted it slightly, and it broke.

I hastened down the slope to find Nick wedged in a corner, blood streaming down his face. An inspection revealed a huge gash but his limbs did not seem to be broken. He was very dazed and in a lot of pain. I collected the pieces of his broken light, got it all going again and then we started the slow journey out.

All the up hill was a bit of a struggle for him but he kept a steady, slow, forward progress. The pain showed on his face with every step. We rested in the Elephant’s Graveyard but I wanted to keep him moving before he fell asleep. Every drop had to be rigged with an abseil and all the traverses rigged for security in case he slipped whilst struggling to get out.

He was yawning and coughing a lot towards the end but eventually, 5 hours after his accident, emerged at the entrance to a hail of rocks from the cliffs above. It was a great relief to finally reach camp and the help of the rest of the team."

Mick Nunwick

The rope had been placed in the cave during the 1978 expedition and appeared to be sound. It was orange polypropylene of platted construction. Under tension it gave no indication of failure, however, when a slight twist was applied the individual strands crumbled. The cause of this deterioration is not known.

It would appear that Nick had put some weight on the rope, which had broken causing him to slip. It was estimated that he fell 50' onto a rocky floor. He suffered a 3" gash on the front, top of his head, within the hair line. It would appear that the landing had caused his helmet to come off, even though his chin strap was fastened. His head then hit a sharp rock causing the gash. He had other grazes and cuts on his hands possibly as he grabbed the wall to stop his fall.

Nick arrived in camp at dusk. He was given a thorough examination and was found to be concussed with dilated pupils. He was suffering from cuts and bruises and generally in bad shape. He was coherent but shaking and cold and moving very slowly. In order to close the gash on his head it was necessary to cut his hair from around the cut. This allowed Pete Smart to close the wound with seven stitches.

Owing to the remoteness of Hidden Valley it was impossible to effect any sort of rescue until the following day so Nick was given some painkillers and put to bed, with a watching eye being kept by all the team.

All the team were well aware of the seriousness of the situation. Not only was Nick in a need of immediate hospital attention but he was also in one of the remotest parts of the Park. It was clearly impossible for him to walk out of Hidden Valley under his own steam but to try to carry him back to Park HQ would require an army of porters which were simply not available. It was clear to all, that the only option would be to evacuate Nick by Helicopter. Plans were made to send the radio set to the ridge at daybreak in order to contact Park HQ and call for a heli, little did the team know the this would be a lost cause. At the same time Tamajarau would set off on the long walk back carrying a note in case the radio link was unsuccessful.

Just as the radio team made contact with someone, Tamajarau arrived at the Park HQ. To the amazement of everyone it had taken him 3 hours 50 minutes from Hidden Valley, a route which normally takes 9 hours.

After a great deal of wheeling and dealing by Ting Hii, and the group's insurance cover note being produced, Hornbill Skyways agreed to send a heli. It became obvious that it would have been impossible to raise a helicopter from the radio call alone. The initial message was received at another national park and no one was prepared to authorise a heli, even if they understood the nature of the incident. It is certain that without Tamajarau taking the note back to Park HQ, and Ting's assistance, the heli would not have arrived.

Unfortunately they were unable to locate Hidden Valley or the heli pad so they returned to HQ and collected Ting who directed them. He had agreed to pay them cash for the heli and had an enormous wad of money in his top pocket. Mick Nunwick accompanied Nick to hospital in Miri.

Nick was given a thorough examination. He was found to have a torn sphincter, presumably caused as he landed. This was stitched without anaesthetic, much to his disgust, and he was then released. There seemed little point in him staying in Sarawak so a return flight was arranged and he left for the UK the next day. The flight home caused him considerable pain as he sat on his stitched bottom for 19 hours. It took a long time for Nick to recover thoroughly and he was very unsteady on his feet on rough ground for over six months. Fortunately by the time of the '98 expedition he had made a full recovery and was able to join the return expedition.

Nick had undertaken what can only be described as a phenomenal self rescue. It is a tribute to his strength and determination that he was able to get out of the cave under his own steam. It is also a tribute to Mick Nunwick who enabled Nick to reach camp without suffering further injury.

Dr. Pete Smart's rapidly self-taught stitching techniques were admired by the Miri hospital who decided that there was no more that they could do to the head wound.

The Team are also indebted to Ting Hii for sorting out the heli. Had he not bypassed all the politics, and come up with a wad of cash, the heli would never have taken off.

Tamajarau deserves a very special mention. All the team are indebted to him for the epic, record breaking, journey back to Park HQ which undoubtedly saved valuable time and enabled Nick to be rescued that day.



Pete Smart stitching Nick's head

APPENDIX 3.

Caves of Gunung Api; Chart

APPENDIX 4.

Guidelines for Expeditions' Access to the Park

GUIDELINES FOR KARST RESEARCH AND SPELEOLOGICAL EXPEDITIONS TO PROTECTED FOREST ESTATES AND TOTALLY PROTECTED AREAS, SARAWAK

1. Introduction

The National Parks and Wildlife Division of the Sarawak Forest Department has now formed a Karst Management Unit. This Unit has been entrusted with the responsibility to constitute karst areas within the State, as Totally Protected Areas, and to monitor and take part in all karst and Speleological research work.

Previously all foreign expeditions have been entirely controlled and organised by their respective members with little input from the Sarawak Forest Department, sometimes with the loss of valuable information for the future management of karst areas.

There are an increasing number of foreign groups wishing to undertake karst and cave research in Sarawak.

2. General Guide Lines and Requirements

- 2.1 For the reasons as stated above the following criteria applies to all foreign groups wishing to carry out cave and karst research within P.F. Estates and T.P. Areas.
- 2.2 All foreign karst research expeditions will be joint ventures between the foreign group and Sarawak Government, with the Forest Department taking overhaul responsibility for control and management of the expedition.
- 2.3 It is recommended that the name of the expedition should be “***The Sarawak (? name of the foreign country) (???) Expedition***”.

- 2.4 The naming of caves and passages will be the prerogative of the Sarawak Forest Department.
- 2.5 The expedition report will be compiled and published in Sarawak in full co-operation with the foreign group.
- 2.6 Some items of equipment will be donated to the Forest Departments expedition equipment pool for future expeditions by mutual consent between the foreign group and the Forest Department.
- 2.7 The full costs of the expedition for the foreign participants will be borne by them.
- 2.8 Any report for publication in any foreign journal or the press must be first submitted to the Forest Department for approval.
- 2.9 The Sarawak Government and its officers shall not be held responsible for any loss of life, limb and property or otherwise, arising from the expedition, as regards to the members of the foreign team, before, during or after the expedition.
- 2.10 Any discovery of new species of fauna and flora must be regarded as a Sarawak discovery.
- 2.11 The decision of the Director of Forests or his representatives shall be final in all matters appertaining to the expedition.
- 2.12 The expedition leader will be required to sign a Memorandum of Understanding with the Forest Department.

3. Pre Expedition Requirements

As the Forest Department is responsible for all aspects of karst research, initial proposals from foreign groups wishing to undertake karst research and Speleological expeditions must first be forwarded to the above department, well in advance, with brief details of the following.

- 3.1 Objectives and areas
- 3.2 Dates of proposed expedition
- 3.3 Numbers of expedition members
- 3.4 Name of the leader
- 3.5 Name of the expedition

- 3.6 Agreement to abide with the preconditions and guide lines for research expeditions as outlined above and below
4. The proposal will then be discussed by the Forest Department. The main criteria will be that the objectives are in line with Forest Department and state government policy, the dates do not clash with other research projects, and the numbers of foreign personnel are logistically possible.
 5. When a favourable reply is received with any suggestions or amendments, the leader or leaders can then proceed with the following.
 6. Full details of 3: above with exact dates, scientific programme and CV's of all the team members.

Curriculum Vitae's should include the following information:

- 6.1 Name
 - 6.2 Passport No., Date and Place of Issue, Expire Date
 - 6.3 Date and Place of Birth, Sex and Nationality
 - 6.4 Address, Phone No., Fax No., E-Mail No.
 - 6.5 Education Details, Academic and Professional qualifications
 - 6.6 Present Occupation and Responsibilities
 - 6.7 Previous Professional Experience
 - 6.8 Membership of professional bodies, research, Speleological, sporting etc., date of membership, membership number and positions held if any
 - 6.9 Publications and papers, in brief
 - 6.10 Expedition experience, in brief
 - 6.11 Brief details of relevant research expertise
 - 6.12 Signed agreement that the member agrees to the conditions and guide lines
7. When the above information is received formal permission will be sought by the Director of Forests from the State Secretary. When this permission is received a formal invitation will be sent to the expedition leader.
8. **Requirements during the Expedition**
 - 8.1 The leader or his representative must pay courtesy calls on the State Secretary and the Director of Forests on arrival and at the close of the expedition.

- 8.2 On arrival the team must report to the Director of Forests for briefing and discussion on the logistics and objectives.
- 8.3 Training will be freely given to Forest Department staff where necessary.
- 8.4 The Forest Ordinance, National Parks and Nature Reserves Ordinance and the Wildlife Protection Ordinance must be adhered to at all times.
- 8.5 All caves will be surveyed to BCRA Grade 5. Important station numbers at junctions to be marked in waterproof ink on tape or waterproof paper for future reference.
- 8.6 All cave and survey data will be entered on the Forest Department Cave Survey Data computer programme before departure.
- 8.7 A preliminary report in English shall be submitted to the Forest Department before departure. This should include details of work carried out, scientific and otherwise, photo copies of all survey notes and log books. Photo copying and typing facilities can be provided by the Forest Department.

9. Post Expedition Requirements

- 9.1 The Report will be a joint effort between the foreign group and the Forest Department as stated above.
- 9.2 Cave surveys, cave and scientific reports must be submitted within 6 months from the close of the expedition. Details on the compilation of the report will be by mutual agreement.
- 9.3 Copies of the final report will be freely supplied to the foreign group members and their sponsors by the Forest Department. Additional copies for sale will be supplied at cost.
- 9.4 General guide lines for the report are as follows:
 - *The report will be written in English to included, surface location maps of all caves explored and cave topographic overlay.*
 - *Detailed cave maps with projected elevations showing important station numbers, unexplored leads etc., and length, depth, location grid reference, names of surveyors etc.*

- *Full descriptions of all caves explored.*
- *Full details of all research undertaken.*
- *Logistic details and expedition members.*
- *Acknowledgements.*

9.5 Good copies of all quality photographs, slides and videos taken will be supplied to the Forest Department free of charge for purposes of lectures and tourism promotion.

10. Address List

The State Secretary, Pejabat Ketua Menteri, Tingkat 18, Wisma Bapa Malaysia, Petra Jaya, 93502 Kuching, Sarawak.

Tel No. (0106) 082 441957 Fax No. (0106) 082 441677

The Director of Forests, Ibu Pejabat Jabatan Perhutanan, Wisma Sumber Alam, Jalan Stadium, Petra Jaya, 93660 Kuching, Sarawak.

Tel No. (0106) 082 442180 Fax No. (0106) 082 441377

Senior Assistant Director, National Parks and Wildlife Division, Forest Department, Kuching.

Tel No. (0106) 082 442180 Fax No. (0106) 082 441702

National Parks and Wildlife Office, Forest Department, 98000 Miri, Sarawak.

Tel No. (0106) 085 436637 Fax No. (0106) 085 431975

APPENDIX 5.

Topographical Map

APPENDIX 6.

Aerial Photograph

The aerial photograph overleaf is a composite comprising two photographs from the 1960 aerial reconnaissance of the area, carried out by the Royal Air Force. Original photographs were taken from 30,000'

The sortie reference is: 2F43 543A RAF171 6OCT60=0034Z 20in 30,000ft.

The photographs used to produce this image were Nos. 0116 & 0118. Unfortunately most of the dolines area is in shadow from the high ground to the east.

APPENDIX 7.

Cave Surveys

CONTENTS

<u>Plan Name</u>	<u>Malay Name</u>	<u>Plan Number</u>
Hidden Valley Area Plan	-	MC96/98-001
Arch Cave	<i>Gua Gerbang</i>	MC96/98-002
Yellow Pit Viper's Pit	-	MC96/98-003
Damocles Cave	<i>Gua Damocles</i>	MC96/98-004
Cloud Cave	<i>Gua Awan</i>	MC96/98-005
Bridge Cave	<i>Gua Jambatan</i>	MC96/98-006
Perseverance Cave	<i>Gua Ketabahan</i>	MC96/98-007
Highest Cave in Mulu	-	MC96/98-008
Tiger Caves	<i>Gua Harimau</i>	MC96/98-009
Clearwater VI & VII	<i>Gua Air Jernih</i>	MC96/98-010
Western Front Cave	-	MC96/98-011
Invader Streamway	-	MC96/98-012