# The Tigris Tunnel and Birkleyn Caves, Turkey

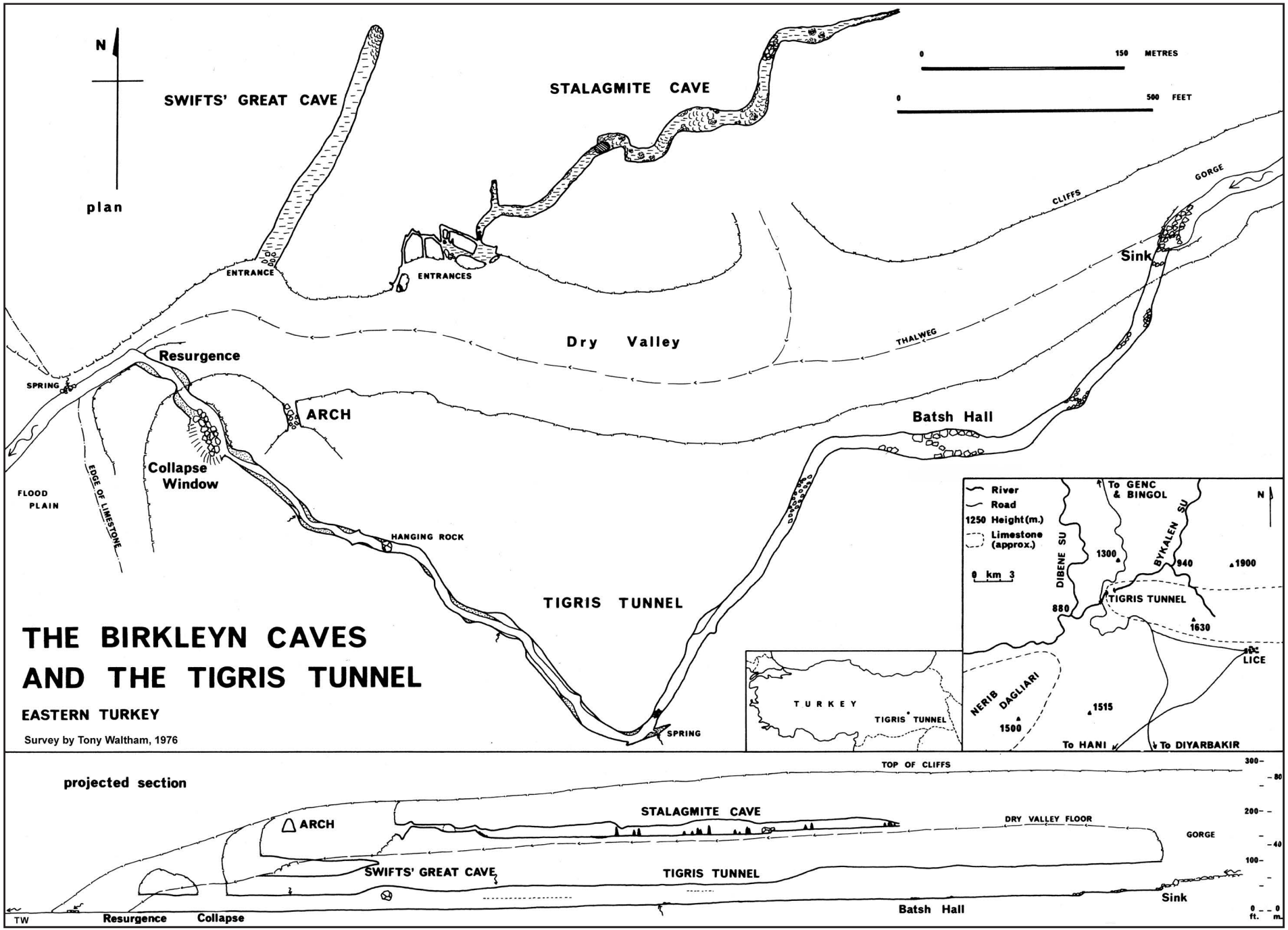
***Tony Waltham***

The Tigris Tunnel has been known for at least 3000 years - it is after all in a part of the world inhabited by some of the earliest civilisations, and it is a conspicuous feature with a large river pouring out of it. Locally the river is known as the Bykalen Su, but this constitutes one of the major headwaters of the great River Tigris - hence the historical name for the cave. Victor von Hagen recently mentioned some of the cave's early history in the Geographical Magazine (March 1976, p.365).

It was the article by von Hagen which prompted the writer to visit the caves in 1976. From Istanbul it is just 1100 miles to the Tigris Tunnel - a relatively easy journey lasting a few days and costing less than £5 on a succession of trains and buses. One of the advantages of the Tigris Tunnel is that it is located adjacent to the main road from Bingol, in the Euphrates valley, to Diyarbakir, in the Tigris valley - a road which carries few cars but does bear a sort of daily bus service. The caves more than lived up to the expectations based on von Hagen's comments. One result of this was, that the caves were not exhaustively explored, as the supply of batteries for the one meagre hand torch proved inadequate. The writer had intended to survey the caves, as no previous speleological description could be found. However as there was no-one to hold the other end of the tape, the survey was only done by compass and pacing - just under a mile of cave (1500 metres) was mapped in this way. No grade is claimed for the survey, but the closed loop through the Tunnel and back over the dry valley closed within 30 feet; while an element of luck must have aided this closure, it does suggest that the map bears some resemblance to the truth.

No other caves were visited, or are known, by the author in the region. The limestone only occurs in an east-west belt (see survey inset) where it breaks through the volcanic rocks that dominate the area. Local relief on the limestone is however more than 700 metres and it forms some very impressive mountains when viewed from the north. Southwest of the Tigris Tunnel the Nerib Dagliari range continues for more than 20 kilometres, and the 1:200,000 map of the area (Sheet E14) shows two large closed valleys just northwest of Hani. The Neribduzu and Neribyusufan valleys are respectively ten and six kilometres long, each appearing on the map with flat floors and cols rising a minimum of 100 metres all round. They are perched well above the surrounding plains and may repay attention from a passing caver with a car and a day to spare.

*The resurgence exit of the Tigris Tunnel, as seen from the road between Bingol and Lice.*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To HANI
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THE BIRKLEYN CAVES
AND THE TIGRIS TUNNEL
EASTERN TURKEY
Survey by Tony Waltham, 1976
projected section
TOP OF CLIFFS
ARCH
STALAGMITE CAVE
DRY VALLEY FLOOR
GORGE
SWIFTS' GREAT CAVE
TIGRIS TUNNEL
Sink
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ft.
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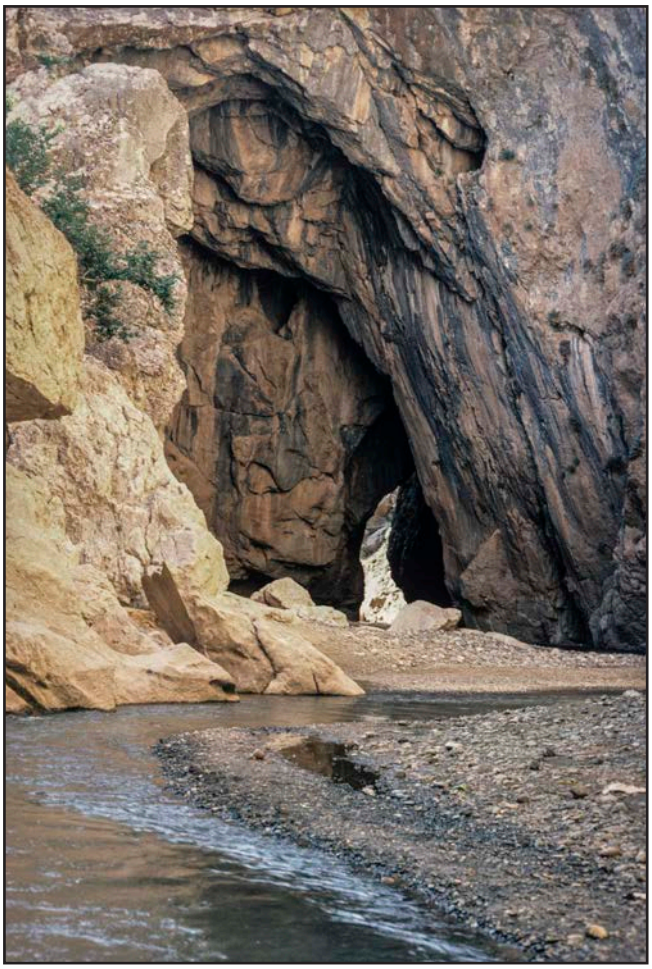
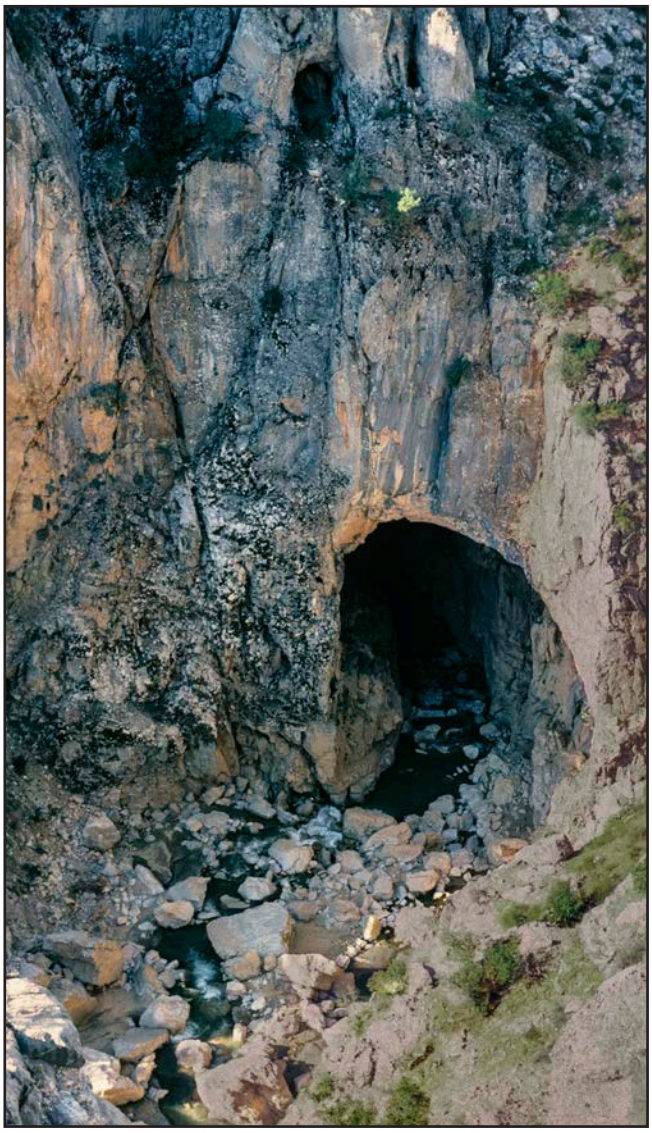
## The Tigris Tunnel

The downstream end of the Tunnel is clearly visible from the nearby road where the river pours out of a narrow limestone ravine onto a flat floored section of valley cut in volcanic rocks. For its entire length of 2840 feet (865 metres) the cave is a massive streamway, averaging 20 feet wide and 40 feet high. Just upstream of the resurgence a section of roof collapse has left the river with an overhanging cliff on the north side and a boulder slope on the south. Most of the cave has a classical keyhole profile with a 20-feet-deep canyon incised below a 20-feet-diameter tube; only in Batsh Hall has there been any extensive collapse. The floor of the cave is nearly all sand gravel and silt in the downstream half, but upstream there are many more boulders and rocks over which the river cascades; the underground river has a total drop of nearly 50 feet and most is in this upper section. The upstream entrance to the Tigris Tunnel is an impressive arch at the foot of a limestone gorge 200 feet deep, with a dry valley taking off just above the cave roof.

The flow of water at the time of the writer's visit (August) was estimated at 15 cusecs, and its temperature must approach 70°F. With care the whole cave could be traversed without getting a pair of shorts wet. However small fresh scallops are carved into the walls up to ten feet above river level - the cave must take an incredible torrent during the spring flood season. Even in August the current was strong, and the river was moving more clastic sediment through the cave than the writer has seen anywhere else underground. Only a few drips enter the roof of the cave, but there are two inlets at floor level. One is from a sandbank midway through the Tunnel, and the larger one emerges from boulders just below the resurgence. Both yield water about 10°F colder than the main water, which suggest it is percolation water that has had a much longer time underground than the river.



*Tigris Tunnel Looking out from the collapse window, through to the resurgence.*



*The upstream entrance of the Togris Tunnel, where the river flows into the cave at the end of its rocky gorge.*

A number of swifts live in the downstream end of the cave, and there is a bat colony at the upper end. The distinctive aroma from the droppings of the latter, accumulated on the boulder piles, accounted for the name of Batsh Hall.

## The Birkleyn Caves

Between sink and resurgence of the Tigris Tunnel there is a dry valley, flanked for most of its length by cliffs a hundred or so feet high. Opening into these cliffs are the various entrances of a number of caves known collectively as the Birkleyn Caves.

Most westerly is the Swifts' Great Cave, .a massive arched tunnel inhabited by a large colony of swifts. The floor is mud and guano until it rises over a huge bank of flowstone which marks the present end of the cave, 510 feet from the entrance.

Farther up-valley, six entrances lead to a small joint controlled maze of passages, from the back of which opens out the long tunnel of the Stalagmite Cave. This consists of a single dry phreatic tube containing large amounts of calcite decorations; massive stalagmites and stalactites obscure much of the wall detail, particularly further into the cave, and old gour terraces interrupt the mud floor. The cave was surveyed for 1615 feet (490 metres) as far as a stalagmite constriction. Failing light then forced a retreat, but the cave appeared to increase in size beyond this point, and probably continues. The writer makes no claims of original exploration; all the passages visited bore footprints, and no light was available to look for side passages which may lurk behind the sizeable formations.

The Arch is a short relict piece of cave passage which passes from the dry valley straight through to the southern hillside. Other smaller or less accessible entrances in the dry valley cliffs await attention.

*Tigris Tunnel near its downstream end.*

## Origin of the caves

All the caves have been formed by the one river (the Tigris or Bykalen Su) cutting down through an anticline of limestone. Relatively weak volcanic rocks lie stratigraphically above the limestone, now outcrop both upstream and downstream, and must once have covered the limestone even over the anticlinal crest. The overall course of the river through the nose of this anticline (it plunges to the west and the river only just meets it) therefore represents an instance of superimposed drainage. The axis of the anticline is clearly visible just upstream of the top entrance to the Tigris Tunnel. The upstream section of the river's course across the limestone is therefore entirely in an open gorge, though caves may be found to be associated with it if they are searched for.

The caves appear to represent a single sequence of development, which probably started at some time during the Pleistocene period, as follows:-

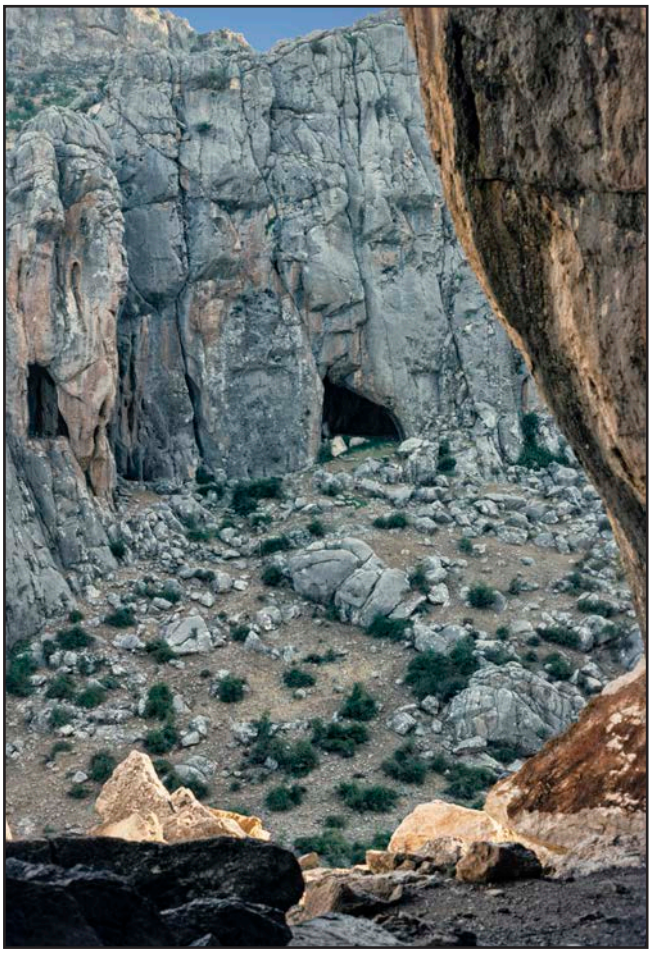
1. Phreatic development of Stalagmite Cave and the Arch. The extensive stalagmite deposits and the high level of these caves suggest (unless the main tunnle is deep phreatic, which is unlikely) that they are the oldest. The Arch is a truncated segment of the main trunk route.

2. Phreatic development of Swifts' Great Cave. Assuming a shallow phreatic origin (see below) this post-dates the Stalagmite Cave, and its downstream continuation almost certainly continued through the narrow part of the ravine now utilised by the water downstream of the present resurgence.

3. Incision of the dry valley. This led to the complete fossilisation and segmenting of the older phreatic caves, and it appears that the valley has invaded and utilised the downstream section of the Swifts' Great Cave. This temporary establishment of surface drainage on the limestone must almost certainly date back to a periglacial phase within the Pleistocene, probably contemporaneous with one of the later glaciations in higher latitudes. Furthermore another rather wetter climatic phase during the late Pleistocene must have been responsible for the major calcite deposition in the Stalagmite Cave; there is little activity of this nature today.

4. Phreatic development of the Tigris Tunnel. The roof of the river cave is so high, in and upstream of Batsh Hall, that it is difficult to identify a phreatic roof tube with certainty. There could have been vadose development in the upstream section leading to a sump part way through the cave.

5. Vadose incision of the canyon in the Tigris Tunnel. This phase continues to the present day.



*Looking across the dry valley at the passage fragments forming the high-level Birkleyn Caves, which pre-date the Tigris Tunnel that lies almost directly beneath.*

The limestone is fairly massive, though some conspicuous bedding planes do occur and there is a normal degree of jointing. The geological influence on cave development seems to be very limited; some passages are joint oriented, notably in the Stalagmite Cave entrance maze, and bedding planes mark some passage ceilings. The only other geological control may be exhibited in the Tigris Tunnel where the upstream half of the cave is deflected down dip (though it climbs stratigraphically), to the major bend at its southernmost point from where it is oriented along' the strike.

Much more significant is the fact that all the caves are remarkably well graded. The present river, including along its underground section, has a classic graded profile, steepening upstream presumably towards a nick point or the limestone-volcanics boundary further up the gorge. Such level phreatic caves cutting right across the geological structures suggest a shallow phreatic origin where the exit level of the water, out onto the non-calcareous rocks downstream, was the major control over development. The apparent concentration of caves at the downstream end of the river's course across the limestone outcrop may be due to the steeper hydraulic gradients in that zone, as the limestone is topographically more resistant than the adjacent volcanic rocks and the whole system of caves and valleys stands as a very fine example of subterranean river capture.

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The text and cave survey were first published in the Bulletin of the British Cave Research Association, Number 14, pp 31-34, in November 1976. Photos by the author have been added to this version.