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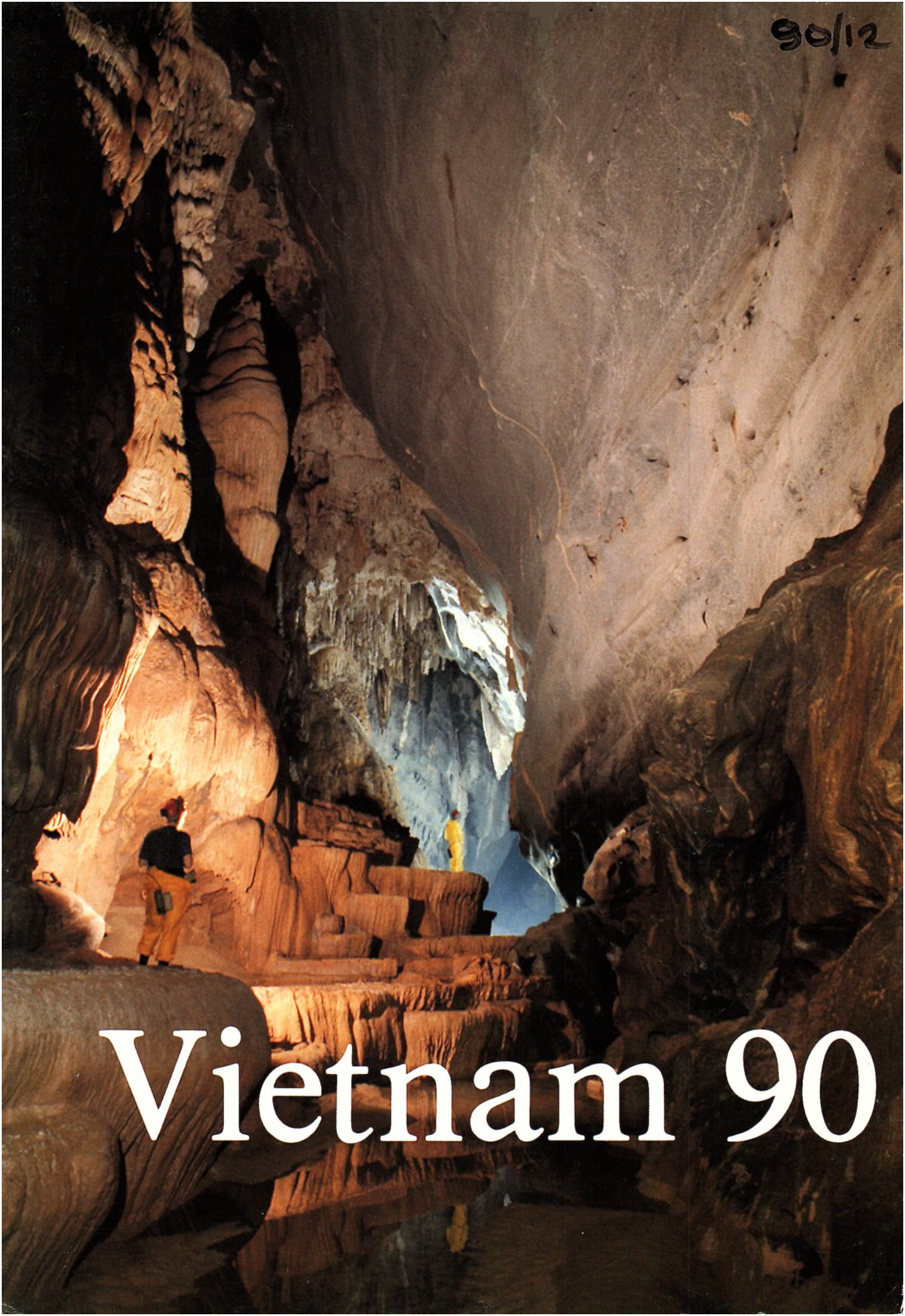

# Vietnam 90

Report on the
British Speleological Expedition
to

# VIETNAM

March/April 1990

Compiled by D.R.Bradshaw

*"No matter what difficulties and hardships lie ahead, our people are sure of total victory".*

HO CHI MINH.

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# Introduction

Picture yourself in a boat on a river gently paddled under misty blue skies, all around you grey karstic towers rise from emerald green fields. As the boat rounds a corner a cool breeze blows on your face. Beneath a cliff on the horizon you discover both cold air and river emerge from a cave of world beating size — "Good Morning Vietnam"! It is a — "Moi Doi" (new day) for British speleology and Anglo-Vietnamese relations. The 1990 British speleological expedition to Vietnam was conceived in 1988 soon after the return of the "Mexico Black Holes" expedition. The leader, Howard Limbert, a veteran of three Mexico campaigns, mooted the idea of turning the attention of the team, in the nineties, to South East Asia. He was quickly joined in the challenge by eight other interested parties.

Consideration was given to the caving potential of a number of countries, Thailand, Laos and Vietnam being top of the list, although at that time Vietnam was thought to be the least likely to grant permission for such a trip. A number of exploratory letters were dispatched to the relevant embassy, seeking permissions. The team were thrilled to receive, some time later, a positive reply. Giving permission in principle from the Vietnamese authorities, they also suggested individuals and organisations within Vietnam to be contacted to progress the project. The Vietnamese Board of Tourism and a specialist travel agent were approached initially, they in turn passed the project on to our final mentors, the faculty of Geology and Geography of Hanoi university.

During the following eighteen months numerous letters were exchanged with Hanoi and research carried out by both parties. As a result of these activities an outline plan and agreement emerged. The two years of preparation finally culminated with a party of nine British speleologists, backed by the Royal Geographical Society, leaving England on 16 March 1990 to spend six weeks as guests of Hanoi University, exploring, surveying and photographing cave systems in Northern Vietnam. The trip would take the form of a reconnaissance expedition with the remit to foster relations with the Vietnamese and lay the foundations for a longer term project in the future. The story and findings of that venture are documented in the following pages of this report.

## Hanoi University

The expedition owes a great debt of gratitude to the faculty of Geography and Geology, without their help we could not have succeeded in our venture.

Credit must be attributed to the enlightened foresight of Vietnam in building on its academic base, to which Hanoi university plays a major role. The twelve faculties and eight scientific centres associated with the institute are accommodated in a number of grand buildings disseminated throughout the capital.

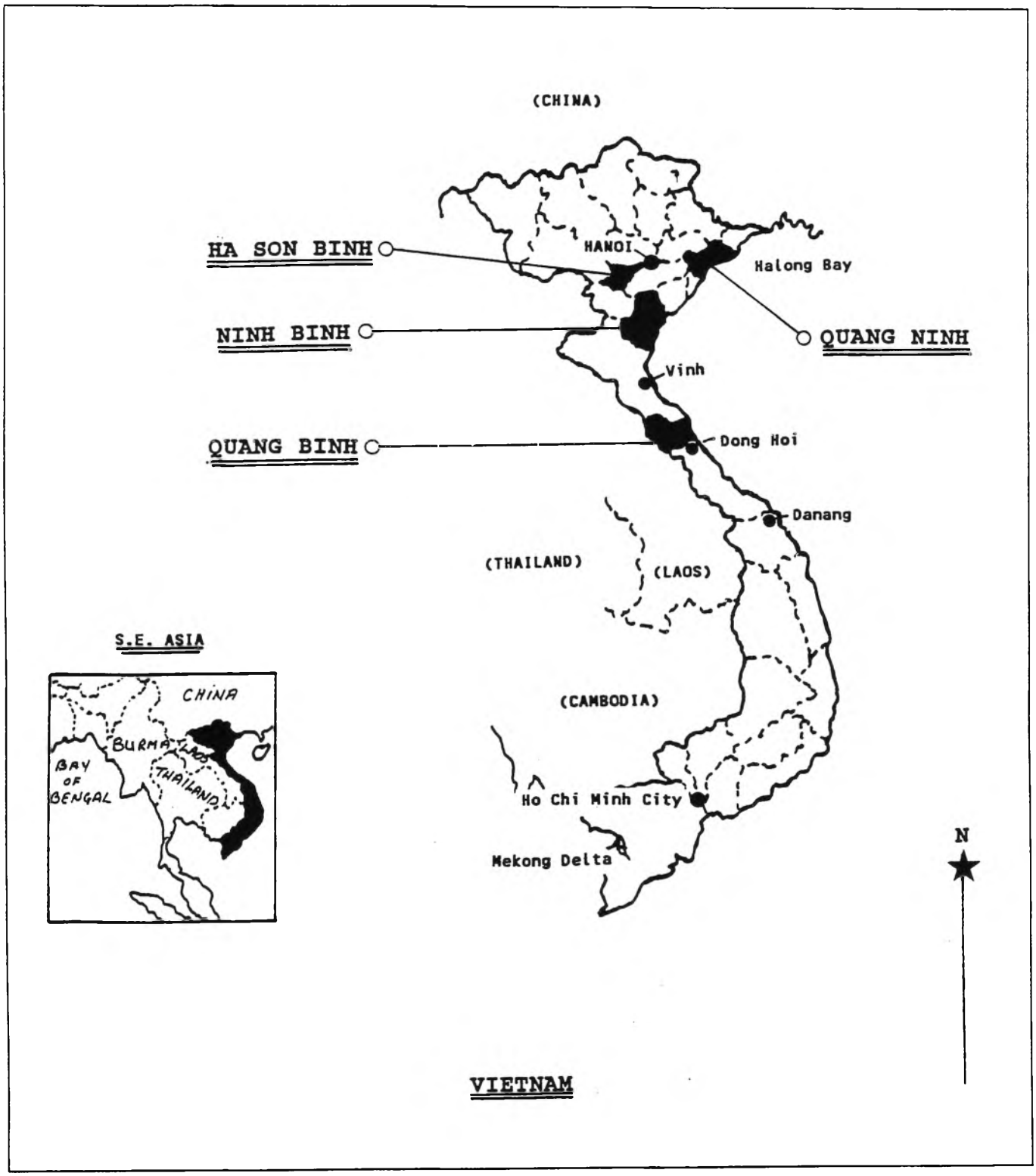
Four thousand five hundred students are engaged on studies with subject headings similar to those found on the prospectus of any western educational establishment. The courses are complimented by the eight hundred lecturers, all of whom are well qualified to act as mentors to their eager to learn pupils.

We were fortunate to enlist the help of the chairman of the faculty of Geography and Geology **Dr Trinh Van Long** and two of his senior lecturers **Nguyen Xuan Truong** of the division of Geomorphology and **Phan Duy Nga** also of the faculty and the department of international relations. Their combined professional skills and personal commitment were a great asset to the expedition.

The vice rector **Dr sc Phan Truong Thi**, the chief of the department of Geology. **Dr Dang Trung Thuan** (Dean) and **Le Chi Vy** of the department of international relations also played a key role in the organisation of this exercise in Anglo-Vietnamese co-operation.

*R. Cork.*

*Cover photograph: Phong Nha, Quang Binh, Vietnam. H. Limbert.*




Principle areas visited by the 1990 expedition.

# Quang Binh Province

The first caving area we visited in Vietnam was the province of Quang Binh. This province is bordered to the west by Laos and to the east by the South China Sea. The district of Dong Hoi, where we were based, is about 40-50 kilometres north of the 17th parallel, the previous border between North and South Vietnam. Consequently this area was badly devastated by the American War. The evidence is everywhere, from the hundreds of bomb craters to the remnants of bridges and the empty bomb casings used in houses and gardens, and for scrap metal. It is amazing that in just 15 years so many of the towns and villages that were completely destroyed have been largely rebuilt. We were also overwhelmed by the friendliness of these people, who have obviously suffered so much.

On our first day, we drove 32 kilometres from our idyllic beach guest house at Ba Don to the village of Son Trach. From here a motor boat was arranged to take us to the *Phong Nha* cave, well known by the locals. We travelled 4.5 kilometres up the Son River (Mountain River) to the first inlet on the left. The cave entrance was immediately obvious and the draught could be felt 50 metres away. *Phong Nha* means wind and teeth, the teeth being the stals that used to decorate the entrance. The cave had also suffered during the war, having been attacked from the air, and is now badly scarred. Transferring to two oar driven boats (Doc Moc) we entered the 30 metre wide 18 metre high entrance.

*Phong Nha* is a spectacular river cave. The first 1·5 kilometres can be covered by the Doc Mocs, or when totally necessary by a rubber dinghy! Apart from dry oxbows and a side passage, there are no other dry passages in the main streamway and the only alternative would be to swim the whole 1·5km. 700m into the cave a large sandbank is found on the right. Disembarking here, we followed the steeply ascending phreatic tube which was 10m in diameter. The top of the ramp led into a total of 1·5km of well decorated phreatic passage. The locals had explored this for five hundred metres where they were stopped by a climb that we rigged. This 6m drop and several short climbs were descended to more passage and eventually a stalagmite choke.

Continuing along the main river a large boulder fall is encountered, which blocks the river at 1·5km. Leaving the boat we climbed over and between the house-sized boulders, (again the locals had been this far), and entered a huge chamber. Surveying round the right hand wall we dropped down the other side of the choke and into a stream again. From the chamber, which is at least 90m wide there are several ways off. From the top of the slope a drop down over boulders required a rope, so it was not pushed. A short section of passage leads to a swim also unpushed. A third route leads back into the upstream continuation by a different route to the surveyed passage. From the boulder choke the surveyed route leads after 300m of swims to the junction of the other passage and the full flow of the main river.

As time was running out, a quick push at the main streamway was made to assess the requirements for a return visit. A small rapid is reached immediately, but this is soon passed. The flow of the water is generally quite strong, making swimming fairly hard work but not impossible. The next section can be passed quite easily on the side for a couple of hundred metres. It is then possible to leave the water and traverse the rocky left hand side for about 100m. Here you can follow a superb dry sandy oxbow or continue in the stream. The oxbow is 8-10m wide and 8m high for about 100m. A long section of swimming follows with no easy means of traversing the walls. In a couple of places large blocks have dropped into the streamway creating rapids where the stream is forced into narrow channels. These are the only tricky bits, hard work going up, but fast coming back downstream! The passage was left wide open at the first convenient point to get out of the river. There was an estimate of 1km unsurveyed.

*Wetsuits are a definite advantage due to the extensive swimming. We intend to have more dinghies on our return to ease surveying and photography.*

Whilst one team was having the trip of their lives in *Phong Nha*, the others had a spectacular day. Taking the motor boat further upstream on the Son river, a second inlet on the left is met. This is the *Chay River*. After about 1km up this inlet the river enters a gorge. On the left a large cave entrance is seen. This is *Hang Tôi* or Dark Cave. The entrance is 20m wide and 30m high. The initial passage is easy going in 30 × 20m dimensions. Several small lakes are passed involving short swims. There are many side passages (only 2 surveyed), and after 800m the foot of an immense boulder slope is reached. The boulder slope is 50m high and leads into a chamber 500m in circumference. Straight ahead in this chamber leads down the boulder slope for a short way in a large passage, involving clambering over massive blocks to reach a junction with the stream. Turning right in the chamber leads down the boulders to a balcony overlooking the streamway. A phreatic passage here 20m in diameter with massive stalagmite bosses leads to an easy but exposed 25m climb down to the stream.

The river passage is huge, in places more than 50m wide. Initially the stream meanders through gravel banks then follows 200m of boulders and sharp solution pockets. Eventually easy walking passage with a gravel and mud floor is reached.

The next obstacle is a series of lakes which have to be swum. The first, also the longest, is 120m. These lakes are separated by small boulder piles. Beyond the lakes 500m of large passage leads to the upstream entrance. Throughout this section there is a great deal of flood debris, fish and insects. The draught is also incredibly strong. The stream was followed for a short way on the surface before the jungle became too dense. This entrance and the resurgence entrance had also been shelled. On our third trip into *Hang Tôi* we were rather concerned to find water flowing into the entrance and enlarging the lakes somewhat. It was at this point that we realised that the Son river which flows directly to the sea was also tidal and the level had risen 1m. Due to the very low water levels in *Hang Tôi* it had temporarily become a sink! Further exploration is needed, as many side passages were noted which we did not have time to survey.

The *Chay river* (into which *Hang Tôi* resurges) continues into a gorge. It then meets a small waterfall preventing any further progress by boat. The river is said to resurge from a cave about 10km further up. Due to lack of time we did not get to it.

Continuing past the *Chay* inlet the Son river was followed by boat for a further 6km. This was the furthest point reachable by boat, as it was the dry season. At this point there are no caves except a short dry one on the right hand bank that had been used for shelter in the war. The locals spoke of many more caves a further 10km upstream. Two inlets to the Son river on the same side as the *Chay* and *Phong Nha* were investigated. The first led to a stream of cold water welling up from a deep hole between boulders. The second was presumed to be similar as the locals insisted there were no other entrances here.

There are reports of caves along the *Ho Chi Minh* trail, but the nearest is described as 40km away. This could be reached by jeep from Son Trach. A small cave 150m long with three entrances was investigated in the cliff face between *Phong Nha* and *Hang Tôi*. This was used as a factory in the war. There are concrete beds for the machinery and bolts in the walls, one section being blasted.

The Vietnamese have plans to use *Phong Nha* for tourism and it would make a spectacular show cave. The main streamway and the dry oxbow near the entrance are all well decorated. The river journey to the cave is also very beautiful as you are surrounded by limestone peaks and towers.

*D. Limbert*

# Ninh Binh

Ninh Binh City sits comfortably amidst scenes of limestone grandeur. Tower karst at its finest, rising abruptly from a sea of paddy fields into an impenetrable mass. These chunks of hollowed rock stretch out into the distance.

However, amidst all this are scenes of destruction. The towers nearest the city are being whittled away by hundreds of quarry workers bent on repairing highway No. 1 and its townships destroyed during the war. This is quarrying in the raw with not a machine in sight. Everybody from boulder trundlers to stone chippers work here and the final product is carried away to site by Buffalo cart.

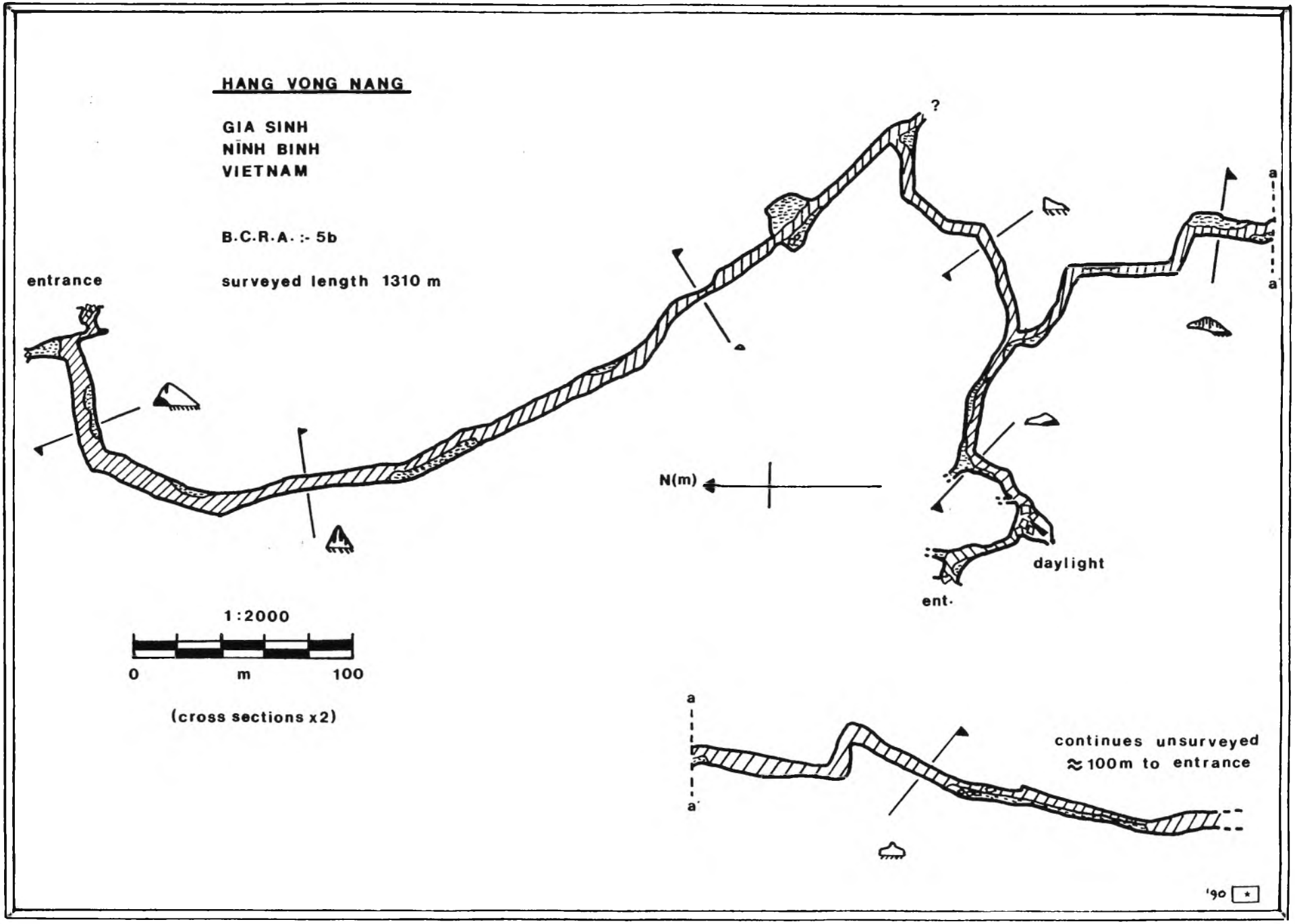
Heading inland you enter the ancient capital and historic home of Vietnam, Hoa Lu, a natural fortress making full use of the crazy towers and large cave entrances. The narrow entrance to the citadel was guarded by tigers and panthers but these animals have long since disappeared.

Despite the overpowering presence of the great rock *Limestone*, caving potential is very limited. Throughtrips at the base of these blocks being very much the order of each day spent here. Many are tourist caves and are popular with the Vietnamese when on holiday. Some of course have religious significance making them inspiring and photogenic. So we became tourists for our 5 day stay, exploring but not discovering the caves, with perhaps one exception Hang Vong Nang .

## Vong Nang

There was a lot of talk about a cave that had no end. This was what we wanted to hear, so the full team got changed ready to do some virgin exploration.

At the entrance a few leeches began attaching themselves to parts of the body and so a few people dropped out. The cave is entered with a swim in a narrow rift amongst dead fish. This deterred a few more before the cave finally opened up to subway dimensions. After 0·5 km of swimming we reached a


HANG VONG NANG
GIA SINH
NINH BINH
VIETNAM
B.C.R.A. :- 5b
surveyed length 1310 m
entrance
?
a
a
N(m)
daylight
ent.
1:2000
0
m
100
(cross sections x2)
a
a'
continues unsurveyed
≈100m to entrance
'90

junction — seemingly a rarity in Vietnam. The cold muddy waters confirmed that this was perhaps virgin territory. A bat dung infested lake deterred the surveyors from completing the through trip achieved by the pushing team, but after surveying the side passage they emerged through a much more pleasant exit to the blistering heat of yet another totally enclosed karstic valley. The mistake is to walk back overland instead of using the much shorter cave route.

## Hang Tang

"Yes there's a cave near here called 'Dark Cave' but access is only by coracle". Only 4 are available so whilst John, Tim, Dick and Andy tried to kill Truong and Long, showing them some SRT techniques off a loose limestone tower, the rest of us tried to sink the coracles. A good effort by the heavy weights Bob C & Dany.

Suitably arranged we set of through paddy field channels for a kilometre to the cave entrance. Now here's where things get complicated. The photography team could not enter the cave because Deb's girl punter did not know the way and Dany's girl punter knew the way but refused to go first because she was scared. Bob C and Howard's punter girl could not understand why she had to keep stopping in mid punt to hold onto a roof pendant. A lot of jockeying for position now took place with Nga translating complicated movements.

Giving up on the photography until the return journey, we began surveying in. The girls became experts at holding position whilst measurements were taken. Mine and Nga's punter girl, Tang, began to take charge and her expertise through the cave was a joy to watch (nudge, nudge). The cave echoed to the sound of *Dung Lai* (stop) and *Didi* (go). Some parts of the cave are quite narrow and low, forcing us to lie down in the coracles. Unfortunately Nga found some delicate parts to my back with his carbide light at these points.

We emerged into a completely enclosed valley with cliffs soaring up on all sides. Obviously a cave materialized at the far end of the valley. This turned out to be a lot shorter and again emerged in an enclosed valley. No doubt the stream would do the same again but time was short. The caves were very photogenic so we chose photos over exploration.

More shuffling for position. Dany's coracle was on the verge of sinking and his woman was not happy, her panicking in the cave didn't help matters. Deb's coracle was leaking badly so her helmet doubled up as a bailer. Nga was ripping his hair out with translation problems. Bob C & Howard's girl seemed to be lulling into a state of shock.

All the problems were miraculously rectified with the appearance of the camera. Now the cave echoed to a different tune — *Lights out, nervous giggles, flash, stunned silence* — followed by a burst of excited chatter as we moved on to the next photographic spot.

A very enjoyable trip, unique in many ways including my injuries sustained in the cave, a sore bum and a burnt back.

Ninh Binh province is of course a massive area. Our search for caves was restricted to areas within close proximity to Ninh Binh City. Further afield the Karstic towers increase in height and bulk, some reaching up 800 metres. Presumably the caves will follow suit.

It's impossible to be disappointed in the caving when you are surrounded by such breathtaking scenery.

*R. North*

# Ha-Son-Binh Province

This area was chosen by our Vietnamese colleagues because of its famous pagodas and the easy access to Hanoi (60km). We originally planned to visit this area for only 4 days, however we decided to extend the stay to 9 days rather than stay in Hanoi. Our good friends at the university obtained the correct permissions in double quick time.

From Hanoi we travelled on good roads dodging thousands of cyclists until we approached Luc Son. This area consisted of isolated karst towers, magnificent scenery but limited caving potential. We continued onwards to Hoa Binh where we obtained an excellent guest house and our base for the next 3 days. Hoa Binh is situated on the Black River where 10 years ago using Russian aid and technology, an impressive dam for hydroelectric power was built. The dam has flooded a large river valley but unfortunately some water continually disappears. This is due to the fact that a large part of the catchment area consists of limestone and the water has found a way through many caves that exist in this area.

In Hanoi we obtained some good 1:50,000 maps of the province and along with our geological map worked out the areas to check. The area nearest Hoa

Binh consisted of C1—Carboniferous limestone and therefore we felt had good potential. However on arrival at Hoa Binh it was obvious that the limestone was only in outcrops intermingled with sandstone. The maps, some being French, had an interesting feature in the hills surrounding Hoa Binh. A closed depression had the words "Grotte" clearly marked, hence the first trip for one group was to check this out. The cave was found after a steady 5km walk from town, the cave being well known by the locals and called *Hang Can* meaning dry cave.

The cave had a stream entering a large entrance at the base of a tower, at an altitude of 220m. The 15m × 8m entrance soon reaches the river via a second entrance. Using cut steps in calcite leads to an exposed traverse on a stal ledge, through a small passage to a series of big dry chambers and a third entrance. These chambers were used by bat guano collectors, to be used as fertiliser on fields. The stream is then followed through the attractive entrance into a massive river passage for 300m in dimensions of 30-40m high and 40m wide. This terminates in a massive run-in of boulders. An inlet enters on the right 5-10m wide which goes for 200m to an entrance west of the main cave. From the boulder choke the river cuts down on the left and the passage reduces in size to 3m wide. It drops down several small cascades with deep pools to an area of prolonged deep water, then follows 200m of swimming. A junction is reached with a large abandoned passage which can be followed for 100m in a 20 × 20m passage to a small entrance amongst blocks. Here the stream can be seen resurging and running away on sandstone. The length of the cave is 750m with huge passage dimensions and sporting climbs and swims. The team were finishing off all the leads when they encountered a huge python in the river inlet passage. Tim was keen on poking the monster with a stick, however the others persuaded him that it wasn't a good idea and left the cave in search of another mysterious deep shaft which unfortunately was never located.

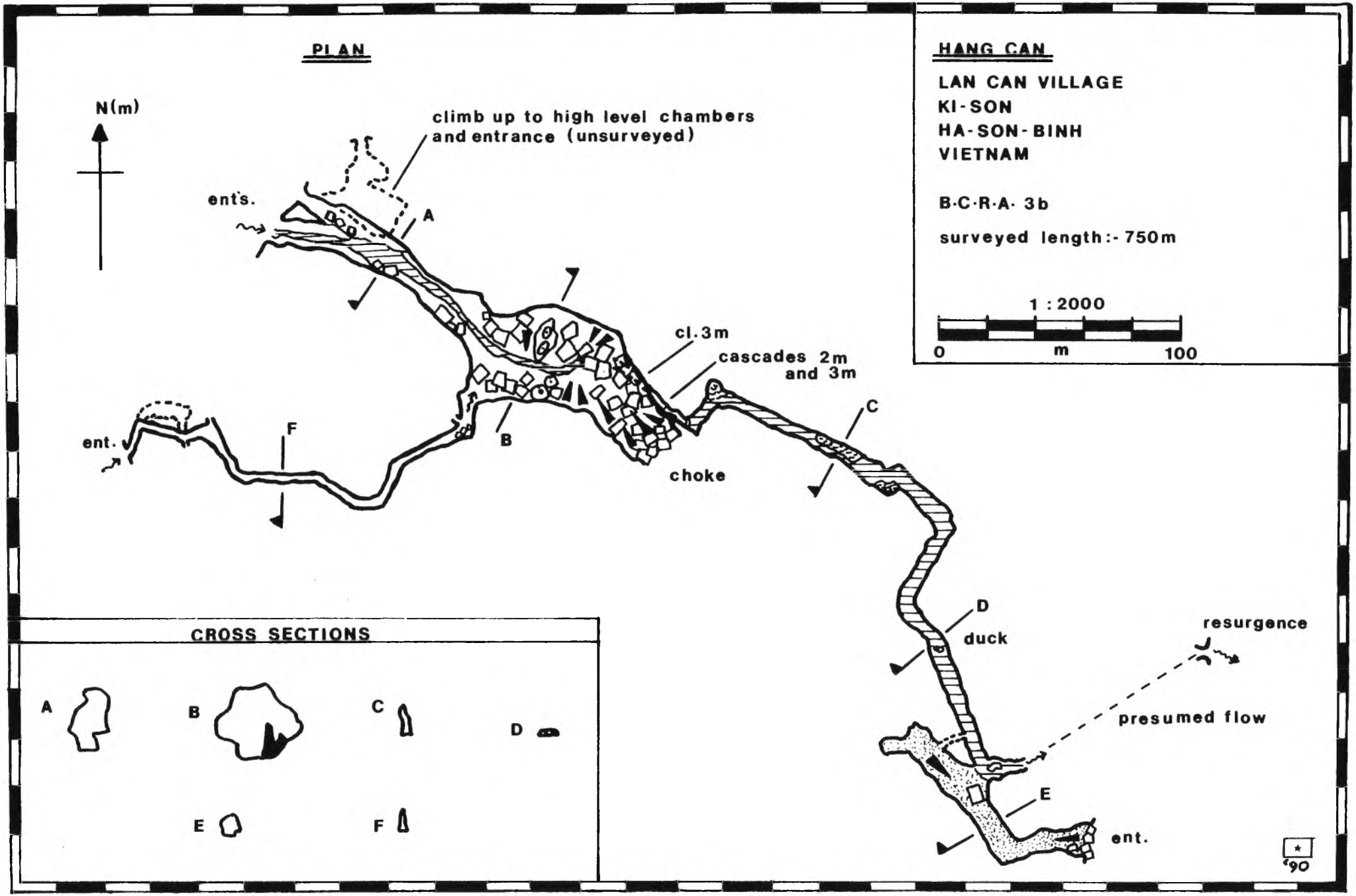
Meanwhile another group went further afield, in search of an obvious sink and closed depression located on the map. They found a cave named *Hang Lan*, a very sporting cave with several cascades which unfortunately sumped after 700m. The cave is well decorated with clean active flowstone and excellent gour pools. This cave was surveyed, pushed and photographed in two short trips, one of the times in flood conditions which made the cave quite exciting.

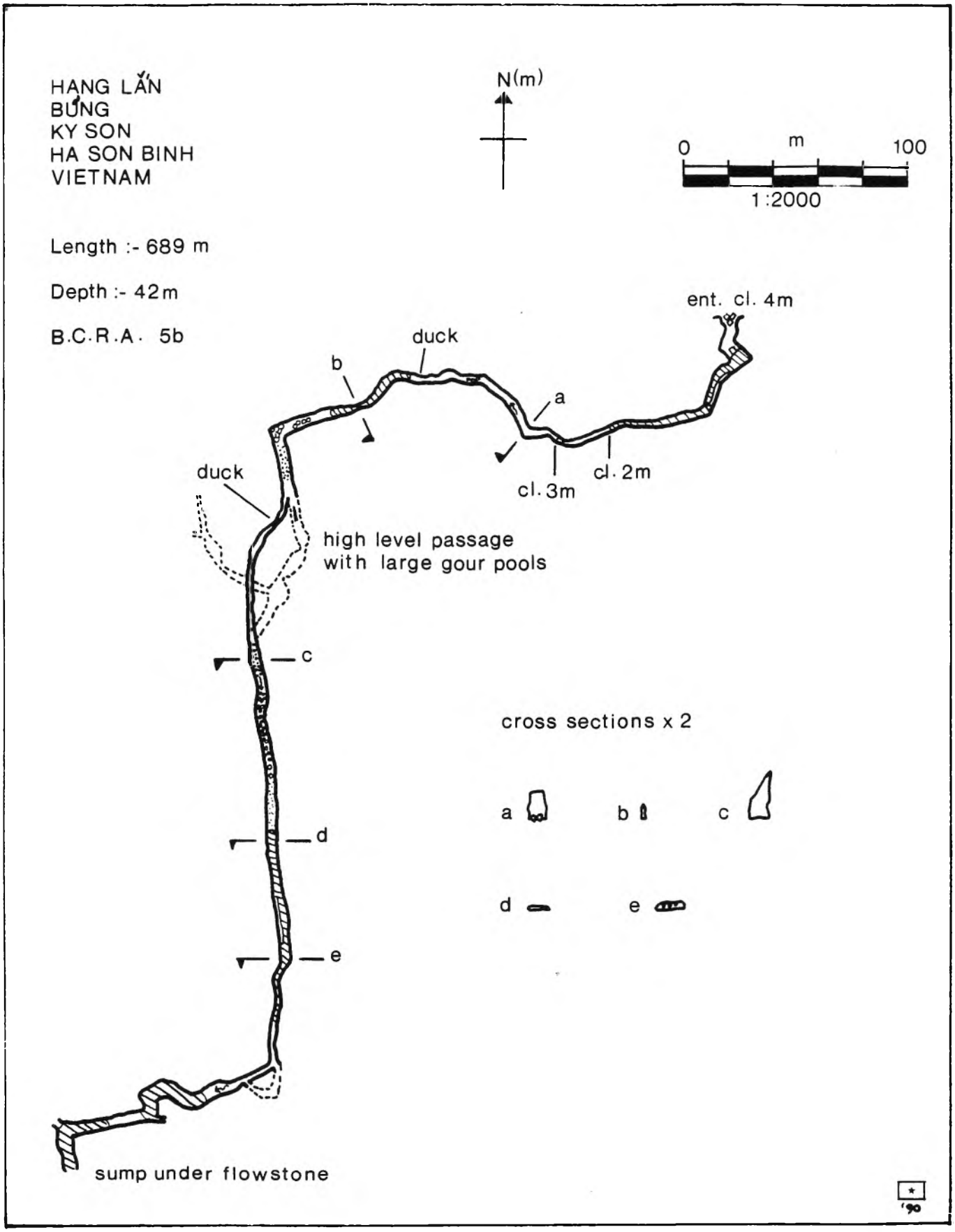
While these short but interesting caves were being checked, a small group took the bus and travelled 40km (2·5 hours) to the scenic village of Mai Chau. The locals told tales of huge caves, strong winds and gold. Because of the lack of cave potential around Hoa Binh the whole team set off to Mai Chau the following day. Many of the people in this beautiful area are of the Thai minority group and a number do not speak Vietnamese. This did not seem to cause any problems and just as everywhere we went in Vietnam the people were incredibly friendly and helpful towards the expedition.

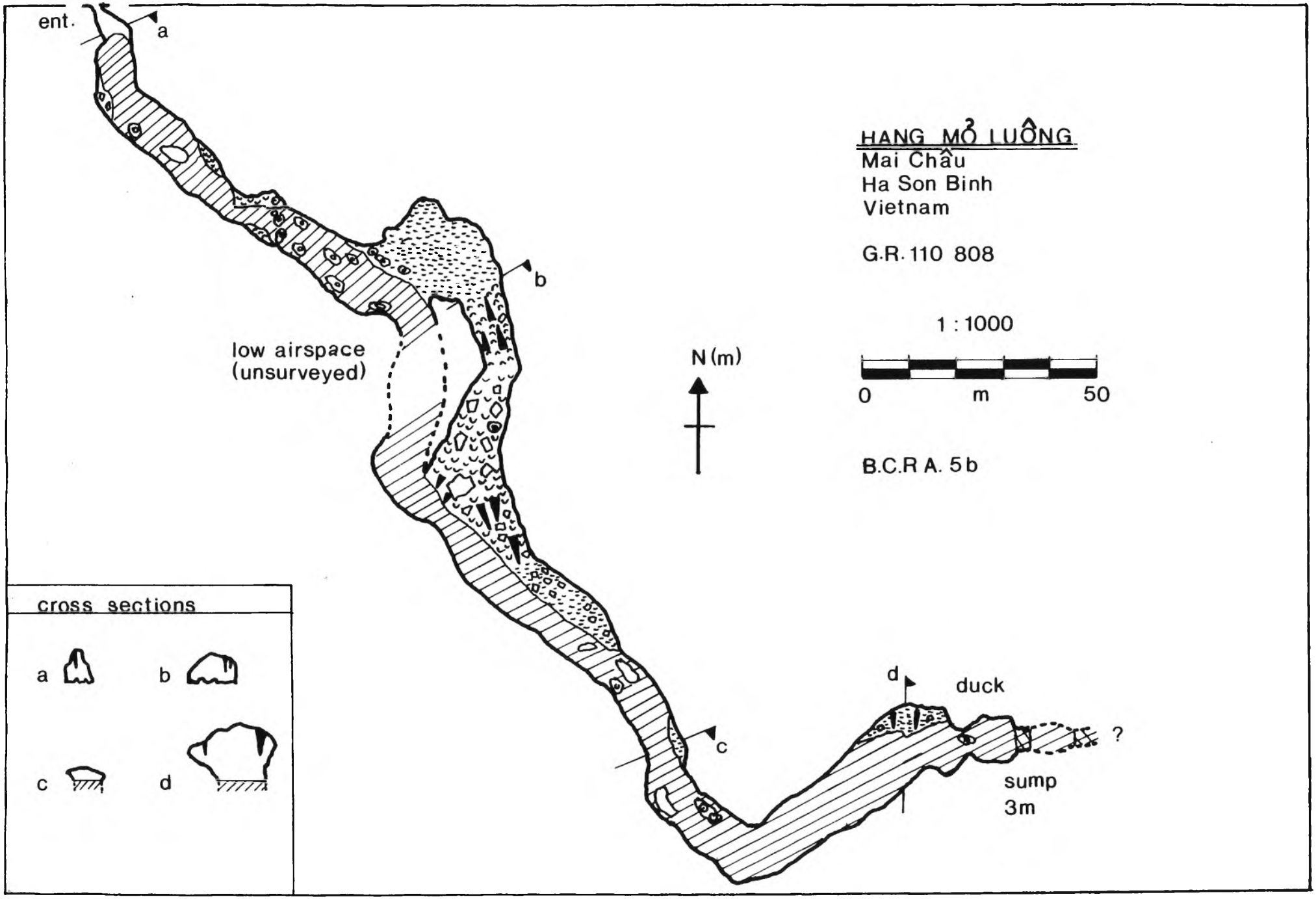
The next day we investigated the two main side valleys which enter the Mai Chau valley, both of which have a sizeable stream at the base. All the caves around the base of the hills were either sumped (free diving was attempted) or choked. We were told of many caves in the hills and we set off in the midday sun, climbing up to around 700m where we were shown a large shaft. Very dense jungle surrounded this huge shaft 60 × 40 meters in diameter and we were told of many animals (monkeys and bears) that lived here. The shaft was descended for 70m but not fully bottomed. The shaft looked to choke and the whole place was very, very loose and dangerous. We were told of other caves 2 hours walk away with rivers entering, however due to lack of time we went back to base stopping near a lake to check out a small cave entrance nearby. *Hang Mo Luang* (water mine cave) though only 350m was a really beautiful cave. The whole cave was well decorated and the water at 16°C was the coldest we had found in any of the caves so far. The whole cave had an artificial water level, caused by a dam forming the lake near the entrance hence swimming past and through huge stals made the cave very photogenic. The cave sumped and was free dived 2m to a short length of passage to a more conclusive sump. The cave however was of large dimensions and gave us the feeling that more caves were to be found in this area.

Meanwhile another team had driven up a new road to an altitude of 750m checking out many closed depressions, all of which closed down very quickly. The next day was spent checking lower down the valley for resurgences and we were told of huge long caves but they were all in the next province for which we had no permission. However we were informed of a cave called *Bat Cave* only 4km away. Again in temperatures of around 40°C and high humidity we slowly staggered up to this classic Vauclusian well. An enormous passage with a strong draught was followed for 272m and 106m deep to a complete choke — very disappointing.

We only had a few days left before having to return to Hanoi, when our Vietnamese friends obtained permission from the People's Committee in Mai Chau to go into the hills with an altitude of up to 1450m and stay over night. This journey was a great experience


PLAN
N(m)
climb up to high level chambers
and entrance (unsurveyed)
ent's.
A
cl.3m
cascades 2m
and 3m
C
ent.
F
B
choke
D
duck
resurgence
presumed flow
E
ent.
'90
HANG CAN
LAN CAN VILLAGE
KI-SON
HA-SON-BINH
VIETNAM
B·C·R·A· 3b
surveyed length:- 750m
1 : 2000
0
m
100
CROSS SECTIONS
A
B
C
D
E
F


HANG LẮN
BUNG
KY SON
HA SON BINH
VIETNAM
N(m)
0
m
100
1:2000
Length :- 689 m
Depth :- 42m
B.C.R.A. 5b
ent. cl. 4m
duck
b
a
duck
cl. 2m
cl. 3m
high level passage
with large gour pools
c
cross sections x 2
a
b
c
d
e
d
e
sump under flowstone
'90




HANG MỎ LUÔNG
Mai Châu
Ha Son Binh
Vietnam

G.R. 110 808

1 : 1000

0 m 50

B.C.R A. 5b

2 Phong Nha phreatic tunnel.

3 Phong Nha beach and boats.

4 phong Nha river passage

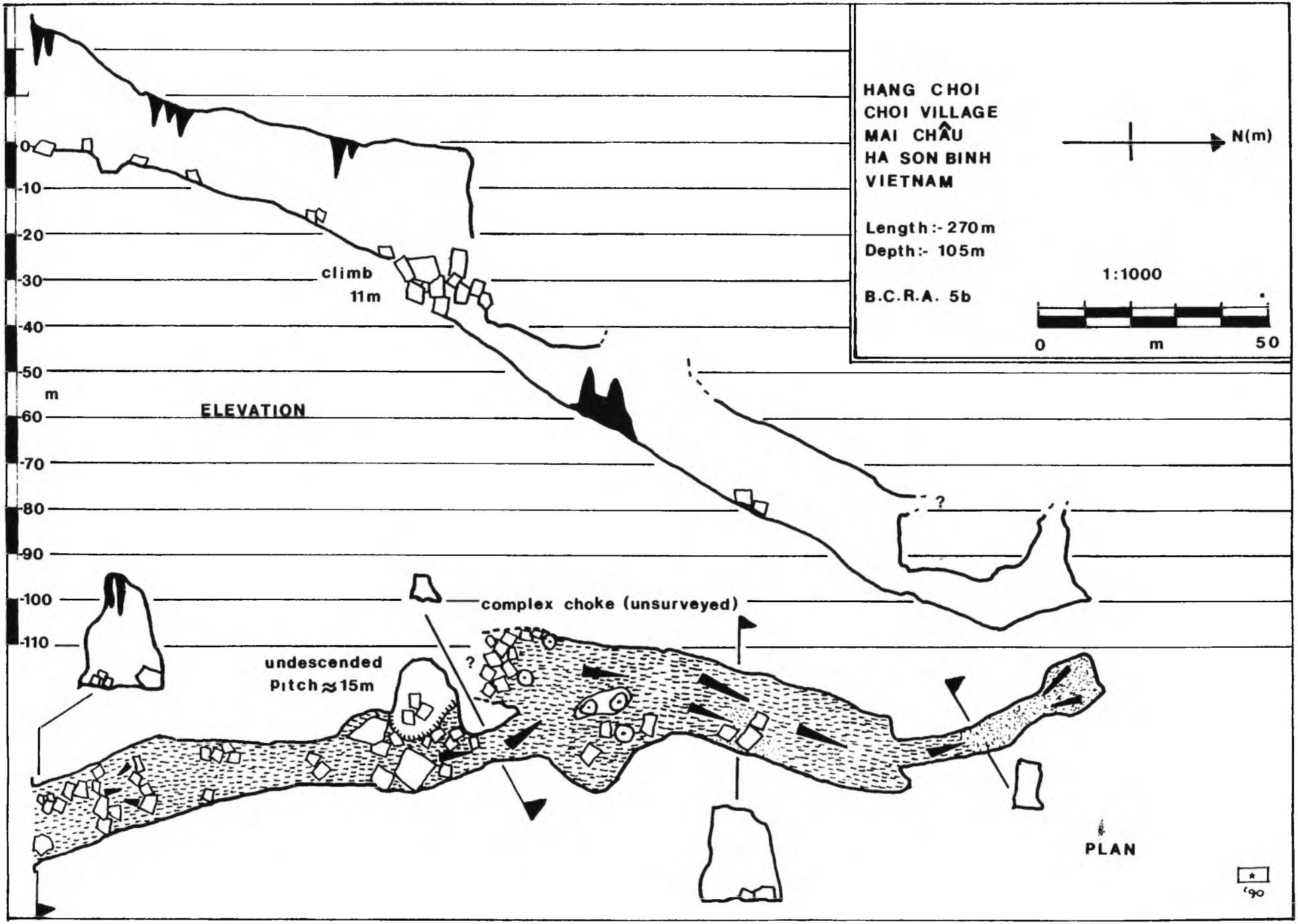
5 Hang Toi main passage.

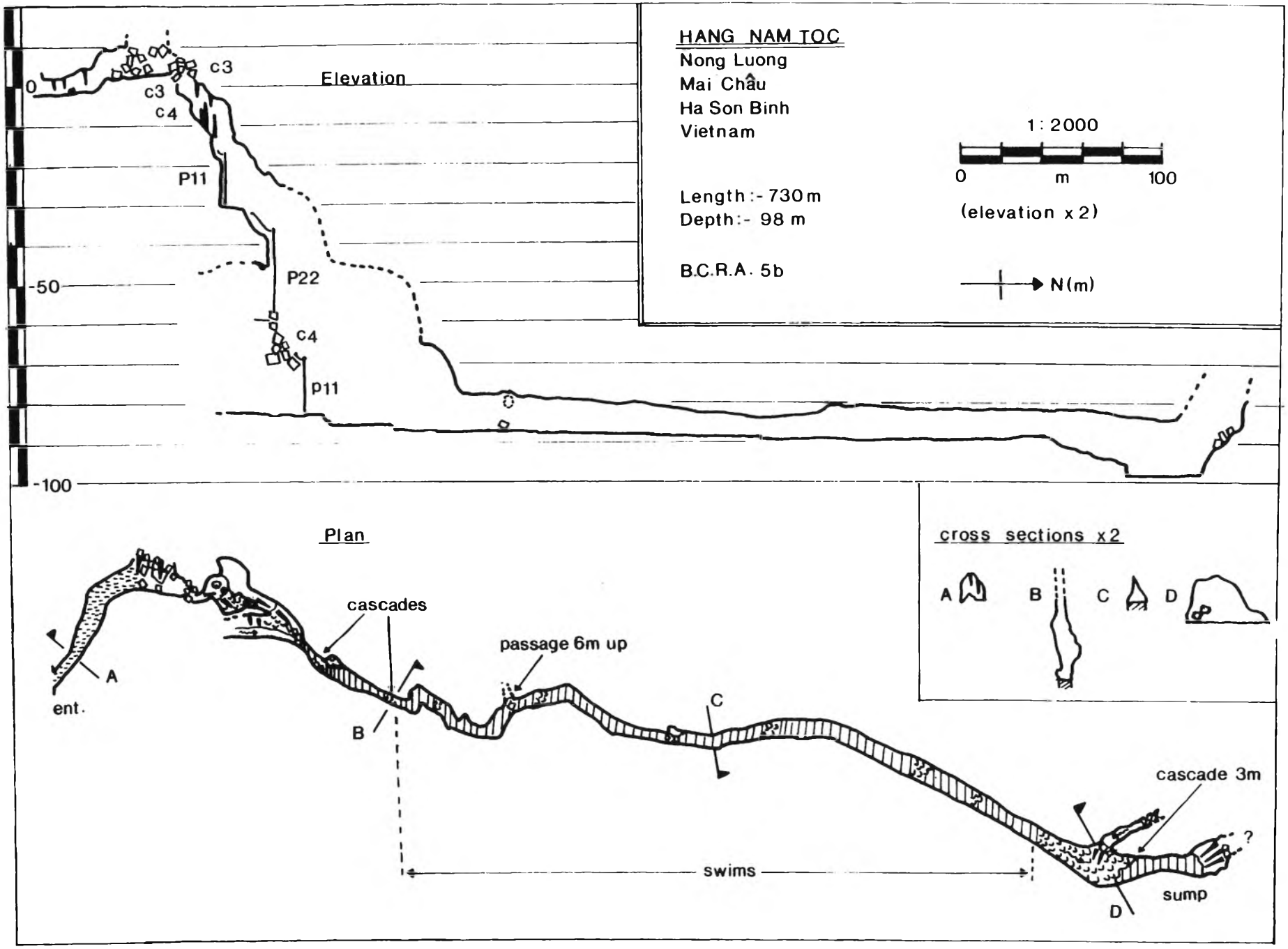
6 Coracle Cave entrance

7 Water Mine Cave Hang Mo Luong

8 Halong Bay chamber and stall Dau Go

9 Halong Bay cave exit shot Bo Nau


HANG CHOI
CHOI VILLAGE
MAI CHÂU
HA SON BINH
VIETNAM
Length:- 270m
Depth:- 105m
B.C.R.A. 5b
N(m)
1:1000
0
m
50
ELEVATION
m
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
climb
11m
?
complex choke (unsurveyed)
undescended
pitch ≈15m
?
PLAN
'90


HANG NAM TOC
Nong Luong
Mai Châu
Ha Son Binh
Vietnam
Length :- 730 m
Depth :- 98 m
B.C.R.A. 5b
1 : 2000
0 m 100
(elevation x 2)
N(m)
Elevation
0
-50
-100
c3
c3
c4
P11
P22
c4
p11
Plan
cross sections x2
A
B
C
D
ent.
A
cascades
passage 6m up
B
C
swims
cascade 3m
?
sump
D

both for the people we met and the scenery as well as the excellent caves. A 3 hour walk (9km) up to an altitude of 900m brought us to the village of Nong Luong, a Thai minority community. We were introduced to the headman where after the usual greetings we were invited to stay in his house which was of timber construction built on stilts, a superb design keeping us cool and comfortable during our stay. We were told of many caves and were straight away shown a river sink at 960m altitude. We followed a high level flood sink along with the locals, who had entered the cave before, searching for gold. We came to a 10m pitch where the locals explained the best belays and dropped into a large passage to the head of a 25m pitch. Tricky rigging followed and we were soon back down to the river at -90m. We later found the locals had been down to this level lowered on vines in search of gold. We were impressed. Time was getting on and we had to return to our house on stilts and a session with the locals resulted in a few sore heads in the morning. One team continued in the exploration at the river cave *Nam Toc*, which went for 732m to a solid choke, again disappointing considering we were in a sizeable river at an altitude of 960m.

The other group who thought they had drawn the short straw, investigated *Cu Hang* (Old Woman cave) for 225m before they were told of a big cave nearby. Approaching the entrance the local borrowed a vine and tying it off at a suitable belay, descended hand over hand to a ledge with a sizeable 20m deep drop below and the sound of a river in the distance. A large bamboo stick with holes cut in was used to descend the 20m to safer ground. Both the English members were not impressed with the safety of this particular method of descent and were pleased to hear that another entrance existed. With the guide, who wore nothing on his feet and a flint for his light, the team were led through a very complex cave involving many exposed climbs and traverses before reaching a high level passage with the sound of a river below in the distance. The cave was estimated at 3km+ that was traversed, however many huge galleries with 10-15m side passages entering were not investigated. Very little of the streamway was explored and it is thought much cave was left to explore in this system. The trip was finished in style when Long the Vietnamese leader of the group took off his helmet and produced boiled eggs and cucumbers for lunch.

Sadly we had to leave this beautiful province but we were at least left with happy memories of the wonderful people and the good friends we had made.

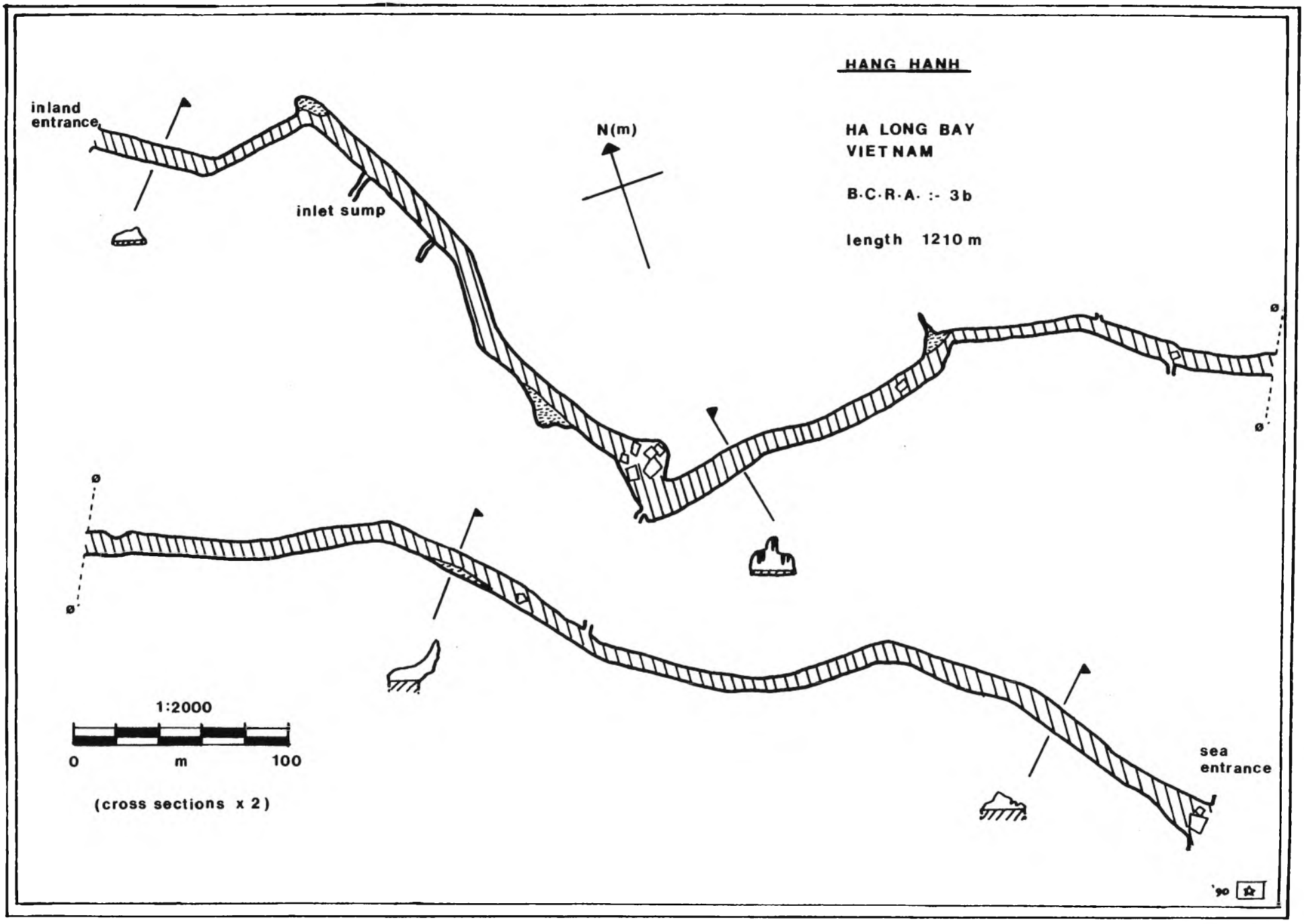
*H. Limbert.*

# Quang Ninh Province

Halong Bay is found 200km to the east of Hanoi in the Gulf of Tonkin. The area is justly famous for its tower karst which extends both inland and out into the bay forming probably the most spectacular karst scenes in the world. The area's stunning land forms are reflected throughout Vietnamese literature and folklore. The journey to the town of Hong Gai, our base in the area, took around six hours by road and several river ferry crossings. The roads are reportedly the best in Vietnam. The area appears to contain little of sporting interest to cavers but would provide any amount of topics for study to the more specialised karst researcher. The highlight of the time spent in Hong Gai was a boat journey out to the off shore towers, which number many thousands, and to visit several short but nethertheless spectacular caves. The caves visited must have been formed when sea levels were lower and large rivers crossed the area. *Hang Hanh* was the only cave of any length found in the area and provided only a minor distraction from the beauty of Halong Bay.

The cave, *Hang Hanh* is found about 30km to the N.E. of Hong Gai, a large coal exporting port, in an area of intense limestone quarrying. The entrance to the cave is on the landward side of a karst ridge rising to about 300m and is reached by following a small river across tidal mud flats. The whole of the 1·3km length of the cave is affected by tidal flow, sumping in places at high tide. The mud coated walls and rotting vegetation in the water gave the cave a depressing air which detracts from the large passage size and the sporting nature of the trip. The cave begins as a 15 × 15m entrance under a limestone cliff and continues in large passage as a mixture of wading and short swims for about 450m. After a short rift to an inlet sump, and another couple of mud choked side rifts, the remainder of the cave continues in the same vein but with deeper water. The occasional mud banks and fallen boulders offer the only respite from swimming (or boating) in the grimy waters. After approximately 1300m the cave's only redeeming feature is reached — the magnificent exit into Halong Bay and the wonderful peaceful views of the tower karst islands. A small buddhist shrine sits above the entrance and adds to the serenity of the place. Unfortunately to avoid a walk of several km along mud flats and then through quarries, the best route back is through the cave!

*A. Quin.*


HANG HANH
HA LONG BAY
VIETNAM
B·C·R·A· :- 3b
length 1210 m
N(m)
inland entrance
inlet sump
sea entrance
1:2000
0
m
100
(cross sections x 2)
'90

# Caves of Vietnam

| Name | Translation | Length | Depth | Survey grade | Map reference |
|---|---|---|---|---|---|
| **Quang Binh** | | | | | |
| Hang Phong Nha | wind and teeth | 3300·0m | >1km (est) | 5b | XE365 440 |
| Hang Tối | dark cave | 4500·0m | 0 | 5b | XE339 432 |
| Not known | factory cave | 150·0m | 0 | | XE346 437 |
| **Ninh Binh** | | | | | |
| Hang Dau | none | 10·0m | 0 | Estimated | |
| Co Tien | angel cave | 81·6m | 0 | 5b | |
| Bich-Dong | name of pagoda | 30·0m | 0 | Estimated | |
| Thong Thay | slow pace cave | 234·8m | 0 | 5b | |
| Hang Quam | none | 143·4m | 0 | 5b | |
| Hang Luon | none | 50·0m | 0 | 3b | |
| Hang Tang 1 | success cave 1 | 305·2m | 0 | 5b | |
| Hang Tang 2 | success cave 2 | 58·3m | 0 | 5b | |
| Vong Nang Hang | arch cave | 1216·3m | 0 | 5b | |
| Hang Cuc Phong | none | 110·0m | 0 | 3b | |
| **Ha-Son-Binh** | | | | | |
| Hang Lãn 1 | none | 219·0m | 19m | 5b | WH304 813 |
| Hang Lãn 2 | none | 689·0m | 42m | 5b | WH304 813 |
| Hang Can | dry cave 1 | 300·0m | 10m | 3b | WH304 806 |
| Hang Lim | none | 50·0m | 5m | Estimated | WH284 812 |
| Hang Can | dry cave 2 | 750·0m | 9m | 5b | WH403 051 |
| Not known | childbirth cave | 30·0m | 0 | Estimated | WH402 035 |
| Not known | tree cave | 50·0m | 50m | Estimated | WH094 836 |
| Not known | bamboo cave | 60·0m | 0 | Estimated | |
| Not known | shaft 1 at dam | 10·0m | 10m | Estimated | WH867 087 |
| Not known | shaft 2 at dam | 0 | 10m | Estimated | WH867 087 |
| Hang Mo Luong 1 | water mine cave 1 | 15·0m | 0 | Estimated | WH808 068 |
| Hang Mo Luong 2 | water mine cave 2 | 354·0m | 8m | 5b | WH808 068 |
| Hang Bo Giong | none | 150·0m | 25m | Estimated | WH783 041 |
| HangChoi | bat cave | 272·0m | 105m | 5b | |
| Not known | cave | 15·0m | 0 | Estimated | |
| Hang Gia | wind cave 1 | 70·0m | 56m | Estimated | WH762 066 |
| Not known | dam cave | 70·0m | 15m | Estimated | WH762 035 |
| Hang Gia | wind cave 2 | 55·0m | 20m | Estimated | WH823 121 |
| Hang Gia | wind cave 3 | 20·0m | 10m | Estimated | WH823 121 |
| Hang Gia | wind cave 4 | 0 | 10m | Estimated | WH823 121 |
| Nam Toc | none | 732·0m | 97m | 5b | WH805 131 |
| Cu Hang | old woman cave | 225·0m | 10m | 3b | WH797 138 |
| Na Lan | none | >3000·0m | 50m | Estimated | WH787 142 |
| Nam Duc | village | 100·0m | 0 | Estimated | WH296 802 |
| Muong Hhen | none | 70·0m | 5m | Estimated | WH292 802 |
| Not known | Dany's shaft | 0 | 0 | Estimated | WH813 109 |
| Not known | pineapple shaft | 0 | 0 | Estimated | WH817 128 |
| **Quang Ninh** | | | | | |
| Bồ Nau | none | 110·0m | 10m | 3b | |
| Trinh Nu | none | 55·0m | 5m | 3b | |
| Dau Go | none | 300·0m | 20m | 3b | |
| Hang Hanh | none | 1300·0m | 0 | 5b | |

# Geological assessment of caving potential in Vietnam.

Karstic process generally occurred in all stratas of C-P and upper Devonian limestone. C-P limestones were formed as homogeneous stratas with CaO content from 56% to 85% or 87% (*Bac Son Massif*). Together these cover an area of approximately 60,000km$^2$ in central and northern Vietnam.

There are three main limestone massifs with areas between 8-10,000km$^2$ and a total thickness between 800-1000m. These seem to be the most attractive areas for speleologists. They are: ***Kebang Karstic Massif*** — located between the 17th and 18th parallel it stretches from the coastal plains around *Dong Hoi* to the border with *Laos*, covering an area of 10,000km$^2$. The majority lies within *Quang Binh* province. There are two surveyed river caves. *Phong Nha* resurges into the Son river, with a surveyed length of 3·5km, its exploration is incomplete. *Hang Tối* resurges into the Chay river and is a 3km trip through the limestone ridge. The massif appears to have a capping to the south. ***Bac Son Massif*** located around the 22nd parallel. The larger part of the massif is to the west of *Lang Son* with smaller part east of *Bac Cam*. ***Cao Bang-Trung Khanh Massif*** located south of the 23rd parallel between *Cao Bang* and the Chinese border.

Other Karstic areas include: *Dong Van* plateau, *Son La* plateau, *Moc Chan* plateau, *Ta Phinh-Sin Chai* plateau, *Ninh Binh Massif*, *Hatong Bay Karstic Massif*, *Cotsa island Massif* and other areas (1-2000km$^2$)

The *Ninh Binh Massif* was visited by the expedition. The caves explored were generally small (low CaO content). In the main only through trips under the tower karst.

The T2a limestone in *Ha Son Binh.* province was visited and as expected the low (40%) CaO content of the limestone produced mainly small short caves. The limestone was thinly bedded and folded and had many bands of clays and shales amongst it. In Vietnam this limestone is used mainly for cement production whereas the C-P limestone is only quarried locally for roadstone and building.

*NGUYEN XUAN TRUONG and T. Allen.*

# Medical Report

The 1990 caving expedition to Vietnam was fortunately free of any serious medical problems. However, this good fortune was not to be known prior to setting off, so as with all expeditions plans had to be made to cover the possibility of illness or injury.

Caving in Vietnam for the first time with limited information on the country, or potential health hazards, necessitated taking along a fairly comprehensive supply of medical goods, yet we had to work within the space and weight limits of the air freight agreement with Thai Airlines. We envisaged various potential problems could be brought about by the environment and, perhaps, scarce local medical facilities.

The potential for snake bites in particular, was of concern as we envisaged spending periods in the dense Vietnamese jungle. Vietnam has some particularly venomous species of snake. Carrying supplies of anti-venom in case of snakebite is impractical, since the exact species of snake needs to be known before a specific anti-venom is administered. Even then, the practice can be hazardous, if not lethal. With this in mind the expedition members were aware of the first aid treatment, i.e. thorough cleansing of the wound, appliance of a pressure bandage (not tourniquet) to the whole of the affected limb above the bite to restrict the spread of venom in the lymphatic system, and most importantly, total rest for the victim.

Another specific problem envisaged was bubonic plague! The World Health Organisation has reported outbreaks of this, nowadays treatable, disease in Vietnam. The organism causing the plague is carried by fleas living on rats, of which there are an abundance in Vietnam. The treatment consists of either Streptomycin or Tetracycline of which we took supplies. We also took pet shop supplied flea powder to prevent being bitten in the first place. This also seemed to work well against the bed bugs!

Apart from preparing for the specific problems such as the above and Histoplasmosis (treatment - Nizoral tablets), a general medical kit was assembled and packed into four B.D.H. containers. One B.D.H. was the emergency kit containing intra-venous fluids, administration sets plus sutures, dressings, bandages etc. Also in the kit was some Diamorphine injection carried under a license granted by the Department of Health in London. The other containers held a variety of medications, dressings and medical sundries.

Each expedition member was responsible for his/her own pre-trip vaccination regime. This consisted of polio, tetanus and typhoid boosters plus rabies and hepatitis jabs. Malaria prophylaxis was kindly supplied by I.C.I. Pharmaceuticals. The team members each took a small first aid kit with simple painkillers, anti-histamines, anti-diarrhoea, anti-emetic, anti-acid tablets and throat lozenges plus sachets of 'Dioralyte' to mix with water to compensate for fluid and electrolyte loss in dehydration due to diarrhoea and excessive sweating etc.

Also in the kit were a few plasters, small dressings and a bandage and a small bottle of 'Betadine' alcohol solution to paint on small cuts, bites and scratches to prevent infection. Iodine was taken for water purification as the cheapest of the alternatives. Three books were taken: The "Pharmaceutical British National Formulary" (explaining indications, dosages and side effects of drugs which we may have needed to administer), the "Red Cross First Aid Manual" and the excellent "Medicine for Mountaineering".

## PROBLEMS ENCOUNTERED

**Sickness and Diarrhoea**:- Affected most members. Duration – 24 hours, occasionally longer. On one occasion requiring a short dose of Flagyl. One expedition member in particular was almost constantly troubled with diarrhoea.

**Flu like illness**:- Affected 2 expedition members.

**Eye infection**:- One person affected — cleared quickly with chloramphenicol eye ointment.

**Fungal skin infection**(?):- Affecting one person for 4 weeks with lesions on limbs and face. 'Daktarin' cream seemed to heal each lesion but others would soon appear elsewhere. Infection disappeared soon after leaving Vietnam.

**Minor cuts & grazes**:- Only one bad graze obtained during a fall in a cave needed a few daily dressings.

**Boil**:- One person developed a large, painful boil on his neck needing hot Dettol poultices to bring it to a head. The infected material was then cleared using forceps. The remaining open wound was dressed daily for a week with 'Bactigras' bactericidal dressing.

**Chest infection**:- A short course of Ampicillin and Flucloxacillin was given to one person with a persistent chest infection. One of the Vietnamese members developed severe right sided abdominal pain and nausea and looked and felt very ill. Appendicitis was feared although his temperature was normal. His pain was eased by 'Temgesic' and the nausea helped with 'Stemtil'. The problem improved and disappeared after 3 days and it turned out he had suffered similar attacks periodically over the previous few years.

Overall a medically trouble-free expedition. Probably the reconnaissance nature of the expedition helped in that we never travelled too far into the more remote areas, and the fact that we stayed in reasonable accommodation with basic, but adequate, sanitation. Future expeditions which may spend longer in the jungle are likely to encounter more problems associated with tropical heat and humidity. Not to mention the snakes!

*J. Palmer.*

# VIETNAM: THE COUNTRY

The date: Sunday 29th April, 1990. It seemed ironic that we were leaving Vietnam on the 15th anniversary, to the day, of the American final withdrawal from Saigon; but there the similarity ended. During our short stay we had become very attached to this beautiful country with its devout and friendly people. More than a hint of a tear could be detected in the eyes of the expedition members during the emotional goodbyes that preceded our final departure.

The history of Vietnam is not one of peace. Throughout time conflict has followed conflict, each time strengthening the resilience of her people. Evidence of pre-historic man has been found in Vietnam dating from the Paleolithic age, 300,000 to 500,000 years ago. By the Neolithic age, 10,000 years ago, he was well established.

During the second millennium B.C. Van Lang, as Vietnam was known then, was ruled by the Hung kings and later became known as Au Lac. Vietnam was then taken by the Han and became part of the southern Chinese empire. Over a period of a thousand years revolutionaries attempted to rid the country of the Chinese oppression and many battles were fought. King Dinh Bo Linh and his successor, Le Hoan, rallied massive peasant armies to ward off the Chinese invaders. Vietnam's boundaries and its capital changed constantly throughout this period. The Nguyen dynasty that followed (1802) was plagued

with peasant riots and therefore the French, who attacked in 1858, found little resistance and quickly took Saigon. By 1883 the French dominance of Vietnam was at its height, the country being divided into Tonkin (Red River Delta), the central area, Annan, and Cochinchina to the south.

Although unknown at that time, an event in the small village of Kim Lien in Nghe An province would have a significant effect on the future of Vietnam. Nguyen Tat Thanh, born on 19th May, 1890 in that village grew up to be one of the best known revolutionary leaders of modern times; he adopted many aliases during his activities - the last, Ho Chi Minh, which he adopted in 1942, has gone down in the history of communist and national liberation movements.

In 1940 Ho Chi Minh formed the League for the Independence of Vietnam called the Viet Minh. The Japanese invaded in 1941 and overthrew the French. They later surrendered in August 1945, and the Democratic Republic of Vietnam was formed under the leadership of Ho Chi Minh. This independence, however, was only short-lived and the French again took control in the south, and retook Tonkin in 1947. A period of intense resistance followed culminating in the fierce battle of Dien Bien Phu in 1954. The French were defeated and on the 20th July, 1954 the Geneva Agreement was signed, ending the Indo-China war. The country was divided at the 17th Parallel; North Vietnam was under the Communist rule, receiving aid from China, and South Vietnam was governed by Dinh Diem and supported by the West.

President Kennedy set up the military assistance command in Saigon in 1962 to preserve the pro-West independence of the South and, by extension, the rest of Indo-China, the now famous 'Domino' theory. In the 1960's military aid was stepped up after President Kennedy's assassination, as tension rose between the South and the Viet Minh, now known as the Viet Cong. The Gulf of Tonkin incident in August 1964, when two U.S. destroyers were reportedly attacked by a North Vietnamese torpedo boat gave rise to discussions between Dean Rusk and Robert McNamara on the possibilities of bombing the North although this plan was at that time opposed by Johnson.

In March 1965 the second Indo-China war, known in the West as the Vietnam War, began in earnest when the U.S. put Operation Rolling Thunder into action with the bombing of targets in North Vietnam. The first American troops set foot on Vietnamese soil at Danang on March 8th 1965 and by 1966 there were over 400,000 Americans fighting in Vietnam. The combined strength of the American and South Vietnamese armies had some initial successes, but the highly motivated North Vietnamese troops were inflicting heavy casualties on the Americans; by the end of 1965 an average of 1,000 American soldiers per month were being killed. The Tet Offensive in 1968 put paid to the illusion of an American victory and by the end of March the bombing of the North had been discontinued.

The Nixon administration in 1969 began to withdraw troops and towards the end of the year massive anti-war demonstrations were held in America. 1969 also saw the loss to the Vietnamese of their legendary leader, Ho Chi Minh, who died in Hanoi. The North was again bombed in 1970 along with Laos and Cambodia after further successful North Vietnamese offensives in the South. Negotiations between the Vietnamese and Americans led to the Cease Fire being signed in Paris on January 27th 1973. The Nobel Peace Prize was jointly awarded to the two negotiators, Henry Kissinger and Le Duc Tho, but was not accepted by the latter. By the end of April all American troops had left Vietnam and the liberation of the South was complete. The eight year war had cost over two million lives and left a massive scar on humanity. In July 1976 the reunited country was named The Socialist Republic of Vietnam and Saigon renamed Ho Chi Minh City.

# TOURISM

War, famine and over-population have considerably affected the economic development of the country. Lack of resources has retarded the re-building of many of Vietnam's cities. Tourism from the West is a relatively new innovation to Vietnam, a positive 'plus' for the traveller, as much of the country can be seen as it is and always has been. Vietnam's great beauty was realised by Ho Chi Minh and qualified by his statement: "Our mountains will always be, our rivers will always be, our people will always be. The American invaders defeated, we will rebuild our land more beautiful than before." Travelling in Vietnam is now much easier and provided arrangements are made through the Vietnamese Tourist Board there are few restrictions. North Vietnam is a mine of culture and interest.

Hanoi, the capital, offers many cultural and architectural sights including pagodas, lakes, theatres and many different markets all of which can be visited either under one's own steam or on one of the many

organised tours. This northern city also boasts many museums dedicated to all aspects of Vietnamese history; including the Arts Museum, the Revolutionary Museum, the Army Museum and the soon-to-be-opened Ho Chi Minh Museum, a spectacular building erected to commemorate the 100th Anniversary of his birth. A short distance away the great leader himself lies in his mausoleum. Long queues can be seen here daily as children and adults alike wait in silence to pay their respects.

Hanoi is a busy city and time spent relaxing in one of the numerous roadside cafe-bars watching the never-ending stream of bicycles with their ever-smiling riders constantly passing, or observing one of the many five road junctions which appear to have no rights of way or indeed any particular direction of travel, much to the bewilderment of the police officer who stands in the centre frantically waving his baton and blowing his whistle, is an education.

Our travels in Vietnam took us firstly south along the aptly named Highway No.1 which links Hanoi with Ho Chi Minh City, formerly Saigon. This road follows the lowlands, never far from the coast. Although progress is slow the scenery never ceases to amaze. Evidence of the war unfolds itself in front of the traveller. This road was almost totally destroyed; not one bridge was left standing, forcing the Vietnamese to construct a second road through the mountains — the famous Ho Chi Minh Trail. The highway shares its route, in places, with the state Railway.This is particularly true on the bridges as in many cases only the railway crossing has been re-built. Long queues develop as road vehicles in single line take it in turns with each other and the occasional train to cross the many rivers. Where no provision has been made for road traffic to cross via the railway bridges ferries are used; a bus full of Westerners, stopping at such points, soon attract an entourage of local entrepreneurs peddling such wares as a single cigarette, packets of bubble-gum or maybe a hard boiled egg!

The Vietnamese coast is a developer's paradise. Miles of deserted beach shaded by palm trees are lapped by the warm China seas. Quang Binh, the furthest point south visited, has tremendous potential for tourism. Here not only is there the attraction of beautiful beaches and idyllic surroundings but also exceptional inland scenery. A 15 kilometre boat journey up river from the sea takes the traveller through spectacular 'tower karst' scenery and gives an insight into the inland villages. The river can be followed on towards the limestone 'massif' to a point where the entire river emerges from a cave at the base of a high cliff. From this point the boat can be navigated a further two kilometres into a cave of world class proportions. It would be a shame for these areas to be exploited but it would be a crime for them not to be seen. The provinces of Central Vietnam are amongst the poorest in the country and a place with such enormous tourist potential must be seen as a great natural resource, but the Vietnamese are wise in these matters and are unlikely to allow the spoilage that has taken place in many other parts of the world.

Vietnam already has a National Parks programme, one of which can be found in the province of Ninh Binh, midway between Hanoi and Quang Binh. The Quoc Phong National Park is a prime example of a primitive rain forest. Although many tourists visit this park its main function is for scientific research. To this end a number of lodges have been constructed throughout the forest to enable scientists to stay for extended periods to study the flora, fauna and wildlife of the area. Of special interest are the exceptionally large trees and, should you be lucky enough to see one, the monkeys which inhabit them. Unfortunately the park also boasts a phenomenal number of leeches which are only too pleased to make the acquaintance of the Westerner!

Hoa Lu in Ninh Binh Province was the ancient capital of Vietnam and therefore steeped in history. The temples and pagodas of the ancient Vietnamese kings, dating back to the 9th Century, can be visited as well as many small but interesting caves.

To the west of Hanoi is Mai Chau, reputed to be the most beautiful valley in Vietnam. This scenic area is mainly inhabited by the Thai minority people whose meticulously finished houses, which are built on stilts, add to the splendour of the region. The overall beauty of this place is only surpassed by the friendliness of its people. There are in the order of 54 such ethnic groups living within Vietnam, making up about 10% of the population. A chance to visit a village of the minority people is not an offer that should be turned down lightly by any visitor to this country.

One of the jewels in the Vietnamese crown is the coastal area to the North East of Hanoi. Halong Bay situated in the gulf of Tonkin combines the mystique of the country with a splash of modern day tourism. As the coast road is followed north from the sea port of Haiphong, the silhouette of what first appears to be hills on the horizon slowly transforms to reveal its true identity as the many hundreds of karstic islands that make up the natural breakwater to Halong Bay. The biggest of these islands, Catba, has been designated as a National Park, to protect the 620 plant species, 100 species of birds and the numerous other wild life indigenous to the island. Halong Bay with

its scenic islands back drop, punctuated with traditional style junks, has been acclaimed by many as one of the wonders of the world. This area of exceptional beauty has given rise to small hotel developments dotted in no logical order on the outskirts of the small township of Hon Gai. The majority of tourists here are still of Eastern Bloc origin although a steady increase of Western visitors is reported; a trend which is sure to continue and grow.

*R.Cork.*

# A Final Note

The trip to Vietnam was a memorable experience for the caves, the countryside and the people. The planning for the next trip is already underway and we would like to be able to visit Vietnam as often as possible.

Caving in Vietnam is in its infancy. Previously only a small Bulgarian team had paid a short visit with only limited caving. This trip on a grander scale (nine people for six weeks) was able to accomplish a lot more. We are however, indebted to the faculty of Geology and Geography at Hanoi University, whose hard work and excellent planning and organization meant that we could concentrate on the caving. Without the assistance of the Vietnamese an expedition would be virtually impossible.

During our stay we introduced our three Vietnamese friends; Long, Nga and Truong to caving, including surveying and SRT (single rope techniques). We also hope that our seminar at the University was useful and informative for the other members of the Geography Department. Vietnam has a unique opportunity to maintain an accurate register of all the caves which will be explored by ours and future expeditions. The Geology Department is happy to undertake this task and all future expeditions will be asked to keep them informed. Hopefully cavers will want to do this anyway as it will benefit all future expeditions.

The limestone of south east Asia has many exciting prospects for cavers in places such as Vietnam, Laos and Burma. But as well as the caving, the experience of visiting these countries and making new friends is something we all look forward to.

# Curriculum Vitae of Expedition Members.

## Howard Limbert

Expedition Leader & Underground Photographer

OCCUPATION: Chief Scientific Officer

AGE: 32 years

CAVING EXPERIENCE: 16 years

CAVING EXPEDITIONS:

| | |
|---|---|
| France | 1976, 1978, 1981. |
| Spain | 1980. |
| Austria | 1983, 1984, 1986, 1988. |
| Mexico | 1982, 1985, 1987, 1988. |

MEMBER;

| | |
|---|---|
| U.W.F.R.A. | Upper Wharfedale Fell Rescue Association |
| C.R.O. | Cave Rescue Organisation |
| B.C.R.A. | British Cave Research Association |

## Debbie Limbert

Expedition Treasurer

OCCUPATION: Scientific Officer

AGE: 29 years

CAVING EXPERIENCE: 13 years

CAVING EXPEDITIONS:

| | |
|---|---|
| France | 1978, 1981, 1988. |
| Spain | 1980. |
| Austria | 1983, 1984, 1986, 1988. |
| Mexico | 1982, 1985, 1988. |
| Ireland | 1989. |

MEMBER:

| | |
|---|---|
| C.R.O. | Cave Rescue Organisation |
| B.C.R.A. | British Cave Research Association |

## Robert North

Expedition Recorder

OCCUPATION: Laboratory Technician

AGE: 33 years

CAVING EXPERIENCE: 10 years

CAVING EXPEDITIONS:

| | |
|---|---|
| France | 1983, 1984. |
| Spain | 1979. |
| Austria | 1988. |
| Mexico | 1985, 1987, 1988. |
| Guatemala | 1988. |

MEMBER:

| | |
|---|---|
| C.R.O. | Cave Rescue Organisation |
| B.C.R.A. | British Cave Research Association |

## Richard Ellis

Photographic Organiser, Underground Photographer

OCCUPATION: House-husband

AGE: 43 years

CAVING EXPERIENCE: 26 years

CAVING EXPEDITIONS:

| | |
|---|---|
| France | 1972. 1988. |
| Yugoslavia | 1966. |
| Mexico | 1982. |

MEMBER:

| | |
|---|---|
| C.R.O. | Cave Rescue Organisation |
| B.C.R.A. | British Cave Research Association |

## Tim Allen

Underground Survey Officer

OCCUPATION: Difficult Access Engineer

AGE: 28 years

CAVING EXPERIENCE: 12 years

CAVING EXPEDITIONS:

| | |
|---|---|
| France | 1983, 1984. |
| Austria | 1985, 1986, 1987, 1988. |
| Mexico | 1985, 1987, 1988. |
| New Britain | 1984 (*Exploration of the world's largest underground river*) |

MEMBER:

| | |
|---|---|
| D.C.R.O. | Derbyshire Cave Rescue Organisation |
| B.C.R.A. | British Cave Research Association |

## Andy Quin

Equipment Officer

OCCUPATION: Cellarman

AGE: 30 years

CAVING EXPERIENCE: 15 years

CAVING EXPEDITIONS:

| | |
|---|---|
| France | 1978, 1979. |
| Spain | 1980, 1981, 1982, 1983, 1984. |
| Austria | 1985. |
| Mexico | 1985, 1988. |
| Canada | 1986, 1989. |
| U.S.A. | 1986, 1989. |

MEMBER:

| | |
|---|---|
| C.R.O. | Cave Rescue Organisation |
| B.C.R.A. | British Cave Research Association |

## John Palmer

Medical Officer

OCCUPATION: Staff Nurse

AGE: 28 years

CAVING EXPERIENCE: 10 years

CAVING EXPEDITION:

| | |
|---|---|
| Spain | 1980, 1981, 1982, 1983, 1984. |
| Austria | 1985, 1986, 1988. |
| Mexico | 1985, 1988. |
| Canada | 1986, 1989. |
| U.S.A. | 1986, 1989. |

MEMBER:

| | |
|---|---|
| C.R.O. | Cave Rescue Organisation |
| B.C.R.A. | British Cave Research Association |

## Dany Bradshaw

Food Supplies Officer

OCCUPATION: Builder

AGE: 34 years

CAVING EXPERIENCE: 19 years

CAVING EXPEDITIONS:

| | |
|---|---|
| France | 1987 |
| Austria | 1983, 1984, 1986, 1987. |
| Mexico | 1982, 1985, 1988. |
| Ireland | 1989. |

MEMBER:

| | |
|---|---|
| M.R.O. | Mendip Rescue Organization (*Warden*) |
| C.D.G. | Cave Diving Group (*Examiner*) |
| B.E.C. | Bristol Exploration Club |
| B.C.R.A. | British Cave Research Association |
| F.R.G.S. | Fellow of the Royal Geographical Society |

## Bob Cork

Assistant Expedition Leader

OCCUPATION: Process Manager

AGE: 32 years

CAVING EXPERIENCE: 20 years

CAVING EXPEDITIONS:

| | |
|---|---|
| Spain | 1984 |
| France | 1987. |
| Austria | 1983, 1986, 1988. |
| Mexico | 1982, 1985, 1988. |
| Ireland | 1989. |

MEMBER:

| | |
|---|---|
| M.R.O. | Mendip Rescue Organization (*Warden*) |
| C.D.G. | Cave Diving Group (*Examiner*) |
| B.E.C. | Bristol Exploration Club |
| B.C.R.A. | British Cave Research Association |
| F.R.G.S. | Fellow of the Royal Geographical Society |

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The peoples committee and people of DONG HOI, QUANG BINH.

The peoples committee and people of NINH BINH.

# Loi Cam On

DOAN THAM HIEM HANG DONG ANH "VIETNAM 90" BAY TO LONG BIET ON DOI VOI SU GIUP DO MA DOAN NHAN DUOC

TIEN si PHAN TRUONG THI
Pho Hieu truong
Chu tich Hoi Khoang hoc
Giam doc Trung tam nghien cuu Khoang chat cong nghiep

Dr DANG TRUNG THUAN
Chu nhiem KHOA DIA
DHTH HANOI

Dr TRINH VAN LONG
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Can Bo Giang Dai Khoa Dia
Truong Dai Hoc Tong Hop Hanoi
Can Bo Phong Doi Ngoai

NGUYEN XUAN TRUONG
Khoa Dia
DHTH HANOI

LE CHI VY
Pho Phong QHQT
DHTH HANOI

NHAN
Lai Xe Phuc Vu Doan Than Hiem

Ong Chu Tich Va Dan Lang Xa
NONG LUONG.

Ong Chu Tich Va Dan Lang Xa
SON TRACH, QUANG BINH.

Ong Chu Tich Va Dan Lang Xa
QUANG TRACH, QUANG BINH.

Ong Chu Tich Va Dan Lang Xa
BAN BO, HA SON BINH.

Hoi dong nhan dan va nhan dan
MAI CHAU, HA SON BINH

Hoi dong nhan dan va nhan dan
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Hoi dong nhan dan va nhan dan
DONG HOI, QUANG BINH.

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NINH BINH

## Acknowledgements (continued)


| | |
|---|---|
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| British Cave Research Association | Finance |
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| Ghar Parau | Finance |
| Mount Everest Foundation | Finance |
| Wells Brokers | Finance |
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| Lady Smith Busywear | Over Suits |
| Paul Deakin | Photography |
| Inglesport | Tackle |
| Bat Products | Tackle |
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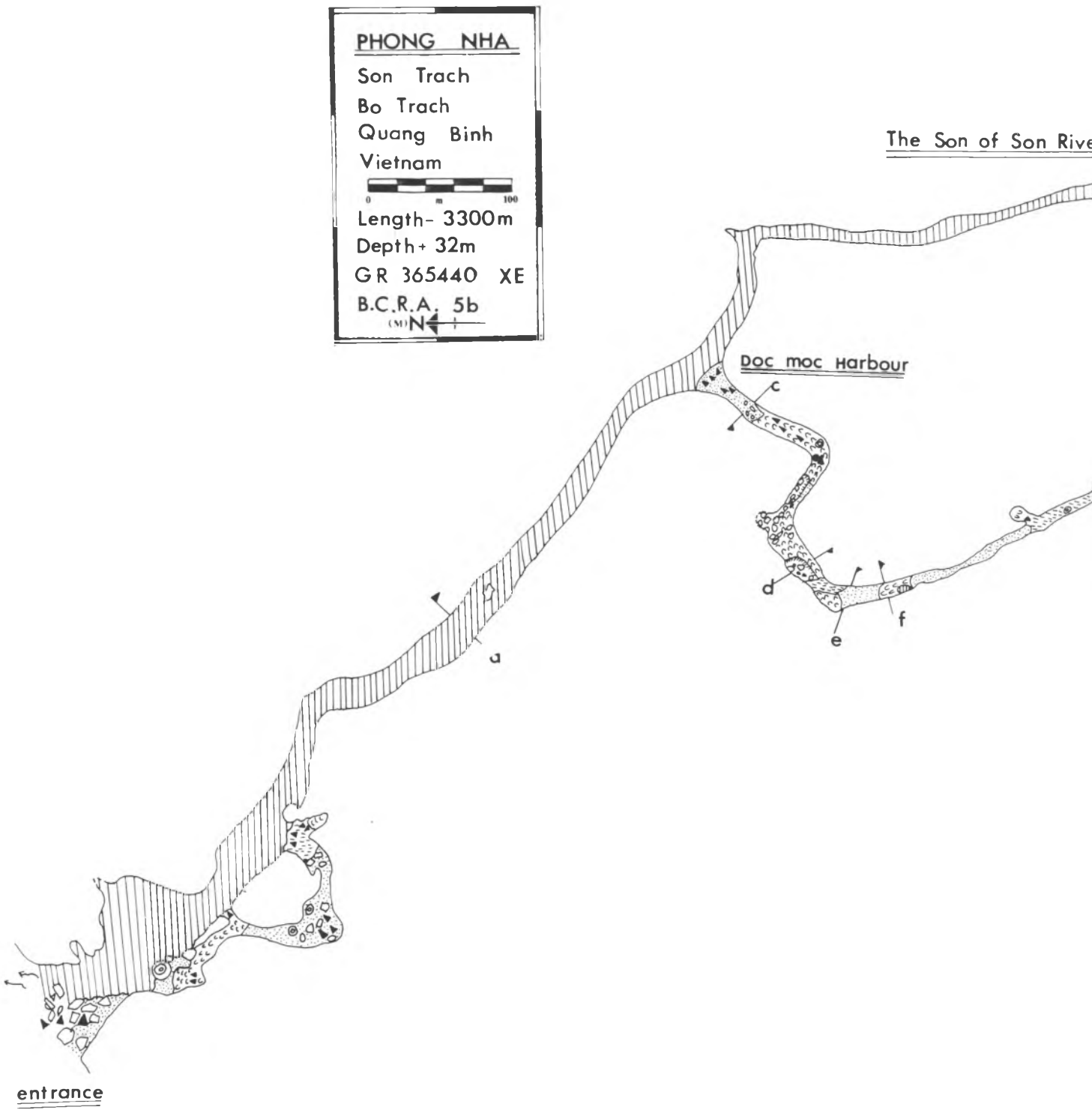
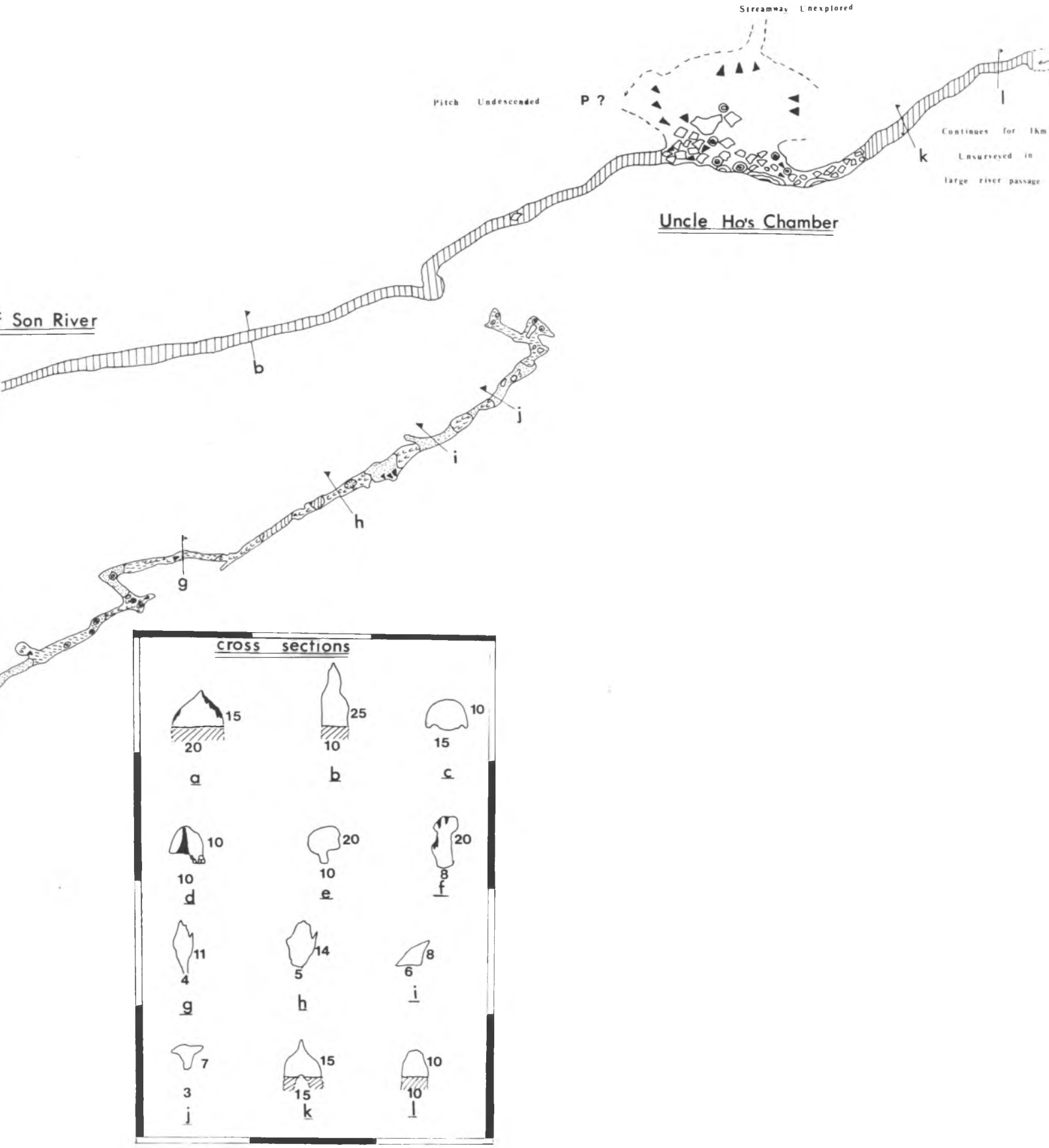
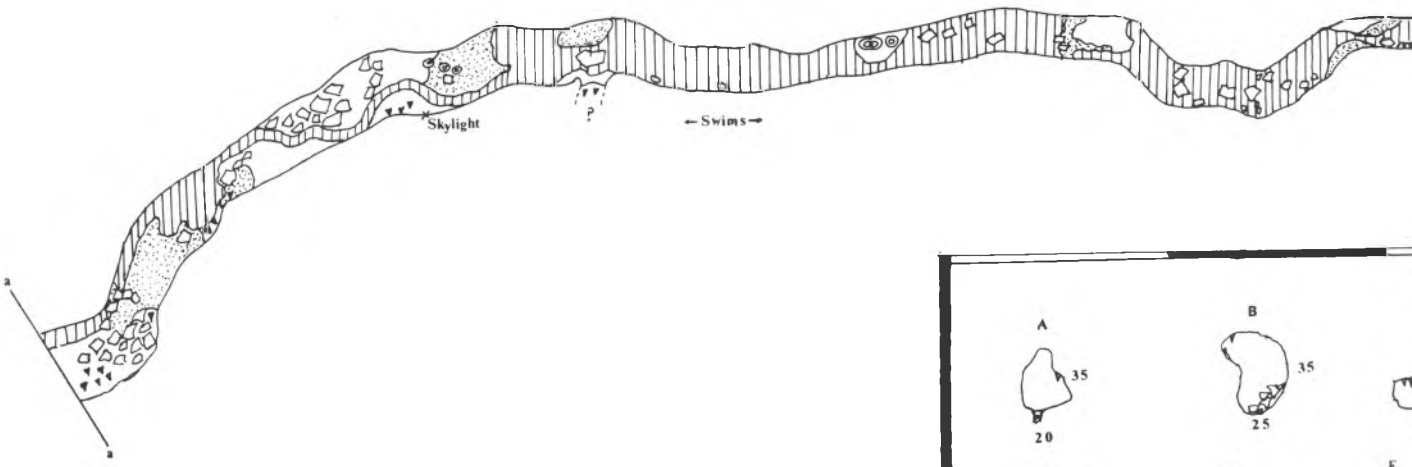
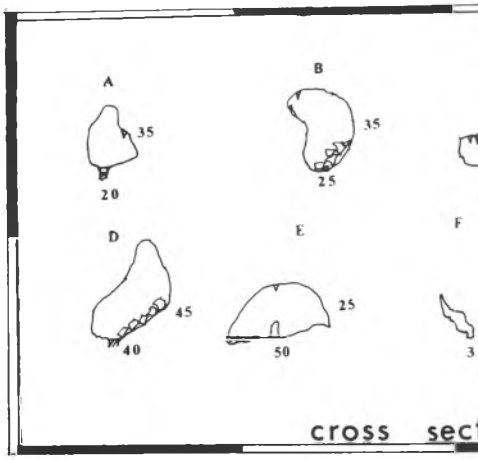
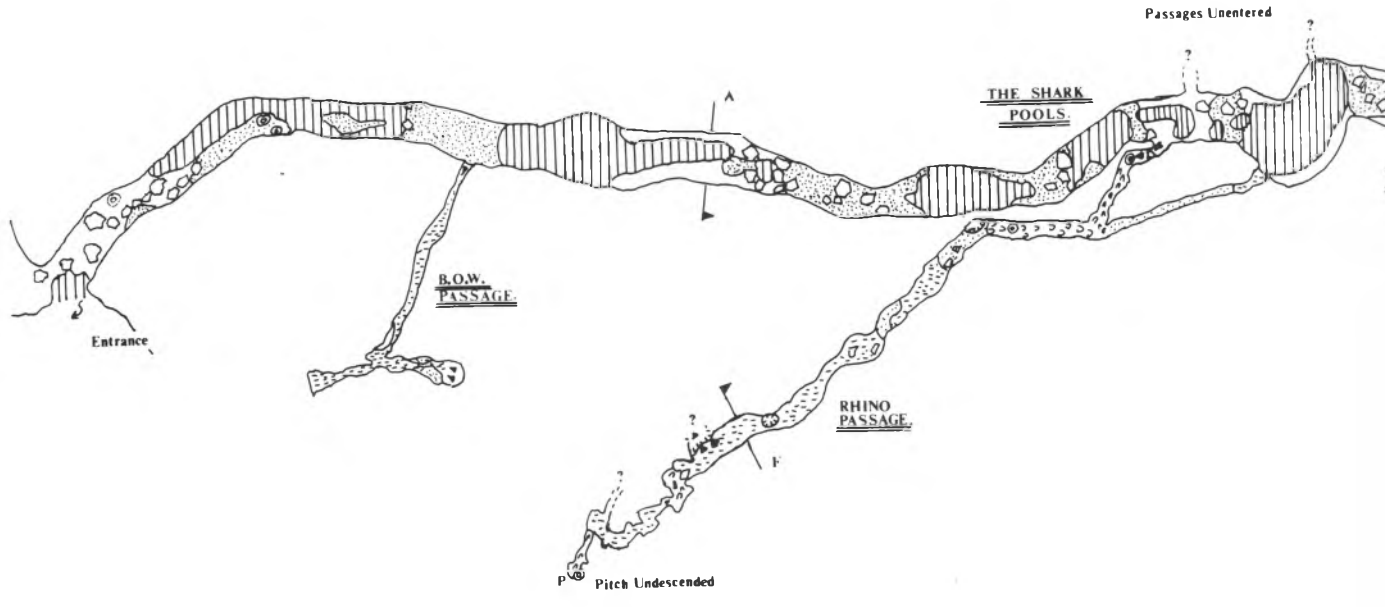

PHONG NHA
Son Trach
Bo Trach
Quang Binh
Vietnam
0 m 100
Length- 3300m
Depth+ 32m
GR 365440 XE
B.C.R.A. 5b
(M) N
The Son of Son Rive
Doc moc Harbour
c
d
e
f
a
entrance

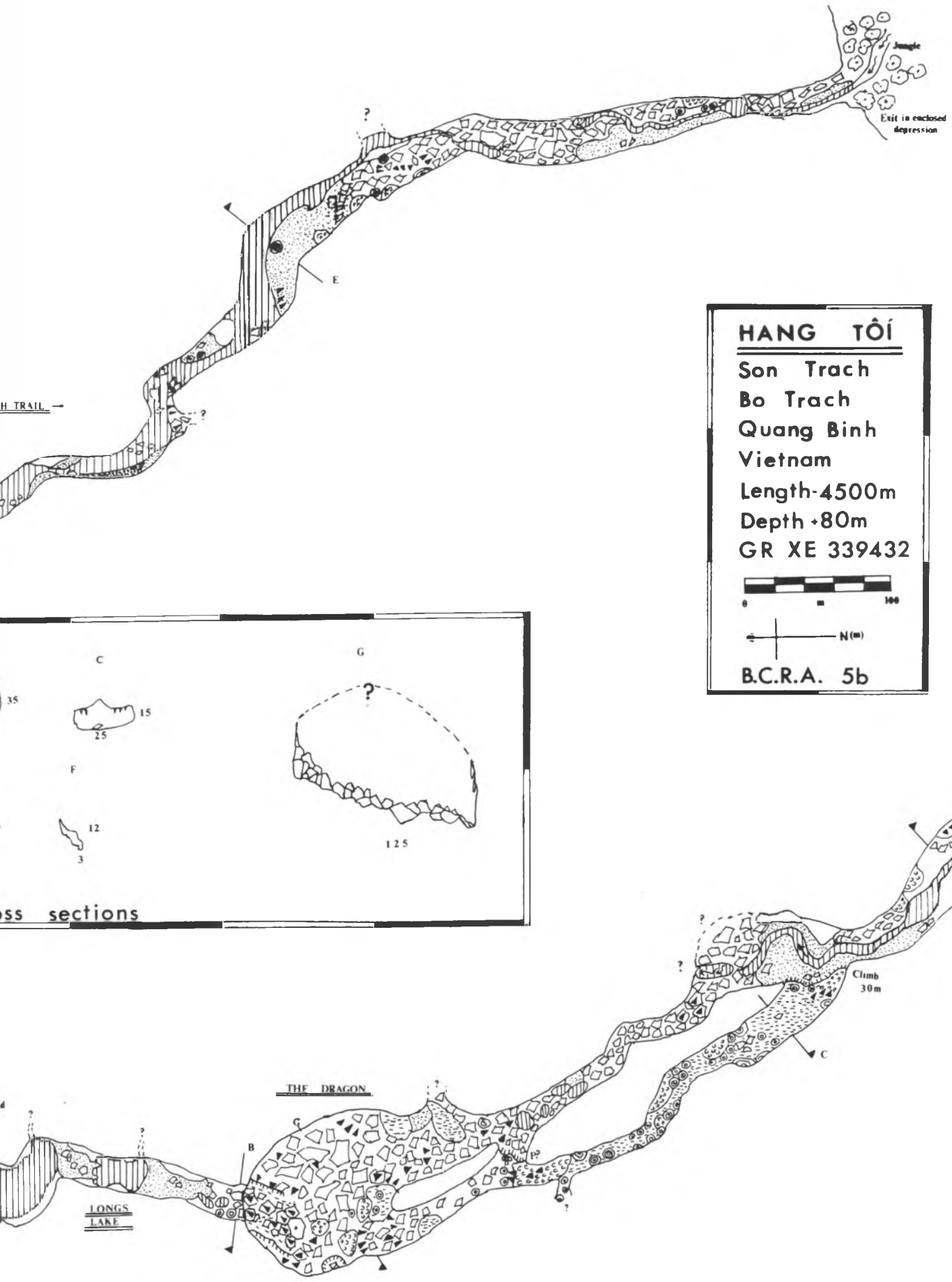

Streamway Unexplored
Pitch Undescended
P ?
Uncle Ho's Chamber
Son River
Continues for 1km
Unsurveyed in
large river passage
a
b
c
d
e
f
g
h
i
j
k
l
cross sections
15
20
25
10
10
15
10
10
20
10
20
8
11
4
14
5
8
6
7
3
15
15
10
10

← THE HO-CHI MINH TRAIL →




Jungle
Exit in enclosed depression
E
H TRAIL
?
HANG TÔI
Son Trach
Bo Trach
Quang Binh
Vietnam
Length-4500m
Depth +80m
GR XE 339432
0
m
100
N(m)
B.C.R.A. 5b
C
G
35
15
25
F
12
3
125
ss sections
Climb
30m
D
C
THE DRAGON
B
P?
LONGS
LAKE