

**GUA di GUNUNG API
(CAVES of FIRE MOUNTAIN)**



**EXPEDITION
REPORT
1994**

REPORT
of the
GUA di GUNUNG API
(Caves of Fire Mountain)
EXPEDITION
and the work of
NATIONAL PARK STAFF
and
VISITING CAVERS
in the
Gunung Mulu
National Park
Sarawak

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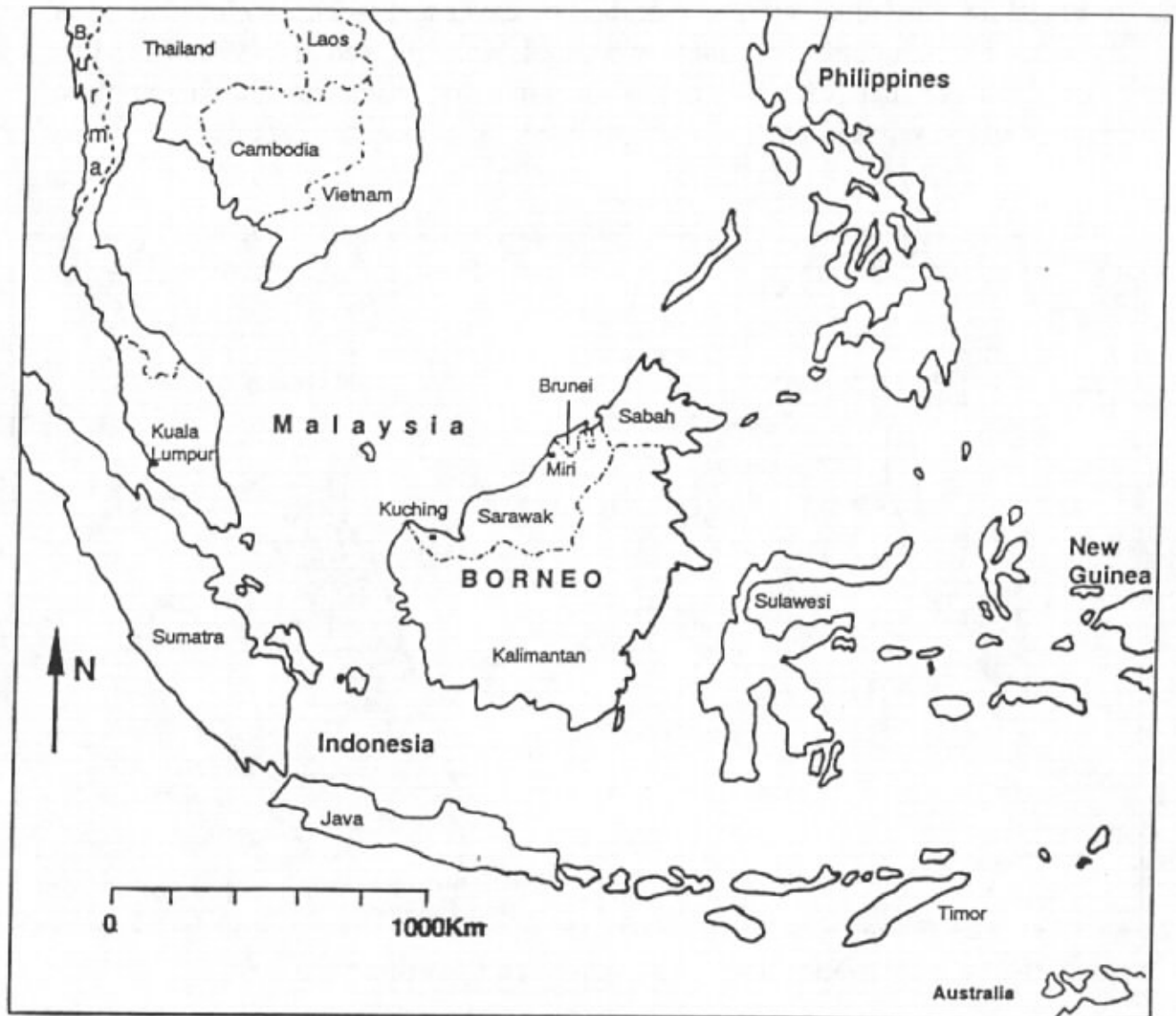
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INTRODUCTION

The Gunung Mulu National Park is centred on the the sandstone mountain Gunung

Mulu after which it takes its name. It is situated in the Fourth and Fifth Divisions of Sarawak close to their borders with Brunei. Since the park opened to the public in 1985 it has changed dramatically from a relatively unpopulated area to a thriving tourist attraction complete with airstrip and hotels.

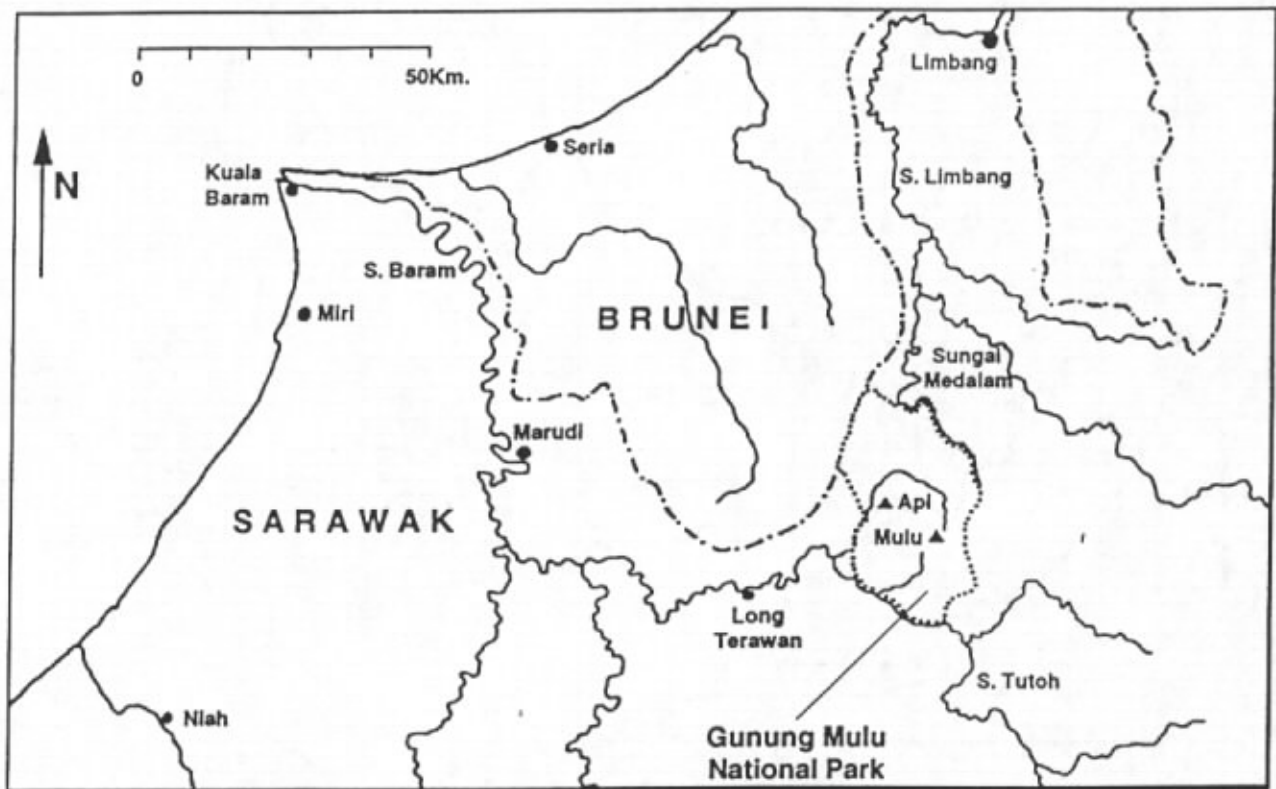


South East Asia

Gunung Mulu dominates the park and, upon its flanks, vast quantities of rainwater are collected and channelled down to the limestone peaks of Gunung Benarat and Gunung Api below. These rainwaters have, over the millennia, developed some of the largest and most spectacular caves in the world.

Spencer St John first documented the existence of caves in the area in 1858 but it was not until 1961, when G E Wilford visited the area, that any of the caves were seriously explored or surveyed. During 1978/79 a joint Royal Geographical Society / Sarawak Government Expedition invited a group of six cavers to join the fifteen month expedition.

During the three months the speleological team were in the park they discovered and surveyed over fifty kilometres of world class caves and laid a firm foundation for future cave exploration. This initial expedition was followed in 1980 and 1984 by two more large scale expeditions that included cave scientists. In all some one hundred and fifty-five kilometres of magnificent caves had been explored.



Gunung Mulu National Park Location Map

It was to be a further four years before a further serious expedition was to return to Mulu. The Mulu Caves '88 Expedition comprised a team of six cavers who discovered fourteen kilometres of cave passage in their major discovery Gua Batu Hitam. They also connected Cave of the Winds and Clearwater River Cave to make the system the longest cave in South East Asia. The following year they returned and added a further fifteen kilometres to Clearwater River Cave and discovered the main active passage Clearwater V.

In 1990 the Gunung Api Connection Expedition further explored the recently discovered Clearwater V river cave to a sump and then found a bypass to Clearwater VI. They also connected Drunken Forest Cave to the Clearwater system to give a new total length of seventy-eight kilometres. They also extended Simon's Cave to 3810 metres. Finally, in 1991, the Mulu Caves '91 expedition connected Blackrock Cave and Clearwater River Cave to take it to a total length of almost one hundred and two kilometres.

In all, between 1979 and 1993 over two hundred kilometres of caves had been explored of which one hundred and three kilometres constitute the Clearwater / Blackrock Cave system.

OBJECTIVES

Weather conditions in Mulu can have an enormous effect on the exploration possible in the caves. As some of our major objectives were quite definitely in the high risk area a number of lesser objectives were also identified. We were to select the most appropriate targets according to the prevailing conditions.

Gua Air Jernih (Clearwater River Cave)

1. The continued exploration of Clearwater VI river cave discovered in 1990. At the current end the passage is 5m wide, has no visible roof and is carrying the main drainage flow for Gunung Api.
2. The descent and continued exploration of Solo. This huge shaft was descended in 1979 by the Royal Geographical Society expedition to the top of a further draughting pitch. The prospects of a connection with Clearwater River Cave looked excellent and it would bring the depth to 430 metres.
3. A traverse across the sump at the end of the show cave to a wide open passage.

Gua Batu Hitam (Blackrock Cave)

Several leads had been left by the Mulu Caves '91 expedition and it was our intention to follow up as many as possible

Simon's Cave and Lagang's Cave

There are several sites for further work to connect Simon's Cave and Lagang's cave. At present there is very little known high level development in Lagang's Cave. Our intention was to search for this with the objective of connecting with the high level passages in Simon's Cave.

Gua Angin (Cave of the Winds)

A lead noticed in 1990 was to be climbed in an attempt to connect Cave of the Winds with Simon's Cave. This had defeated us when it was first discovered due to a lack of climbing equipment.

Lubang Lipah Sileh (Cobra Cave)

The end of Cobra Cave is wide open for further exploration. A highly flood-labile section of passage needs to be bypassed to give safe, all weather access but the rewards could be a cave running through to the Hidden Valley and possibly beyond.

Surface Exploration

Surface exploration was to be concentrated on the Melinau gorge with a systematic search for new cave entrances in Gunung Api. A blocked cave in Gunung Benarat that was discovered by the Mulu Caves '91 team was also to be visited.

On arrival in the park we discovered that some of the proposed objectives had already been visited by national park staff with visiting cavers. Frustratingly, for us, over fifteen hundred metres of passage had been surveyed in some of our target areas. Also there had been sufficient rain to make a visit to Clearwater VI and Cobra cave both foolhardy and a gross waste of precious time. There was, however, a great deal of work still to be done.

LEOPARD CAVE

Leopard Cave was discovered in 1980 and, whilst there were several loose ends to tidy up, it was not revisited until 1991 when a Korean Expedition claimed to have discovered approximately one kilometre of new passage. The cave was already 3375 metres long and the prospects of a connection with Clearwater River Cave were good. Apart from making the connection we hoped to extend the cave and, in all, some nine sites were identified for investigation before we left the United Kingdom.

Goldwater Foot Extension

A full day was spent finding the route to this passage due to confusion with the survey. Almost every wall and corner was searched for what is described as "a ridiculous thrutch up a vertical rift". Once Goldwater Foot had been found a gentle romp to the end ended at an obvious climb to an open rift.



Goldwater Foot Extension (Paul Norman)

Above the climb the passage continues past a small pool and opens into grander proportions trending south. The floor is deep swift guano and, whilst there are many

large formations they are dirty and covered in guano. The extension ends at a further calcite slope that was climbed with no way on being found.

Both walls of the extension were closely examined on the way out but no further passage was found. Close to the junction of Goldwater Foot and the link passage to Pussyfoot Chamber a small lead was found. This led to the top of an eight metre pitch into what may be either an alcove or a small passage. The lead was not followed up.

North Pussyfoot Passage

In Pussyfoot Chamber directly opposite the climb to Goldwater Foot a passage was found and surveyed. Whilst this passage has almost certainly been visited in the past it is unclear as to whether or not it has been surveyed. A small passage, at the bottom of one of the several holes in the floor, is almost certainly new passage. In all 160m of passage was surveyed.

In the North West corner of Pussyfoot Chamber, North Pussyfoot Passage starts as a low bedding that breaks quickly into a wide, well-decorated passage. It passes several holes in the floor and two small climbs to reach an exit to daylight. Approximately 30 metres along the passage a window looks down into Pussyfoot chamber. Down the second hole a small passage leads, after seventy metres, back to the main Leopard Cave streamway close to the entrance.

The Leopard Cave/Blackrock Cave Connection.

In 1980 an artificial climbing route was made to reach the Sceptic Scenic Series that runs just below the northern chambers of Clearwater River Cave. In 1991 the Mulu Caves Expedition connected Blackrock Cave and Clearwater River Cave and a side passage in the link area had an inlet that appeared to be at a similar height to the Sceptic Scenic Series. We felt a connection could be made in at least one of these areas.

A small team re-bolted the route up to Sceptic Scenic Series and spent a day finding the leads we had identified for pushing. At the extreme eastern end a short climb up into a muddy tube led to a window looking down into a large passage some ten metres below.

The following day the pitch was descended directly onto a survey cairn. Whilst the team knew they were in the Clearwater River Cave system they were not exactly sure where. Ascending the ramp passage it was soon obvious that they were in

Petrus's Dream Series that links the Blackrock and Clearwater River Cave systems.

Leopard Cave provides new safe route into the farther reaches of Blackrock Cave. It avoids the long and arduous route from the Blackrock Cave entrance and the Sweat of Fear Traverse from the Clearwater River Cave direction giving much safer and easier access.

BLACKROCK CAVE

With the easier route to the farther reaches of Blackrock we were able to follow up some of the leads left by the Mulu Caves '90 expedition. As our time at Long Lutut camp was drawing to a close some visits were simply to confirm the potential of the sites.

The 80 Metre Ramp

A steep ramp in Petrus's Dream Series was partially descended by the Mulu Caves '91 expedition that estimated its depth at 80m.

The passage descends steeply until at approximately -40m a passage leads north. After only 10m the passage turns sharply west and continues for a short distance with a deep slot in the floor to water. Continuing down the main ramp leads to a very muddy area at saturation level where no way on could be found.

The 50 Metre Pitch

Approximately one hundred metres south of Broken Hope Hall, in Petrus's Dream Series, is a huge hole in the floor. This had been reported as being over fifty metres deep and hopes were high that this may be a point at which the system had broken through to the next bed of limestone east of the Revival bed. In the event the pitch was a little over thirty metres and simply looped back to the ramp passage below the Leopard Cave connection.

Originally this pitch was passed by climbing up dip (east), traversing past it and then rigging a 20m pitch back into the passage. A traverse route at the main passage level is now rigged avoiding this diversion.

Caves is Where You Find Them

The passage was easily located and the un-descended pitch and passage some fifty metres along the passage were explored though not surveyed.

At the bottom of the pitch (15m) is a small chamber with a ramp descending a further fifteen metres to end in small, choked passages. Climbing out of the chamber, at the opposite end to the descent rope, leads to a small passage with a floor slot. The passage soon ends and down the slot leads to larger passage that also quickly closes down.

There is still good potential here since, on leaving the area, a good draught was detected in the main passage.

The Broken Glass Pitch Bypass

Passing the Broken Glass pitch required the traverse of a steep, slippery calcite slope above a deep pitch, the bypass avoids the associated risks.

Some thirty metres back from the pitch, towards Broken Hope Hall, is a climb up a black flowstone bank. This leads to a traverse, on flowstone ledges, which eventually drops back down into Phoenix at the top of a boulder slope.

Pete's Peccadillo

This lead was first noted by the Mulu Caves '91 expedition that commented on its promise. The passage ends at an un-scaled climb to a passage that emits a strong draught. The site was revisited with the intention of completing the climb and reconnoitring the passage. In the event there was time only to confirm the promise of the site and the requirement of the top three metres to be bolted.

CLEARWATER RIVER CAVE NORTHERN LEVELS

Whilst camped at Long Lutut the opportunity was taken to locate the position of the North Exit of the Clearwater River Cave system. This entrance is notoriously difficult to find due to its size. It was easily located by following the foot of the scar for two hundred metres north and then turning directly up the scar/scree slope for about eighty metres. The track is now fairly well defined but how long it will remain so is debatable. There are now a number of guides familiar with its location.

The objectives were simple and were the investigation of a number of leads that have remained un-visited since 1980. The connection of Leopard Cave and Blackrock Cave had removed several objectives that were associated with the connection of the Clearwater system to Leopards Cave.

On a familiarisation trip a passage was seen high up in the west wall of East Passage. Entry was gained by throwing a length of raffia fastened to a rock through an eyehole at the side of the passage. This was used to pull up a rope that, in its turn, was used to haul up a ladder. One hundred and thirty metres of passage were explored and surveyed with one un-pushed lead at the top of a seven metre wall of loose rubble.



Helictites in East Passage, Clearwater River Cave (Paul Norman)

One other lead, in the east wall, led down a ramp and vertical pitch to end, in mud, twenty-three metres below East Passage at what was believed to be saturation level.

CAVE OF THE WINDS

An open lead left in 1990 and references, in the Park Guides log book, to open leads in the Seven Pillars of Wisdom area ensured that two or three day's work was required in Cave of the Winds.

Cave of the Winds River Passage

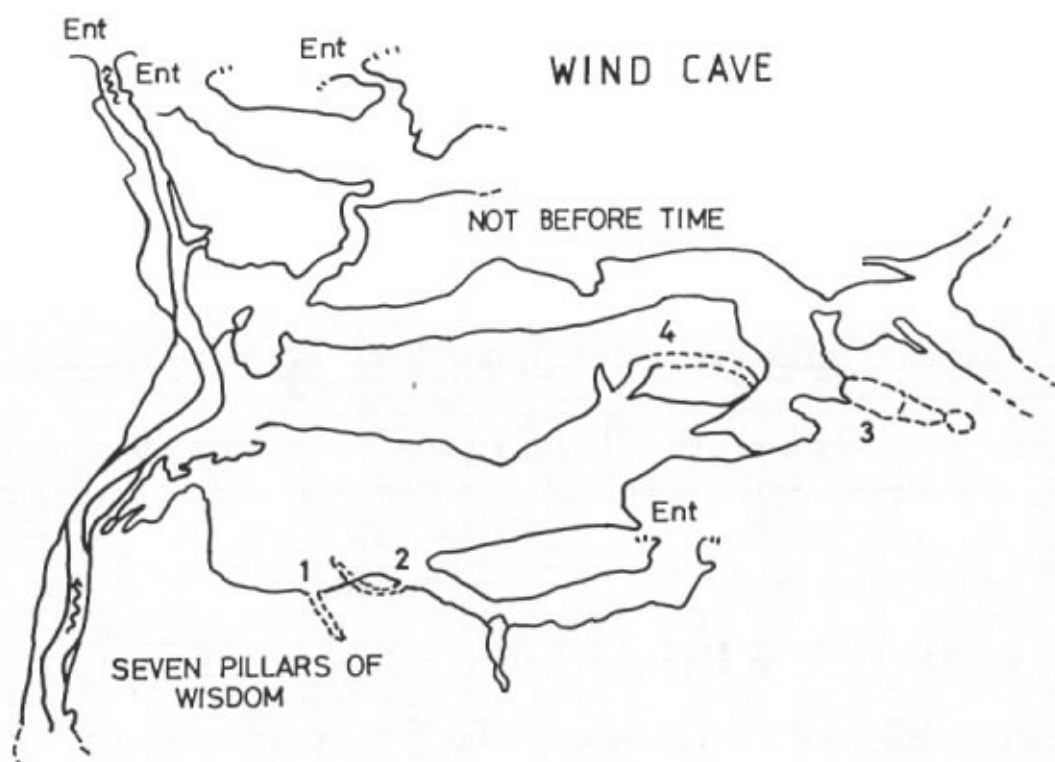
In 1990 an open passage was seen high in the south wall of the main river passage but was not visited due to a lack of appropriate climbing equipment.

Rather than bolting up the side of the unstable wall of rubble below the passage bamboo poles were lashed together as a maypole to gain access. The passage led to a series of narrow rifts and approximately ten metres of walking size passage. No possibility of a link with Simon's Cave exists here.

A parallel ramp slightly downstream was also investigated to a muddy chamber some thirty metres above river level.

Seven Pillars of Wisdom

Park guide expeditions in this area had noticed several leads in this high level series. The leads included holes in the floor and climbs to open passages. All leads were followed up as well as a passage discovered just above the rope climb to the Seven Pillars of wisdom.



Objectives in the Seven Pillars of Wisdom Area



East Passage Clearwater River Cave (Paul Norman)

PETER'S CAVE

In 1990 Simon Lagang, whilst employed as a Park Guide, discovered a cave entrance in an isolated limestone block (batu) between Long Pala and Deer Cave. He explored three hundred metres of large passage that continued in the same proportions from where he turned back.

Simon joined us in an attempt to relocate the entrance so that we could survey the known cave and explore beyond the known limit. In the event we were unable to locate the original entrance but a new cave was discovered and surveyed. The entrance is approximately 30m above the alluvial plain and is opposite the closest point of the old Long Pala - Deer Cave boardwalk to the limestone block.

From the entrance a fine phreatic passage averaging five metres wide continues for one hundred metres to a small chamber, Castle Glum. For almost the entire length the floor is covered with the hoof prints of wild pig. Twenty metres before Castle Glum are two interconnecting small phreatic tubes in the east wall. These have not been surveyed or pushed to a conclusion

From Castle Glum an ascending corkscrew climb and a short rift passage leads to the

Site 1.

This is a hole in the east wall that can be climbed into from a sloping ledge on the left. Initially this 3m ascending tube climbs at approximately 30 degrees for 50m. At this point it turns north and closes down with flowstone. A way on could be seen but the squeeze could not be passed. There is little or no potential here.

Site 2

A short way up the side passage towards daylight is a hole in the floor close to the south wall. A short pitch (7m) drops into a 3m diameter tube back underneath the main passage. About half way along an easy climb emerges into the main passage.

Site 3

Above the rope climb to the Seven Pillars of Wisdom climb over a huge hanging block. After a traverse along the north wall a short passage leads to an eyehole. From the eyehole a three metre climb drops into a small chamber with no exit.

Site 4

A flat out crawl and a squeeze through a calcite constriction leads to a further bedding to the head of a fifteen metre pitch. This drops to the boulder slope at the bottom of the rope climb back up into the Seven Pillars of Wisdom.

well-decorated Christmas Chamber. The draught can be followed past several holes in the floor and goes to a junction. Turning south-west with the main passage leads past more holes and over false floor to a final dogleg where the passage becomes too small. West at the junction immediately enters a chamber that spirals up to where a small passage is visible high in the wall above. In this area several side passages loop around to look back into the chamber from higher levels. The whole of the upper level is populated by swiftlets but the absence of any in the corkscrew climb suggests that there may be another entrance near here.

Half way up the corkscrew climb a rift passage enters which is rather tight but does draught. This was traversed for fifty metres with the way on continuing. It was not surveyed. The final going lead is a hole in the roof very close to the entrance.

STONE HORSE CAVE

Following the plankwalk to Deer Cave, and 500m after reaching the obvious cliff on

the left, a tree 'archway' reaches over the path. One hundred metres beyond this, guano can be smelt on most days. Ascend the wooded slope on the left to reach the bottom of the cliff. Climb up a low cliff on tree roots, and traverse left to reach the entrance.

A major fossil phreatic/stream cave, with extensive infill deposits extending throughout the cave. A relatively minor lower set of passages (Sump Series and elsewhere) has developed from small active inlets. The cobbled floor of the near-level main passage has been extensively reworked by these inlets cascading from above, forming large craters.

The cave is strongly linked to the overlying Frog Cave, as well as Fern Rock Cave which is located very close to the caves' extremity (but is truncated by calcification and infill). It is obvious that the cave has acted as a conduit for the Deer Cave stream at various times, as well as the Paku in all probability.

The cave has few objective dangers if care is taken, and the rope traverse is protected.

Main Passage

A short breakdown boulder slope leads down from the entrance into a 25-30m-wide trunk passage. The passage passes two bends, and climbs past formations into joint controlled passages leading to a 'bad step' over a gully. Beyond this, the passage widens until a large crater is reached. This can be passed by crossing a watered rock

bridge, and then traversing left along an exposed mud ledge (rope bolted in place in 1992). A corner is reached, and after winding between craters, the main fossil stream-bed is reached. This cobbled floor extends almost unbroken to the end of the cave except for a few pits formed by inlets. After passing Snoopy's Loop, a sudden left-hand bend after a passage-wide pit marks the clay-infilled end of the cave. Just before the cave terminates, a dark patch of water on the right wall can be observed. At a close distance, a hidden window into a parallel passage reveals itself (Surprise Junction) - which leads to entrance 4.

Sump Series

Several of the pits close to the rope traverse have passages leading out of their bases. These form a low-level series, and terminate at several sumps at a similar level. This water almost certainly resurges down the valley, close to the bridge over the main stream.

North Passage

Before reaching the rope traverse, a rift leads off to the left. This rift is orientated along a minor fault running N-S. These faults can be observed at regular spaced intervals throughout this system, and are probably related to the major faulting running from the Southern Hills up to the summit of Gunung Api. North Passage terminates at an increasingly exposed climb/traverse leading diagonally towards the out-of-sight ceiling. It is now recognised that this is almost certainly connected to Frog Cave, and requires no further effort.

Entrance 2

Midway along the main passage, a passage enters from the right which leads to daylight after passing the start of Makanan passage. This passage was captured from Frog Cave, as evidenced by the remnants of a phreatic tube leading across the roof of the main passage (25m high at this point) to the end of Centre Route in Frog Cave.

Entrance 3

Just after the passage to Entrance 2 is a slope leading to a small archway into a scree-sloped chamber. At the top of this chamber is a short, but tricky, climb to reach a T-junction with a passage ascending to the right. Up from this point reaches a 5m pitch into the continuing passage to a small entrance. Downhill reaches the pit close to the end of the main passage. A short traverse has to be made on the right to reach firm ground.

Entrance 4

From Surprise Junction, the passage slopes down to a clay choke in a similar manner to the main passage. Steeply uphill in a very high passage reaches a series of climbs

on 'pinnacles' formed by dripping water. Eventually a large pit is reached which is passed via an exposed climb on mud to the left to reach a large entrance. Traversing round the hill to the left at this level reaches Paris Cave.

A passage is observed on the left before reaching the entrance, and leads to an ancient section of passage which appears to be choked. No draught was observed, but this passage may once have lead to Paris/Fern Rock cave.

Descending into the pit near the entrance reaches a boulder ruckle. This can be entered on the right to emerge in a passage which continues to descend (via a short pitch) in a similar manner, until it begins to rise into a dangerously unstable area (not passed). This is directly below the large doline seen downhill from the entrance, and is not worth pursuing further.

FAT FROG CAVE

Following the plankwalk to Deer Cave, the original entrance is located approx 100m before Stone Horse Cave. Climb up 40m to the left to reach the base of the main cliff. Follow a fallen tree up a steep gully on the right to reach the small entrance.

A hydrologically complex cave, which mirrors Stone Horse Cave 30m below it, and is part of the same system - albeit of greater age. This cave represents a period when Deer Cave would have been in its relative infancy, and probably carried the Deer Cave stream at various times. It is also possible that the cave carried the Paku stream through Fern-Rock/Paris Cave: or vice-versa even! A study of past water flows would be of considerable interest. The cave was explored by Forestry staff over a period of time, in conjunction with local and foreign cavers visiting the park. As yet, no physical connection exists between Fat Frog/Stone Horse cave and Fern Rock/Paris cave due to breakdown and calcification. The total system length in this event is expected to easily exceed 10km.

It should be noted that most of the cave is fairly technical, loose, and requires some skill in climbing and Single-Rope Technique (SRT). For the sake of conservation and safety, it is recommended that inexperienced cavers not be allowed to enter the cave - a problem considering the relatively easy access via the Deer Cave plankwalk.

Entrance to Junction 32.

A boulder-strewn passage is entered which emerges in a high aven. Beyond the aven, the passage narrows to a rift which finishes abruptly at an undescended pitch (believed to be the same rift entered from near Portcullis Entrance, see later). This rift lies along a strong fault-line extending through the hill. Before entering the rift, an

overhanging 5m climb on the left reaches a near-vertical ramp which is climbed for 15m to an arrete with a large passage leading off to the right. If this is ignored, the passage rapidly drops down a large hole above the aforementioned rift. Handlines were left in place in 1992/3 on the climbs.

The passage to the right meanders past several craters and an unstable 4m climb to a narrow, draughting gap between a calcite boss and the ceiling. This was widened to permit a tight squeeze into a 15m diameter tunnel leading off left and right (Junction 32).

Left-Hand Route.

Left from Junction 32 leads via deep, black guano (the Sea of Tranquillity) in a pleasant phreatic tunnel to an abrupt undescended drop of approx 20-25m. A delicate traverse on the left wall (20m rope and 2 slings essential) leads around a right-hand bend to a large ledge. The ledge reaches a solid floor, and the tunnel passes an obvious drop to finish at a too-narrow slit overlooking a large chamber. The 5m drop is rigged, and emerges at the top of a slope leading into the same large chamber. Turning right from here reaches Sunbeam entrance, with Bat-Trap beyond it. A Cave-Racer was observed here hanging from the ceiling whilst consuming a bat. Turning left in the chamber you arrive at a mud slope which leads to a ledge with daylight entering from the small Portcullis entrance to the right. Straight ahead is a narrow rift which arrives at the top of a 17m free-hanging pitch (stud bolts in place) to an arrete in the middle of a large aven. The drop continues unexplored for at least another 20m over loose boulders. This rift is expected to be the same as that observed near the entrance.

Right-Hand Route.

Right from Junction 32 leads into a formation-filled chamber. On the left a small passage leads off - Centre Route. To the right, in a continuation of the original passage, a broken 25m pitch is reached which drops into Stone Horse Cave - adjacent to the rope traverse (left, rigged in 1993 on bolts). This represents by far the easiest route into Fat Frog Cave in terms of difficulty and route-finding.

Centre Route

The small passage enlarges, and reaches a steep ramp leading down to the left. At the bottom of the ramp a 15m wide passage leads off to the right, and a large hole is observed to the left. This hole can be bypassed on the right to reach a blind parallel passage running alongside the passage below the ramp. The 15m-wide main passage to the right is flat and pebble-floored, and is an excellent example of an abandoned stream-bed. Beyond this, the passage narrows and zig-zags through joint-controlled bends until large holes in the floor begin to impede progress (Every Which-Way and Loose). A ledge is followed on the right via a short, but exposed, climb (a handline or

slings could be useful here). At this point, a window in the wall leads to a sharp rift which bypasses the climb with difficulty. At the end of the ledge, the pit is crossed via a narrow boulder bridge to arrive at a junction with a passage to the left. This left-hand passage is a floorless, but climbable, rift which reaches small phreatic tubes (explored, but unsurveyed. Aid required to pass blank wall at end of rift). A drop to the left was descended, and is believed to connect with Stone Horse Cave. Straight on from the junction reaches a wide, low passage which quickly stops at a direct 25m pitch into the main Stone Horse Cave passage. The remains of the tunnel can be observed in the roof of this large void, and it is clear that entrance 2 of Stone Horse Cave was once the extension of this passage. It is noteworthy that the passage near entrance 2 has similar stream debris to Fat Frog Cave, which is of a different pebble-size to that in Stone Horse Cave.

Lawai's Loop

On a corner of the zig-zags in the Centre Route, a slit enters a series of small passages which loop around to re-enter the main route. At the furthest point, a draughting passage closes down to a low bedding where the passage can be seen to continue. It is doubtful whether this passage can be passed without enlargement. It may continue into the hillside, or more likely connect with Snoopy's Passage in Stone Horse Cave, which is close-by and similar in context.

PARIS'S CAVE

The entrance is high above the plankwalk, and it is very difficult and strenuous to locate from below. It is strongly recommended that the cave be located from Entrance 4 of Stone Horse Cave as described previously.

This cave is the direct high-level continuation of Fern Rock Cave. It is hard to deduce exactly what has occurred hydrologically in this area; did the Paku flow through Fern Rock and Paris's Cave or is Paris's Cave some sort of phreatic remnant of downstream Deer Cave, intersected by a developing Stone Horse/Fern Rock system?

Main Passage

The large entrance passage is of the order of 50m wide and up to 25m high. Proceeding over ground scored with the tracks of wild boar (the Pig Run), the passage abruptly narrows and deepens to form a 30-50m high passage which crosses a high ridge in the middle of a chamber to eventually reach a 25m pitch over debris. This is better rigged by traversing out on the left wall to reach a large thread

belay. A bolt rebelay 4m down enables a free hang to be made into a very large arched passage - the end of Fern Rock Cave.

Richards Rat Run

If the slope is descended to the left of the ridge, a window in the wall can be found. This leads into a series of small phreatic passages, and eventually a rift parallel to the main passage. It is suspected that this rift is associated with a minor entrance which is passed on the way to Paris's Cave (tackle is required). At the lowest point of this series is an upward leading, draughting tunnel which is blocked with large boulders. This point is surveyed to be just under the boulder slope below Entrance 4 of Stone Horse Cave, and is the closest point between the two caves.

GUA BATU PAKU (Fern Rock Cave)

Fern Rock Cave lies in the western flank of the Deer Cave massif. Following the discovery of the cave by National Park guides some further exploration and surveying (845m) was done in 1991 by the Gunung Api Connection Expedition. Over the next two years National Park exploration groups discovered further passages and a connection with the Stone Horse system (Paris's Cave). In 1994 the Gua di Gunung Api Expedition continued the exploration and surveying to include two more entrances (Hornbill and Canopy Exit) and extend the surveyed length to 1.66km. The following description combines the work from the Gunung Api Connection Expedition in 1991 and the current expedition in 1994.

From the National Park HQ take the Mulu Summit trail for about 1km. Where the trail veers to the left, continue straight on through the forest for a few hundred metres to the Melinau Paku river, which runs at the foot of a limestone cliff. A large submerged (depth depends on height of river which can vary significantly) tree trunk can be used to cross the river onto the narrow (2-3m) bank below the cliff. Just to the left two small entrances can be seen through the trees approximately 30m up in a vertical section of the cliff. To the right (west) a third, larger entrance at a similar height has been seen but it is not known if this entrance has been visited.

To the left (east) of the two small entrances the cliff drops back from the river and becomes a steep slope. To gain the original entrance scramble up the slope for 15-20m then take an ascending traverse to the right across the cliff using trees and roots, ending with an exposed section to the entrance. To reach Hornbill entrance, which is to the left and higher, follow the same route until a large comforting tree is reached

on the lower part of the rightwards traverse. At this point climb slightly to the left and vertically for about 10m, around another tree and over a ledge into the entrance.



The climb to Gua Batu Paku (Becky Weight)

Original Entrance

The Original Entrance is a small sand/mud floored area 2-3m high, draughting from the back. On the right a short crawl leads to a 3-4m wide incut ledge with a grill of stalactites and trees above a vertical section of the cliff followed by a second duck under to another sandy ledge. The first section of passage is relatively small (2-3m wide and high) with old columns and flowstone and a dry mud/sand floor. This opens into a larger, cleaner passage to the right with a dissected floor. To the left a passage descends to a climb/pitch (not known if descended). Ivy passage from Hornbill Entrance joins from above (8m pitch) along this section.

Hornbill Entrance

To the right (west) a walking size passage, Riverside, loops out to another entrance after about 30m. To the left a crawl soon opens up to a walking size passage with occasional low areas, Ivy Passage. After 50-60m a small tube on the left extends for 40-50m to a 3m drop into a slightly larger passage but this was not surveyed or explored further. Continue in Ivy passage for a further 45-50m to a hole in the floor (8m pitch) down into Original entrance passage. Traverse around the hole, on the left to the top of a steep ramp with a 2-3m vertical drop at the bottom, into the Original Entrance passage.

Continue along the Original Entrance passage past some holes in the floor to a small passage on the left (1-2m wide and high). After a few metres descend a hole in the floor (tube about 1.5 by 2-3m and just off vertical) for 5m (rope recommended) to a short, narrow, descending passage to a four way junction.

An alternative route to the four way junction is by continuing across the top of the hole in the floor past 3-4 more holes to a larger hole across the passage. The passage appears to go on beyond the hole but has not yet been explored. Climb down on the right, descending 10-12m into a passage which doubles back underneath the holes just passed (voice connections through most of them). The lower passage is clean washed with a small inlet from one of the holes in the roof and a sharp boulder floor. After 20-30m descend an open shaft (9m pitch) to a ledge. Below the shaft drops several metres into water and above links to one of the holes in the upper passage floor. An ascending, exposed traverse around the left wall of the shaft leads to a small ascending ramp passage, with an ox-bow crawl, and to the four way junction.

To the north from the four-way junction a low passage runs for about 100m in a mixture of low tubes, rifts and small chambers. A steeply descending tube (rope needed) and a horizontal tube crawl have been noted but not explored due to lack of time. The passage ends at a larger rift chamber with a calcite flow (~45 degrees inclination) coming in from the roof on the left. This was climbed for 17m and estimated to go as far again before appearing to narrow down.

To the east from the four way junction the ramp like passage ascends for a further 20-30m, passing an opening on the left, to open into a large phreatic tube running NE/SW with a sediment floor, Robert's Highway. The opening on the left also joins Robert's Highway. To the NE Robert's Highway soon closes down. To the SW it continues, past a large opening high on the right into Canopy Way, and becomes half filled with stony sediments with a channel by the left wall. After about 100m Robert's Highway enters the side of a large strike oriented phreatic passage

descending to the east. Continuing down to the east progress is stopped by a pitch (not descended?). In the other direction (south west) the main passage rises and is some 5m high and 10m wide, with a dry mud and rock floor with a dusting of guano. The passage continues larger and more horizontal for some 200m, passing the southern junction to The Trenchfoot Arm and an area of huge columns and flowstone. A canyon opens in the floor on the right running parallel then crossing the passage. Staying on the left of the passage cross the canyon and then avoid a second deeper canyon by climbing through some formations on the left. Cross a wide flat area where the roof slowly dips to the floor to where a large high aven connects to the Stone Horse System.

At the southern junction with The Trenchfoot Arm the passage climbs to the west over dissected mud, infill and flowstone floor, before swinging northeast and becoming horizontal. The passage, with an arched scalloped roof and dry mud floor, continues 2-3m high and 10-15m wide for about 100m before meeting a deep rift in the floor. Follow a narrow mud and infill ledge on the left until it is possible to climb down and cross the passage into a bouldery area with a dissected floor and the junction with Canopy Way. Climbing down to the right soon meets Robert's Highway. To the left the passage ascends. Climb over an unstable arrete of mud and infill with a crusty calcite surface, which crosses the passage. After 50m or so the passage closes down and tree roots can be seen. A short way back in the west wall a smaller passage leads out to Canopy Exit up a short, steep sandy slope with a convenient tree root handrail. Canopy Exit is a ledge 2m wide and 15m long under an overhang in the cliff, with a glorious view over the canopy, towards the Park HQ, Southern Api and Batu Bungan.

MELINAU GORGE

The team reconnoitred Gunung Api in the Melinau Gorge looking for new entrances and examining leads in known caves. At the request of the Park several sites on Gunung Benarat were also visited.

PINNACLE CAVE

This cave was first entered in 1990 by a Korean expedition and it was subsequently surveyed by National Park Guides and a small group of Dutch cavers. Their survey notes indicated a hole in the roof with a draught. The draught could not be located but the hole does appear to lead into a passage. It will require a bolt route to reach the hole due to the very loose nature of the fill which constitutes the cave walls directly

below the hole.

A very exposed climb on rotting calcite in a side passage led to a large very well decorated alcove in what is home to what must be one of the largest bat colonies outside Deer Cave.

A cave some 50m higher up the mountain from Pinnacle Cave ends at a hole in the floor. The hole is approximately 0.3m diameter through 3m of water perforated rock. It looks down into a cave passage of 7m diameter but it will require a great deal of effort to excavate a way through.

PROBOSCIS CAVE

Half an hours walk from Camp 5 leads to a cliff with several high level entrance features. Most are heavily calcited and blocked. One however has a large tufa shield over it and it does appear to draught. This is Proboscis Cave and is so named because of the resemblance of the tufa shield to the nose of the Proboscis Monkey.

PARANG CAVE

Some 200 metres from Proboscis Cave is the entrance to Parang Cave (Gua Parang). At its furthest point (approx 50m) there are three locations where a powerful draught is present. This is quite definitely cave air draught (as opposed to recirculating air around the chamber and entrance) and the removal of a small quantity of fill will probably lead to a large cave system.

GUNUNG BENARAT

A surface traverse of Gunung Benarat within the gorge discovered a draughting cave which was blocked by mud. High above a second entrance was found but this was equally sealed. This cave had been visited previously, probably by the 1984 expedition. A second day was spent climbing to a feature between the gorge and Cobweb Cave seen from a helicopter. This proved to be no more than an alcove and holds no further promise.

CONCLUSIONS

The expedition surveyed some two kilometres of new cave passage and connected Leopard's Cave with the Clearwater River Cave system. The Clearwater system is now over 107km long and is the seventh longest cave in the world once again.

It is becoming increasingly apparent that no connection is likely to be found between

Cave of the Winds and Simon's Cave. It seems almost certain that any connection has been truncated by a deep valley between the two caves. Any further work should search no higher than the Mezzanine Series in Simon's Cave.

The caves of the Melinau Gorge will require more work to enter than their more southerly counterparts. This is due to the vast amount of river fill (sandstone boulders and mud) washed into the caves as Sungai Melinau truncated them as it cut its way down through the gorge. Very little is known about the previous work in the gorge and much of previous expeditions work must have been repeated. Now is the time to start a coordinated and thoroughly documented search of the gorge.

The discovery of caves within the isolated limestone outcrop and the surveying of 700m of passage in Fern Rock Cave once again highlights just how much cave awaits discovery within walking distance of the park headquarters.

EXPEDITION MEMBERS

British team members

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Augustine	Camp manager
Murang	Tropical Adventure Guide
Paris Wan	Tropical Adventure Guide Manager

NON-EXPEDITION CAVERS

These cavers have worked extensively in the Park but were not members of the expedition. Specifically they explored and surveyed Gua Kuda Batu, GuaKatak Gemuk and Gua Paris. Several members of the Expedition also worked in these caves and, where this is the case, their names are not repeated here.

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Visiting Cavers

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