

SOME LIMESTONE CAVES NORTH-EAST OF MAE HONG SON, NORTHERN THAILAND

*Kevin Kiernan**

A B S T R A C T

Maps and brief descriptions are presented of several caves in an outcrop of Permian limestone in the northernmost part of the Nam Lang catchment in Mae Hong Son Province. The caves have developed primarily along the strike of the limestone beds and are up to 2 km in length. With a vertical depth of 270 m, Tham Pha Puek may be the deepest cave yet explored in mainland Southeast Asia.

I N T R O D U C T I O N

Extensive outcrops of Permian limestone occur in Mae Hong Son Province (BUNOPAS, 1981; BENDER, 1983). Caves and other karst landforms are prominent in some of these limestone belts (DUNKLEY, 1985; KIERNAN, 1988). This contribution documents several limestone caves northeast of the provincial capital of Mae Hong Son, principally in the vicinity of Ban Pha Puek, Ban Pha Daeng and Ban Pang Kham (Figure 1). These caves include one which may be the deepest cave recorded to date on the mainland of Southeast Asia.

In the vicinity of these three villages there is an elongate belt of limestone that strikes from north-south. The valley floors in this area are formed on non-carbonate rocks that underlie the limestone. The maximum topographic relief of the limestone in this area is about 600 m. In the vicinity of Ban Pang Kham the limestone is largely confined to a very large enclosed karstic depression about 5 km² in extent and 160 m deep. Further to the south the limestone forms an elevated ridge that rises to about 1100 m altitude. The surface of this ridge is characterised by very steep slopes, numerous enclosed depressions and very few surface streams. The karst features include a compound depression of about 6 km² that contains numerous subordinate sinkholes up to 800 m in diameter and 100 m deep. The depressions in the vicinity of Ban Pha Puek have a very steep or vertical down-dip west wall and a less steep eastern side across which small streams flow from the non-carbonate rocks that form the eastern margin of the ridge. Cliff-faces up to 200 m high occur in some localities, and, like the sinkholes, these tend to be oriented north-south along the strike of the limestone.

*15 Summerleas Road, FERN TREE Tasmania, Australia 7054

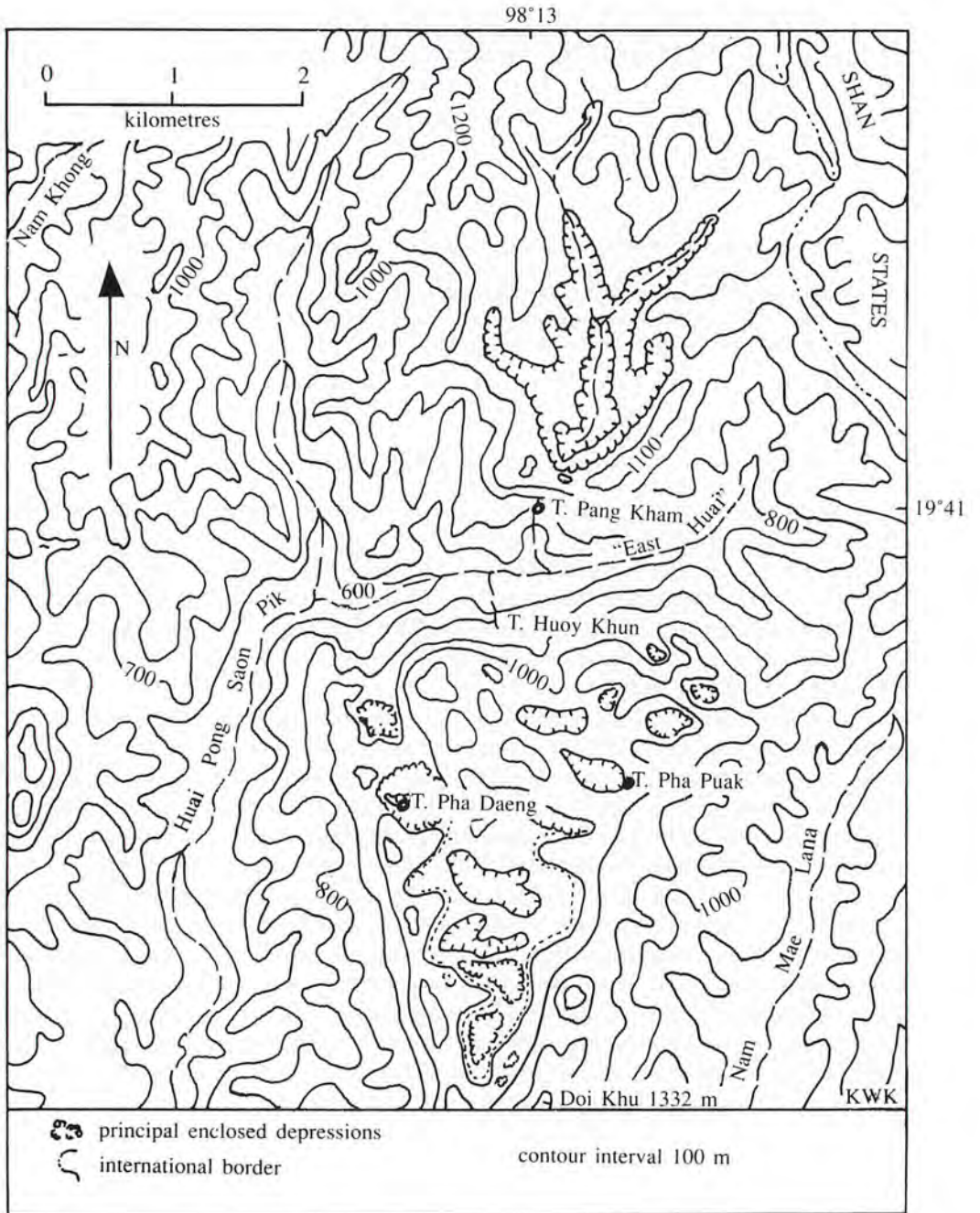


Figure 1. Location of the caves in the Ban Pang Kham-Ban Pha Daeng-Ban Pha Puek area.

THE CAVES

The northernmost of the major caves in this area drains the large karstic depression in which Ban Pang Kham is located (Figure 2). At the upstream end of this cave a tributary stream falls down a spectacular vertical rift estimated at 30–40 m deep that admits daylight deep into the cave. Near the rift there is a very large chamber 20 m high that is flooded by fallen blocks of limestone and which contains a large colony of bats. Beyond this chamber the stream can be followed for several hundred m along a passage that reaches 10–15 m high until it emerges on the surface at the top of a waterfall that overlooks a large tributary of the Huai Pong Saen Pik. For most of its length the underground passages of Tham Pang Kham have developed along the strike of the limestone beds. Gravel and sand deposits form small terraces 4 m or more above the cave stream and there are numerous stalactites and other secondary carbonate speleothems in some areas of the cave. The present downstream entrance is only ~ 4 m in diameter and appears to have formed since an earlier outflow nearby became blocked by the accumulation of clastic and chemical sediment.

On the opposite side of the tributary valley lies Tham Huoy Khun (Figure 3). This contains a permanent stream that discharges about 100 m above the floor of the valley and which has deposited a series of small travertine cascades outside the cave entrance. The downstream part of this cave comprises an underground stream passage 4–6 m high and wide floor of fine gravel and sand. This passage divides into two tributary passages the roofs of which become progressively lower as one proceeds upstream. Neither of these passages has yet been fully explored. Tham Huoy Khun is already known to exceed 1 km in length.

About 2 km SSW of Tham Huoy Khun a small stream sinks into the entrance of Tham Pha Daeng, which gives access to a large chamber that extends to a depth of about 50 m. Exploration has probably not proceeded beyond the bottom of this chamber due to there being a vertical drop of about 10 m through large and unstable boulders (Figure 4).

Just under 2 km to the east of Tham Pha Daeng lies the huge 100 m high entrance of Tham Pha Puek (Figure 5). This entrance leads to a massive chamber that is flooded by huge blocks of fallen limestone. Very large stalactites hang from the roof, which is formed from a series of bedding planes that dip steeply westwards. The small stream that enters the cave has been followed to a narrow constriction 270 m below the level of the cave roof at the entrance, which may make this the deepest cave yet explored on the mainland of southeast Asia.

A further 2 km to the SW an ephemeral stream sinks into another cave entrance. This cave has been explored for at least 2 km and appears to head almost directly northwards, again following the strike of the limestone. Exploration of this system also remains incomplete, and no cave map has yet been compiled.

DISCUSSION

Of the caves known to occur in this area, the longest has been explored for about 2 km and another is probably the deepest cave yet explored in this part of the world.

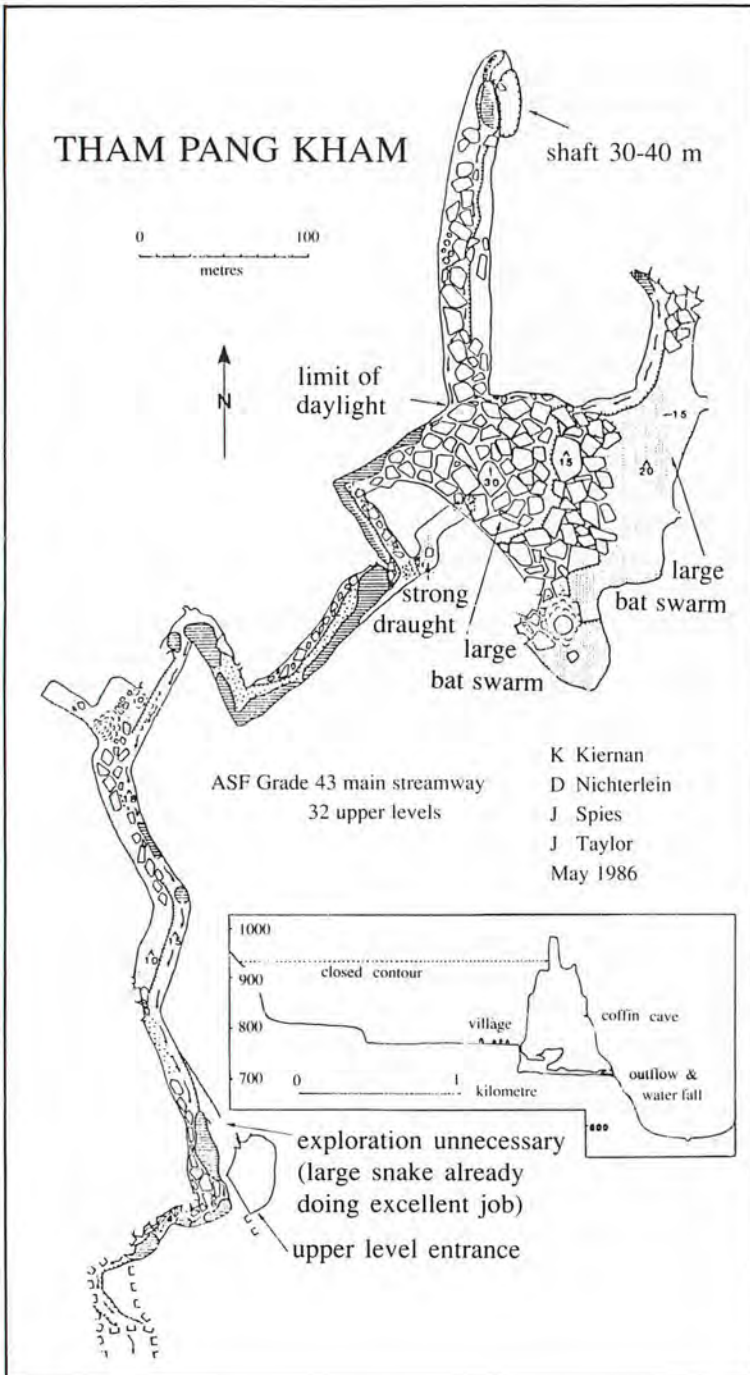


Figure 2. Map of Tham Pang Kham, lat. 19°41', long. 98°13'

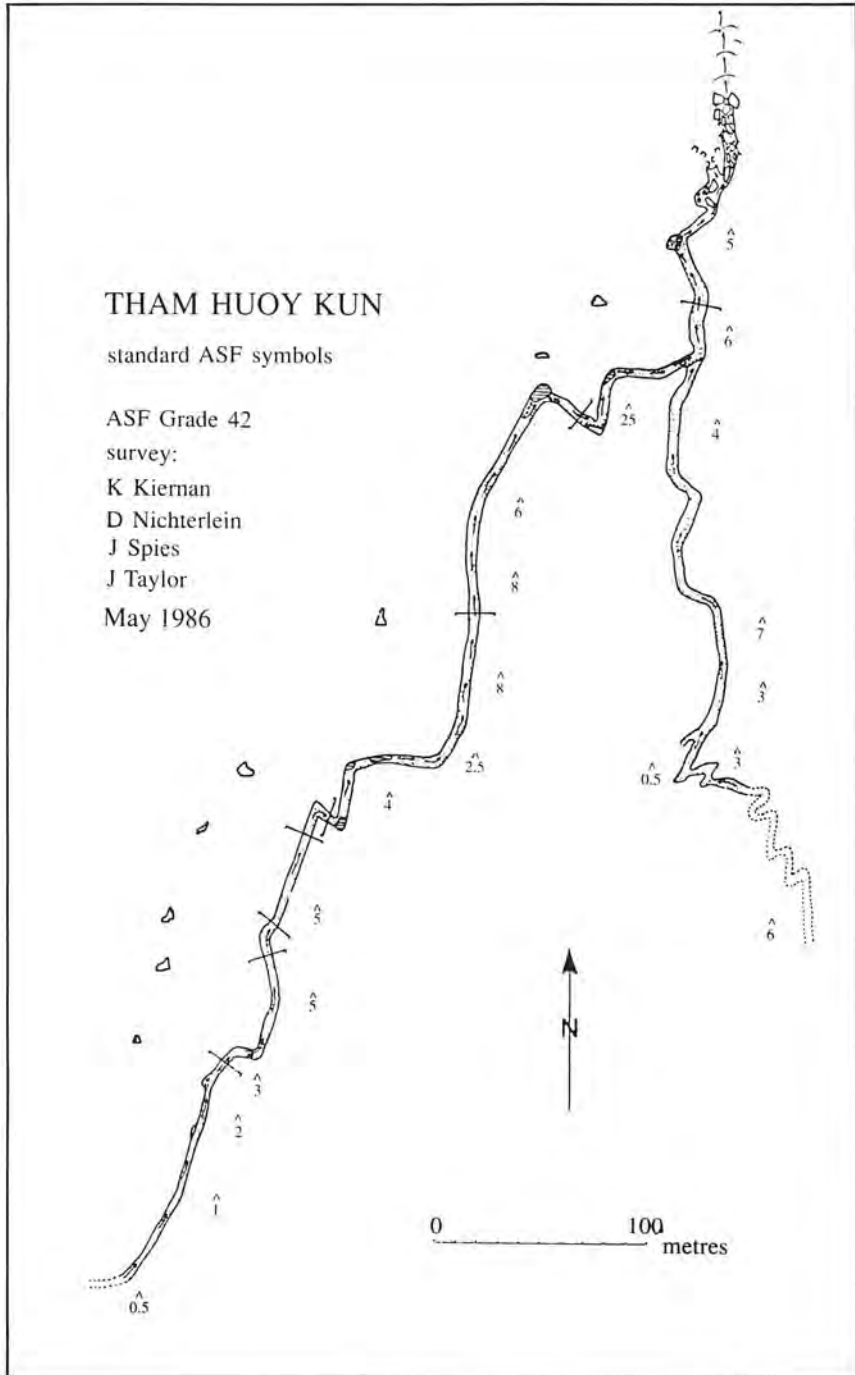


Figure 3. Map of Tham Huoy Khun, lat. 19°38', long. 12'.

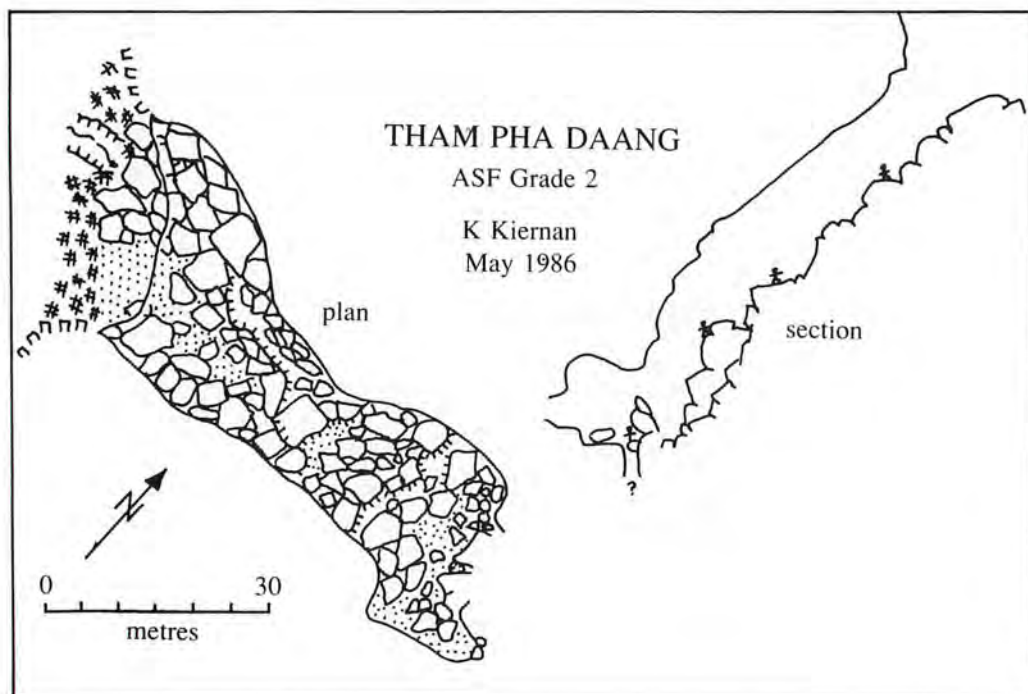


Figure 4. Sketch map of Tham Pha Daang, lat. $19^{\circ}41'$, long. $98^{\circ}12'$.

These caves must, therefore, be regarded as being of considerable significance. Their evolution has in each case been dominated by the structure of the limestone, the long stream caves being elongate along the strike of the limestone beds and the Tham Pha Puek (and possibly Tham Pha Daeng) having developed down the dip of the rocks. These strong structural controls on cave development are by no means confined to this local area but are also evident elsewhere in northern Mae Hong Son. For example, the development of Tham Kaeng Khao, which lies near the Tham Plah park a few kilometres from Mae Hong Son along the road to Pai, has also been dominated by solution along the strike of the limestone with very few deflections of the passages along joints at other orientations (Figure 6). The presence on relic gravel deposits in the caves, and the possibility of dating these by radiometric assay of secondary speleothem carbonates that overlie them, offer the possibility of obtaining a better understanding of the age of the caves and of environmental changes that have occurred in this part of Mae Hong Son during past millenia.

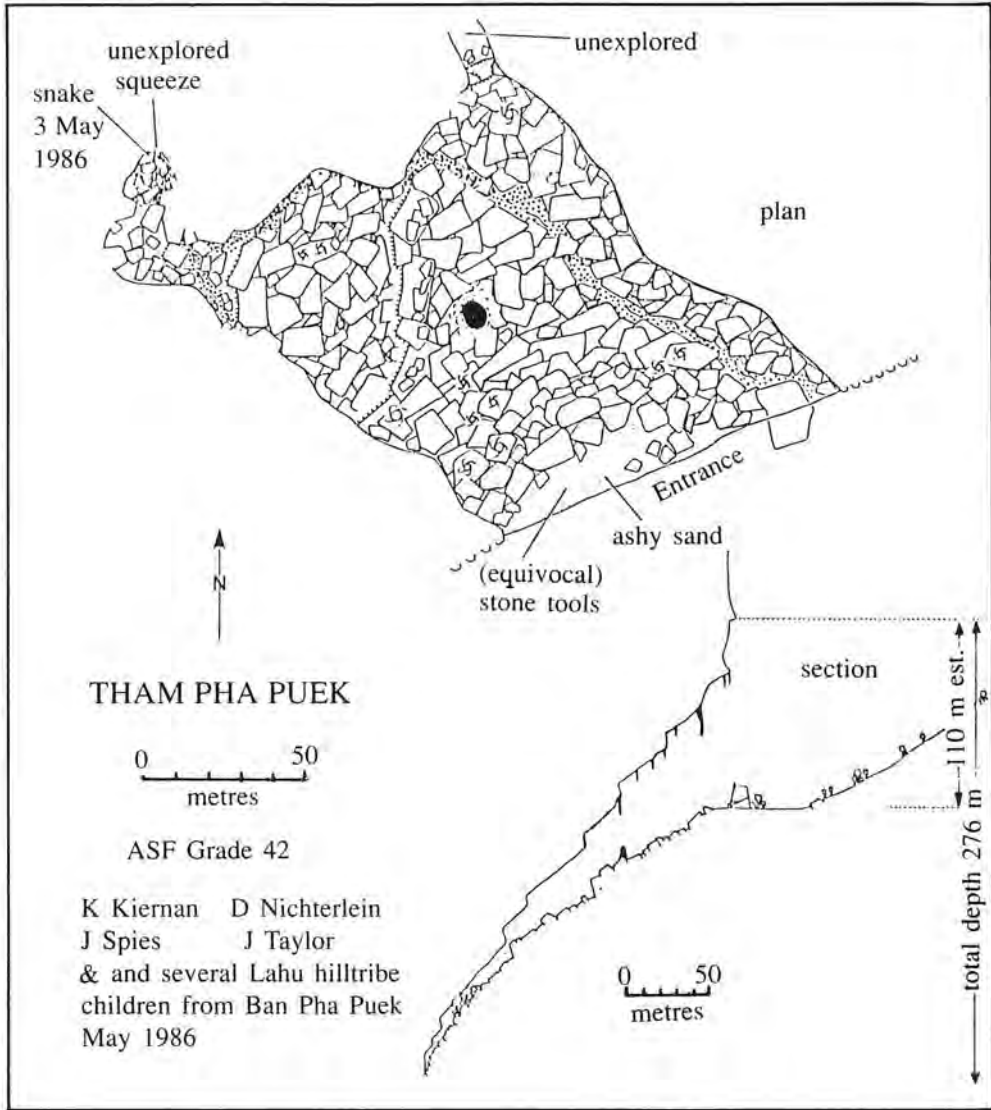


Figure 5. Map of Tham Pha Puek, lat. 19°39', long. 98°13'.

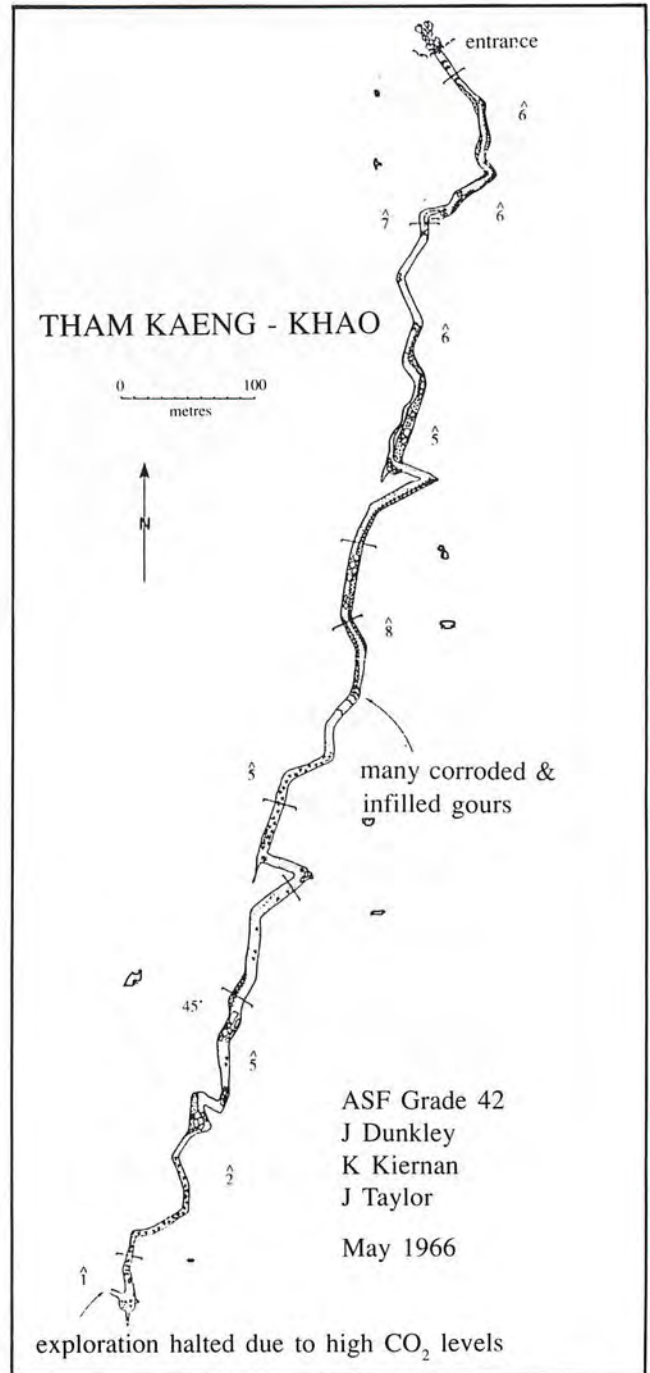


Figure 6. Map of Tham Kaeng Khao, located in the Tham Plah area near Mae Hong Son, lat. 19°25', long. 97°59'.

ACKNOWLEDGMENTS

I acknowledge with gratitude my caving friends John Spies, John Dunkely, John Taylor and Dorothy Nichterlein who assisted in the compilation of the cave maps and were excellent company in the field.

REFERENCES

- BENDER, F. 1983. *Geology of Burma*. Gebruder Borntraeger, Berlin. 294 pp.
- BUNOPAS, S. 1981. Palaeogeographic History of Western Thailand and Adjacent Parts of Southeast Asia – A Plate Tectonics Interpretation. *Thailand Geological Survey Paper*, 810 pp.
- DUNKLEY, J.R. 1985. Karst and caves of the Nam Lang - Nam Khong region, north Thailand. *Helictite* 23(1): 3-22.
- KIERNAN, K. 1988. Geomorphology of a tropical intermontane basin in the Sino-Burman ranges. Unpublished paper presented to 26th International Geographical Congress, Sydney, Australia.

