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Second Report on the Little Neath River Cave

by
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Parish Ystradfellte
Maps 1 in. Sheet 141
6 in. Sheet SN 91 SW

Flood Entrance SN 912142
Altitude 304 m. (997 ft.)
Length 8·14 km. (5·06 miles)
Depth 88 m. (288 ft.)

CONTENTS

ABSTRACT

The Little Neath River Cave is situated in the Valley of the Nedd Fechan, Breconshire, S. Wales. It was discovered in 1967 and has been explored and surveyed to its current length of over 8 km. by members of the University of Bristol Spelæological Society.

In dry weather the whole of the Nedd Fechan sinks into the system, mostly via Bridge Cave. The water resurges in the bed of the river 2 km. to the south near Pwll Du, which itself is a flood rising. Sump 6—the present end of L.N.R.C. is at the same altitude as Pwll Du.

As with other South Wales systems the cave has been heavily influenced by the glacial history of the region. Successive phases of erosion, deposition and re-excavation are suggested. The development of the cave down-dip and the later change of direction of flow lines are linked to surface changes. The local flood hydrology is discussed with the conclusion that flows dangerous to spelæologists may occur on almost any winter's day.

A description and Grade 5C survey of the cave are presented. A checklist of smaller caves in the Little Neath Valley is also given.

INTRODUCTION

Four years have passed since the discovery of the Little Neath River Cave (L.N.R.C.) and publication of the first report on the system (Norton, Savage and Standing, 1967). This second report has three

major objectives—to record the explorations made since 1967, to present a new survey of the cave and lastly, and perhaps most important, to describe the geomorphology of the system.

As copies of the first report are now in short supply, a summary of the earlier published work has been included for the sake of completeness.

HISTORY OF EXPLORATION

Early Work in the Valley

The classic limestone gorge at Cwm Pwll y Rhyd was visited by several 19th century topographers, though it never achieved the popularity of neighbouring Porth yr Ogof (Standing and Lloyd, 1970). Rönnfeldt (1890) was one of the first to record the chasm of Pwll y Rhyd. North (1928) described the surface topography of the Nedd Fechan and other valleys in the Vale of Neath.

Systematic investigation of the caves did not begin until the mid 1930's when a group of Mendip spelæologists under the guidance of T. A. J. Braithwaite visited the valley. This party explored the first part of Bridge Cave, Pwll y Rhyd, White Lady Cave and Town Drain, and produced the first survey of the latter (Braithwaite, 1938; Wood 1939). In 1947 members of the newly formed South Wales Caving Club forced the boulder choke 45 m inside Bridge Cave and reached the underground course of the Nedd Fechan. Exploration was disappointingly halted by a sump after 150 m. of fine streamway.

Further developments in the valley included the extension of Pant Mawr by the S.W.C.C. in 1953 (Alexander & Jones, 1959) and the underwater connection of Pwll y Rhyd to White Lady Cave by the Cave Diving Group in 1960 (De Graaf & George, 1960). The Mendip Nature Research Committee did much valuable surface work in the early 1960's and found a number of small caves to the east of the Nedd Fechan (Fortnum and Knee, 1964).

Discovery of the Little Neath River Cave

The discovery and exploration of L.N.R.C. has been carried out almost entirely by members of the University of Bristol Spelæological Society (U.B.S.S.). The sequence of discoveries has made it convenient to divide the cave into parts. These are determined by the upstream ends of Sumps 1–6. Thus L.N.R.C. 1 is Bridge Cave down to Sump 1. L.N.R.C. 2 consists of all those passages found after diving Sump 1 and before Sump 2 and so on.

It was not until January 22nd, 1967—almost 20 years after its discovery—that Bridge Cave sump was first investigated by a U.B.S.S./C.D.G. party. C. J. Gilmore passed an easy 20-m. sump and explored solo as far as Sand Chamber. On January 28th he returned with D. Savage and P. W. Kaye and explored Tributary Passage up to Flood Entrance. Though daylight could be seen, it was not possible to reach the surface. Returning downstream the party then investigated the Canal Bypass, and continued, from Junction Chamber to Sump 2, under high water conditions. The top end of the Canal was sumped.

On February 11/12th a large U.B.S.S. party camped at the cave. Flood Entrance was soon opened up and most of the system surveyed. Further discoveries included the North East Inlet Series, Straw Aven, Ubbs Aven and Gyrn Fawr Passage. The river was lower than before, and the Canal was passable. On February 18th Blaen Nedd Isaf Passage was found. Later the same day there was a heavy rainfall and a party of three who had been surveying in the North East Inlet Series were unable to get out of Flood Entrance. They were trapped for three hours before rescuers diverted the floodwaters.

On March 18th Cairn Passage was fully explored and Genesis Gallery discovered. The next important find came when maypoles were taken through sump 1 and erected in Bouncing Boulder Hall. A hair-raising 10-m. climb was rewarded by the discovery of the High Level Series which connected with Straw Aven.

Over the months that followed, attention was concentrated on L.N.R.C. 5 and 6, and the old part of the cave, (which had come to be known as L.N.R.C. 2), was rather ignored. It was not until February 21st, 1970, that a further major discovery was made. A party of five dug through a squeeze in 3-D Maze, Genesis Gallery, and reached the Old World Series. On returning to the main streamway a few hours later they were surprised to find the river in high flood, and were trapped for a further 12 hours.

On March 15th, 1970, the wet aven in Genesis Gallery was maypoled and Genesis Inlet explored.

Diving and the Discovery of L.N.R.C. 3–6.

Exploration beyond Sump 2 began quite soon after the opening of L.N.R.C. and is still in progress. Sump 2 was passed on March 11th, 1967, and Sump 3 on May 21st. The diving of Sump 4 and exploration of the L.N.R.C.5 streamway and Perspicuity Passage took place on June 10th. Sump 5 fell on July 8th, and the high level complex around Sump 4 was also explored then.

Major extensions were made on September 17th (Savage, 1968). After Sump 6 had been dived without success, the choke in Lake Chamber was forced and New World Passage entered. Sump Passage and 17th Street were found the same day, as well as the first bypass to Sump 5 (an aven near Sump 4A). Foot and Mouth Passage was discovered on November 19th, 1967, and New World Passage was connected with the streamway near Sump 4. The epidemic of Foot and Mouth disease then halted exploration for several months until June, 1968, when radio-location equipment was carried through the sumps (Standing, 1968). Several more surveying and exploratory trips have taken place since (Wilkins 1970a). Tipperary—entered on November 19th, 1969—is the most recent major find beyond Sumps 2–4 (Priddle, 1970).

Diving has played a large part in the discovery of L.N.R.C.—about 70% of its passages have been first trodden by cave divers. It is pertinent to mention briefly the techniques employed. All the diving has been carried out with compressed air equipment using 40 cu. ft. bottles and 2 stage demand valves (Boon, 1966). The sumps have fixed courlene guidelines and the visibility is generally good. They present no particular problem other than their length, which necessitates the use of fins. The practical difficulties of organising a trip to L.N.R.C. 5 and 6 are, however, quite considerable, and there have still only been 15 visits to this part of the cave to February, 1970. Long working trips beyond the sumps are a strenuous undertaking particularly if the diver has to carry his own equipment out of the cave. Fortunately willing bands of sherpas have usually been available to transport diving gear down to Sump 2, and occasionally they have even been persuaded to carry it out again after the dive! Their support is gratefully acknowledged.

ACCESS

Flood Entrance lies on the land of the Lewis family of Blaen Nedd Isaf. Permission should be sought at the farm, and a levy of 5p is usually charged for access. Cavers should approach the entrance by crossing the bridge over the Nedd Fechan and walking up the west bank of the river.

DESCRIPTION OF THE CAVE

A detailed description of the cave, as it was known up to June 1967, was included in the First Report. A summary of this is given below. Passages discovered since 1967 are described in more detail. In both cases the accounts are complementary to the survey.

Bridge Cave

A large shakehole at SN 91171399 gives access to a 60-m. crawl leading to a boulder choke. The water, which sinks at the bend of the river, is met here and a short meandering streamway then leads to the Main Passage, which is of lofty proportions (*Plate* 27A). After 45 m., at a point where a slender natural rock bridge spans the river, the roof descends and Sump 1 is only a further 45 m. away. The sump is about 18 m. long, shorter than was previously thought.

Flood Entrance and Tributary Passage

Flood Entrance (SN 91181420) is a small opening in the left bank of the Nedd Fechan, 200 m. upstream of the bridge. After a 2-m. flat-out crawl one progresses on hands and knees, negotiating 13 right angle bends to an easy duck. Here one branch of Blaen Nedd Isaf Passage (a 600-m. wet inlet), joins Tributary Passage which trends southwards to a 1·5-m. pot. Several ways on, between or under boulders lead on from here, but soon re-join. The second branch of Blaen Nedd Isaf Passage enters beneath a large section of fallen blocks, and from this point on the passage is generally larger (3 m. high, 2 m. wide). Two dry oxbows bypass some of the more awkward sections of streamway, the second one leading out almost opposite the calcite bee-hive entrance to the Canal By-pass. Downstream a low bedding plane is entered for 15 m. after which the roof rises again. A larger dry passage, Mud Hall, leads back on the right, over banks of stalagmite and mud fill. Shortly after this, Tributary Passage, by now 15 m. wide and 7 m. high, enters Sand Chamber where water flowing from Sump 1 crosses from the right, into the Canal on the left.

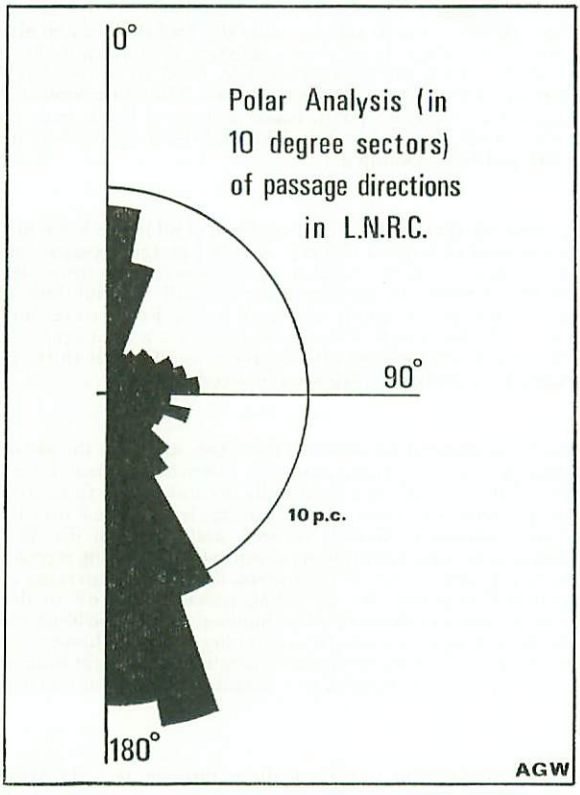

Fig. 55

The Canal and Canal By-pass

The Canal is a wide, low bedding plane crawl, in 70 cm. of water, nearly 200 m. in length. The light brown trout, which abound in the L.N.R.C. stream, can often be seen here, particularly if a mask and snorkel are taken. The upstream end of the Canal offers only 20 cm. of airspace and sumps in mild flood.

An alternative and somewhat dryer route is the Canal By-pass, entered at Gour Passage (*Plate* 28). This is mostly hands and knees crawling, the passage gradually ascending, until the water from the N.E. Inlet Series crosses it to reappear as an impressive waterfall a little further on (*Plate* 29A). The stream is then followed down to Junction Chamber, a dry high level route forming the last section of the by-pass. At Junction Chamber, the Canal enters from the right and the united streams flow southwards down the Main Stream Passage.

The N.E. Inlet Series is a complex of small inlet passages with some larger sections of dry canyon passage. There are some fine gours.

Main Stream Passage

The Main Stream Passage from Junction Chamber to Sump 2 is over 600 m. long. Initially it is 10 m. high and 10 m. wide and the river cascades down over some spectacular fallen blocks. A high bank of fill is passed on the right and can be climbed to reach Genesis Gallery. Further downstream past the Fallen Slab, the water enters a canyon type passage for 30 m., forming a by-pass to the more unstable section of Bouncing Boulder Hall. The Canyon (*Plate* 29B) leads out into the second part of the Hall, where the passage dimensions are colossal. Most of the water disappears into the Wet Loop to be met again after a short clamber over boulders, while the roof drops suddenly, exposing the maypole entrance to the High Level Series. Further downstream the roof gradually descends to the duck, which can be by-passed in flood by a roof-level crawl. Cairn Passage and the route to Ubbs Aven are then reached. The Main Stream Passage, which has been trending S.S.E. until this point, makes a series of bends back westwards. The entrance to Exodus Crawl is passed on the right, and the steep slope up into Gyrn Fawr Passage on the left, just before Sump 2.

Genesis Gallery

A bedding plane crawl at the top of a large bank of fill in the Main Stream leads to a small chamber, the start of Genesis Gallery. A rifty passage developed along a fault is then followed to a small bedding chamber which conceals the route through the 3D Maze to the Old World Series. By keeping to the left wall, the fault line is regained, and eventually leads to a line of beautifully decorated avens. Further crawling, over shingle on the right, leads to the latter half of Genesis Gallery, via a tight squeeze. An aven here provides a small cascade of water and also the route into Genesis Inlet. The water sinks after a short distance. It probably reappears in Exodus Crawl.

Genesis Inlet

A 6-m. maypole is required for access to this series, although the pitch has been free-climbed with difficulty. A 2-m. square passage is followed upstream for a short distance via a 3-m. climb and shower-bath to a beautifully decorated, dry 10-m. aven. This can be free-climbed—(rope useful)—to enter a larger passage leading back over the first towards the fault line which dominates Genesis Gallery, and in which the Maypole Aven is formed. The passage now turns abruptly west, and after ascending steeply a 5-m. drain-pipe climb leads to a stooping crawl in the stream, the passage enlarging after 30 m. into a small well-decorated chamber. An ascending passage leads off to the left here via several tight squeezes, and climbs to the top chamber, a small bedding cave with straws and helictites on the ceiling and walls. By continuing upstream however, an even larger chamber (20 m. × 8 m.) is reached, the stream emerging from a tight sump at the northern end. Several avens have been maypoled to a height of 17 m., but either close or end in boulder chokes.

Old World Series

This series is entered from Genesis Gallery through the 3D Maze, an area of collapsed, enormous, rectangular blocks. The route through these, which involves two tight squeezes, is difficult to find. Eventually a large bedding chamber is entered, 3 m. high and 10 m. wide, with a small stream running from left to right, emerging from a boulder ruckle directly below Genesis Gallery. Downstream there are fine dripstone formations and a large (3-m. square) passage, with the stream meandering between mud banks, may be followed for 100 m. to the lip of Gooseberry Pot (6 m. deep). The water sinks in the gravel at the bottom in two places. The way on is reached, by traversing half way down the pitch and entering a fossil oxbow. After 30 m. the stream reappears in the floor, issuing from an impenetrable sump. Only 60 m. of low crawling through mud

or over razor sharp rocks, remain before the stream sinks once again at the present limit of exploration.

Crystal River Passage is a dry tributary entering Old World Series just past the 3D Maze. It ends in a choke.

High Level Series

The 10-m. maypole entrance to the series at Bouncing Boulder Hall may be by-passed either by climbing Straw Aven, 60 m. downstream of the maypole point, or via a very tight squeeze in the roof of the Main Passage, midway between the two, and leading into the 2nd pot. Midway between here and the maypole point, a low crawl next to a collection of pure white speleothems, leads to a larger passage and eventually a boulder ruckle. A stream cascades in from the left, sinking to a lower level, while a further passage leads off the other side at the same level. This is followed for 50 m. where a short drop into the stream occurs. After only 50 m. more the stream enters an impenetrable bedding plane. A higher level dig in clay could provide a way on.

Sumps 2–4

Sump 2, which is about 40 m. long, has a constricted downstream end, the diver having to wriggle up an under-water boulder slope to emerge in L.N.R.C. 3. This consists of a single chamber, 10 m. long by 10 m. high. A climb up the southern wall leads to a short section of choked high level passage, with a small stream entering from an aven.

Sump 3 (70 m. long) is notable for a large, blind, under-water pot-hole about half way along. The overweighted diver may have difficulty in getting out of it.

L.N.R.C. 4 consists of 45 m. of roomy streamway, with one short side passage just before the start of sump 4 (50 m. long).

L.N.R.C. 5 and 6 Streamway

The 5 streamway is about 200 m. in length and consists of 2 types of passages of very different character. The first usually takes the form of a semi-circular tunnel up to 2 m. high by 2 m. wide. The second type is much larger and has its eastern wall formed along a fault line running at 340°–160° and heading at 20° to the east. There are several avens along this fault and also much evidence of collapse in the streamway (*Plate* 32). There are numerous oxbows along the 5 streamway not all of which are shown on the survey. They all take water in flood. About 70 m. before Sump 5 the stream divides, the right branch flowing direct to Sump 5 past the entrance to Perspicuity Passage, along a high canyon passage. The left branch follows the fault line and most of the water sinks into the short impenetrable Sump 4A.

Sump 5 is about 35 m. long with a large airbell 5 m. from the end. The 6 streamway though only 120 m. long is amongst the most impressive in the cave. Initially it is a fine canyon passage with numerous calcite veins in the floor, roof and walls. The 17th Street water enters from the left after 30 m. and the entrance to Sump Passage will be seen high on the right after 75 m. Further on the main stream flows down a water chute into a lake, 1 m. deep and 10 m. wide, joining a very much larger passage which comes in on the left (*Plate* 31A). This is really the continuation of New World Passage. The final 40 m. of streamway is of majestic proportions, before the roof suddenly descends to Sump 6, which has not yet been passed. The sump descends gradually for about 30 m. where the floor falls away steeply into a large underwater pot, dived to an estimated depth of 15 m. The way on is wide open but continues steeply downwards and as the sump is practically at the same level as the resurgence, the prospects of further discoveries here do not look good.

Sump Passage is an attractive canyon passage, 135 m. long, which has been abandoned by the Main Stream in favour of Lake Chamber. The passage ends in the static sump 6A, which is at the same level as Sump 6, and has been dived for a distance of 27 m. to an airspace and sump 6B. The latter descends steeply like Sump 6, and probably connects with it. Depth reached is 17 m. at a squeeze. When the Main Stream has backed up by 6 m. or more, both this and Sump Passage actively take water.

New World Passage

This is the largest and most spectacular high level passage in L.N.R.C. It provides a by-pass to Sump 5 and can be entered at three points upstream of the sump. The first and most obvious route follows a steep boulder and gravel slope, up on the left, 30 m. after Sump 4. There are two short climbs. At the top of the second one, which has a

fixed etrier, a small chamber is entered and an exceedingly tight inlet, Contortionist Passage, can be reached by a further climb. The way on to New World, however, lies in the opposite direction, being a crawl along the top of a remarkable rift 10 m. deep and about 20 cm. wide. This leads to a small boulder chamber and the way on is then up a steep slope to a wide bedding plane passage with several avens along its left hand wall. After 50 m. the roof suddenly soars up into New World Aven, which is about 5 m. across and over 20 m. high. A tantalising high level passage, heading north, can be seen crossing the aven at a level of about 15 m. (Promised Land). Maypoles will probably be required to reach this. Although New World Aven has yet to be scaled, most of the other avens nearby have been climbed and all become choked with boulders, usually at about 15 m. These may well be under the floor of Promised Land.

The floor of New World Passage, which is composed of enormous quantities of sand and boulder fill, drops away steeply after the aven. Low down on the right hand wall, the second route up from the L.N.R.C. 5 streamway enters. This is a steep climb up through boulders. After a further 30 m. the passage becomes colossal (W. 25 m. H. 15 m.) and New World Oxbow—itself of impressive size—leaves on the right (*Plate* 30). The third route up from the stream requires a ladder, being a 6 m. aven just downstream of Sump 4A. This leads into a tight ascending rift which gradually opens out and leads into New World Oxbow.

After New World Oxbow rejoins, the main passage continues big for 50 m. where a boulder choke will be seen on the left hand wall. This conceals the route down to Lake Chamber. An alternative means of reaching Sump 6 is to continue straight on past the choke. The roof soon descends and a short canyon passage then leads out into the roof of Sump Passage not far from the L.N.R.C. 6 stream.

High Level Complex around Sump 4

This is an extremely complicated series of high level passages, oxbows, avens and potholes in the vicinity of Sump 4. Owing to its complexity a few minor routes have been omitted from the survey for clarity. There are numerous entrances to the series but access is most easily gained by climbing up the boulder slope opposite the entrance to Foot and Mouth Passage.

Foot and Mouth Passage

This inlet enters the Main Stream about 60 m. downstream from Sump 4. It starts as a roomy passage with muddy banks but after 30 m the roof comes down abruptly. After a short hands and knees crawl, a very tight squeeze leads into a little chamber. It is not possible to follow the stream here but the constricted section can be by-passed by a high level passage leading to a 3-m. pot. The stream is seen again at the bottom of this and nearby a 6-m. aven connects with the Sump 4 High Level Complex. The route on, however, is another dry high-level passage at the top of the pot. A fine meandering section of streamway follows, ending in a 2-m. climable pitch. After 30 m. the stream is lost yet again, and the next 80 m. of passage is completely dry with many chert ledges. It ends in a vertical rift 5 m. deep. A choked passage then enters from the right but the way on is a low crawl to the left where the streamway is regained. It can be followed upstream for about 100 m. passing several squeezes until the passage eventually becomes too tight.

The present upstream limit of Foot and Mouth Passage is close to Berthlwyd Swallet (*Plate* 26, 33) and though a positive water trace has yet to be obtained, it seems reasonable to assume that this is the origin of the water. Town Drain may also flow into Foot and Mouth Passage. If it continues its current direction and gradient (*Fig.* 56) a connection is quite possible.

Perspicuity Passage

This 200 m. long inlet passage normally carries only a small trickle of water. The early sections are quite lofty with evidence of faulting. Further upstream the passage becomes smaller and eventually it degenerates into a muddy crawl. It might repay determined exploration.

Seventeenth Street

Two routes to 17th Street lead off from the eastern wall of New World Passage. The first is a tight squeeze over boulders, followed by a drop into a chamber. The 60-m. long, dry, Joke Passage, then gives easy access to 17th Street. The second route is a tortuous canyon passage which enters 17th Street a little further downstream. The

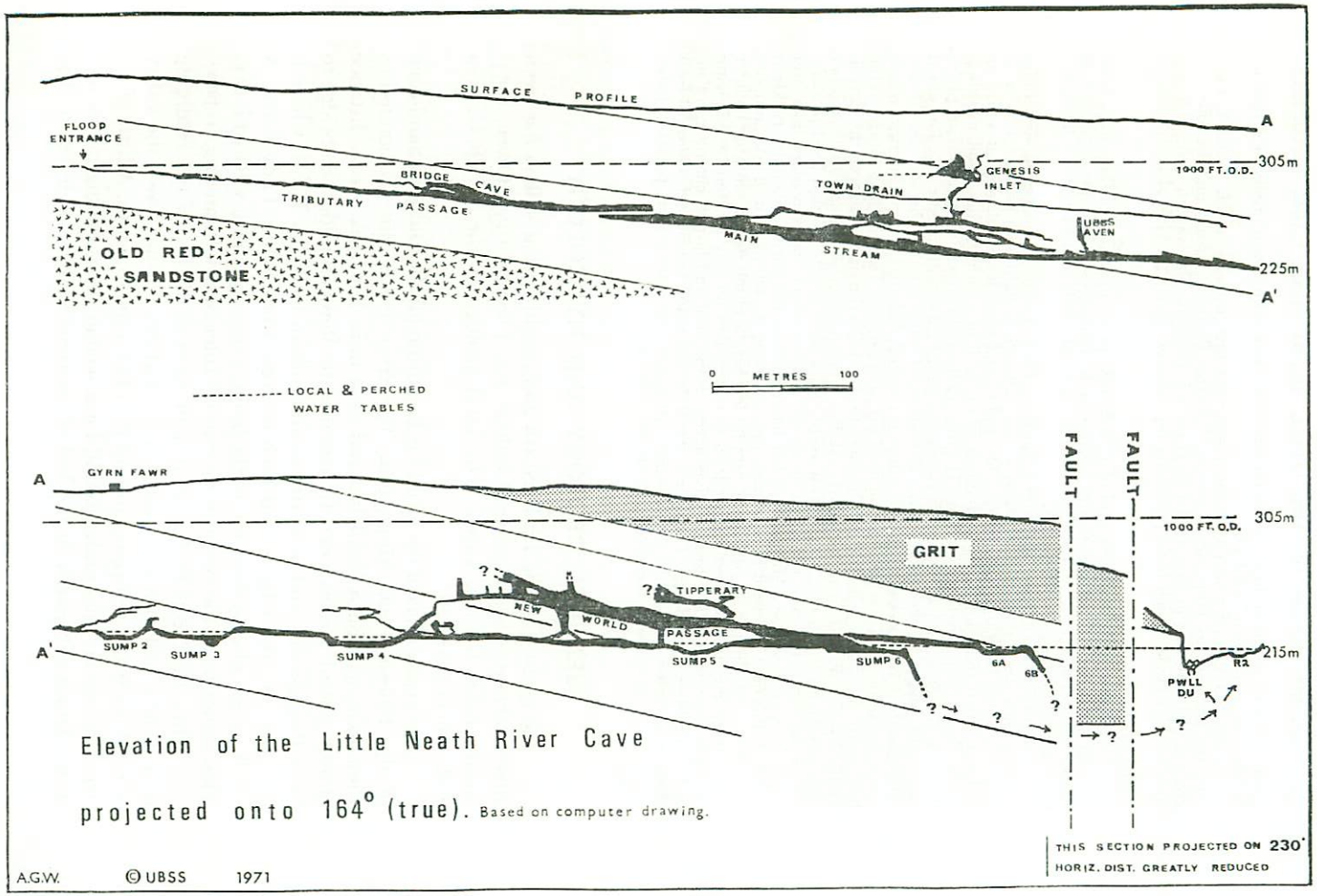
SURFACE PROFILE
A
FLOOD ENTRANCE
BRIDGE CAVE
TRIBUTARY PASSAGE
TOWN DRAIN
GENESIS INLET
1900 FT.O.D.
305m
MAIN STREAM
UBSS AVEN
OLD RED SANDSTONE
225m
A'
0 METRES 100
LOCAL & PERCHED WATER TABLES
A
GYRN FAWR
FAULT
FAULT
GRIT
1000 FT. O.D.
305m
TIPPERARY
NEW WORLD PASSAGE
A'
SUMP 2
SUMP 3
SUMP 4
SUMP 5
SUMP 6
6A
6B
R2
PWLL DU
215m
Elevation of the Little Neath River Cave
projected onto 164° (true). Based on computer drawing.
THIS SECTION PROJECTED ON 230°
HORIZ. DIST. GREATLY REDUCED
A.G.W.
© UBSS 1971

Fig. 56

stream may be followed down to a sump and the water is then seen briefly in Tipperary before flowing on to L.N.R.C. 6.

Upstream the 17th Street Streamway assumes larger proportions (H. 10 m. W. 2 m.) after the entrance to Tipperary is passed. A further 80 m. of stream may be followed, gradually diminishing in size, until a short canal is reached. The way on is then blocked by a boulder choke which looks promising but has not yet (1970) yielded to digging.

Tipperary

A high rift in the southern wall of 17th Street, 40 m. upstream of the sump, leads to Tipperary. The series was so named because of the remoteness felt by the divers during its exploration, due partly to the distance from base and partly to the technical difficulties encountered in this part of the cave.

The rift leads to a 6-m. climb and T junction. The left branch may be followed under a 20-m. high aven, at the top of which is a short length of tight inlet passage, to a steep slope dropping back into 17th Street. The right hand branch soon degenerates into an awkward mud slide down into a chamber (8 m. by 8 m.) with obvious flood markings on the floor. There are three ways on. The first, to the right (west), drops down steeply to the 17th Street stream at a point between two sumps; the centre route is a low crawl over mud, and is blocked after 14 m.; the left hand route (east) is the way on. Almost immediately a very awkward muddy climb is reached, followed by a tight crawl which comes out in the roof of a meandering fossil canyon passage. This can be followed to the left (north) for about 50 m. where it becomes too tight. To the right, however, the canyon gradually widens and turns eastwards. At this point a low crawl leads off to another chamber (7 m. by 10 m.) with several avens and a short length of high level passage. The main route, however, continues along the canyon, which has a boulder floor and begins to ascend steeply. After a short left hand bend to the north, a boulder ruckle is reached; this may be passed by squeezing through along the left hand wall into an upper chamber (1 m. high, 5 m. wide). By turning left here a climb up an unstable boulder slope brings one into an even higher level chamber with no way on. But by following the right hand wall, a low squeeze gives access to the final and largest chamber (13 m. wide, 2 m. high, 45 m. long). The floor is of soft dry sand, and the far end is blocked by a choke of enormous megaliths (Stonehenge). Although there are several points of penetration no way through the choke has yet been found.

GENERAL GEOLOGY AND HYDROLOGY

The geology of the Little Neath and neighbouring valleys has been adequately described by several authors (e.g. Thomas, 1959; Owen, 1954; North, 1962; George, 1970). The local geology of the L.N.R.C. area is shown in plate 26.

The headwaters of the Nedd Fechan drain off the Old Red Sandstone of the Fforest Fawr Mountains. The river meets the Carboniferous Limestone near Blæn Nedd Isaf and sinks in its left bank over a distance of some 200 m. (see survey). In winter water flows on under the bridge to West Passage sink and in wetter weather down to Pwll y Rhyd, where it cascades into the Chasm and then resurges from White Lady Cave. A small stream always flows out of the latter, even when Pwll y Rhyd is dry. This comes from the recently discovered Inlet Series (Standing, 1969a).

When the Nedd Fechan is in spate most of the floodwater resurging from White Lady Cave remains on the surface, flowing down the valley to meet the water resurging around Pwll Du, 1700 m. south. A little of the water, however, goes underground for a second time, sinking partly into Town Drain and partly in the bed of the river further downstream. The

destination of this water is probably L.N.R.C. 5 & 6 although attempts at tracing Town Drain water have so far proved unsuccessful.

The location of the L.N.R.C. resurgence was a matter of some controversy in 1967. Norton *et. al.* postulated that the water did not return to the Nedd Fechan but drained instead to the neighbouring Mellte Valley. This seemed an attractive theory at the time, being suggested from the south-eastward trend of the explored part of the cave. Had an accurate figure for the altitude of the terminal sump (216 m.) been known, it would have been realised that resurgence in the Mellte was unlikely on geological grounds, for at that altitude the Mellte has been flowing for 800 m. over gritstone.

Subsequent work has in fact shown that the cave must radically change direction beyond the limits of exploration, and head back to the Nedd Fechan. In July, 1968, 4½ lbs. of fluorescein were put into Bridge Cave sink in very dry weather. Within 36 hours the dye had reappeared at the resurgence opposite Pwll Du (R2) and the river was visibly green at Pont Neath Vaughan. Pwll Du itself, virtually static at the time, remained fluorescently green for three weeks. Detectors in the top rising (R1) failed to pick up any dye, and it must be assumed that this is entirely Pant Mawr water.

Our experiences with the fluorescein/activated charcoal method of water-tracing support the conclusions of Drew (1968), that the method is of low efficacy. Three previous attempts to trace L.N.R.C. to the Pwll Du risings were unsuccessful, though smaller quantities of dye had been used. This, at the time, was taken as additional evidence of drainage to the Mellte.

The survey has confirmed that Sump 6 and Pwll Du are at virtually the same level. What was not appreciated in 1967 was that in high flood the water backs up at Sump 6 by 20 m. or more (*Pl.* 27B). It seems likely that there will be little or no open streamway between Sump 6 and Pwll Du, a horizontal distance of about 900 m.

The return of the water south-west to the Little Neath does present certain problems. The faulting in the area (*Pl.* 26) has resulted in a continuous 400 m. wide block of strata being downfaulted in relation to the surrounding terrain. On the assumption that the post-Avonian unconformity does not differ from the dip by more than a couple of degrees, then it can be calculated from the available data of dip angles and positions of geological boundaries that the magnitude of the disturbance is around 50 m. *Fig.* 56 shows how this results in the grit/limestone boundary, itself not far above the cave at Sump 6, being located a long way below the local piezometric surface inside the fault ribbon. The effect is to insert a largely impermeable barrier in the hydrology, the grit

being quartzitic conglomerate. One mechanism for avoidance of the obstacle is that suggested in *Fig.* 56, a 30-m. deep phreatic circulation in the limestone beneath the grit. Alternatively there is the possibility of a flow along faulting in the grit. Further study of the problem is merited.

THE GEOMORPHOLOGY OF THE CAVE AND ITS SURROUNDINGS

In dealing with the development of any cave system one can either spotlight the unique morphological elements and sequential development of the system in question, or stress the generalities of cavern development within a local framework. The latter approach is necessitated by the Little Neath River Cave and its neighbours. The overwhelming impression of the cave itself is that many more passages remain to be discovered, or forcibly cleared of obstructive sediments, before the full story of development is clear. The new survey which has been prepared gives clues, but is a restricted sample of the data which would be needed to make a full assessment.

Despite the vastness of parts of the system the stream passages have obviously only recently been partially cleared of large volumes of fluvial sediments and collapsed boulders. In many places fills of rounded sandstone and limestone cobbles remain, obscuring all those passages which were not re-invaded by a large stream after the phase of deposition. The large banks of fluvial material at intervals along the west bank of the main streamway are particularly impressive—opposite Canal By-Pass at its upper end, in Sand Chamber and near Genesis Gallery. In many places the deposits are bound or covered by flowstone and three separate phases are therefore suggested for the period following the formation of the passages. These phases were characterised by deposition of sediments, deposition of flowstone and re-excavation. The last phase has been restricted—the original development of passages was obviously during a phase of very active streamflow, which entered the system from both the Nedd Fechan and the surface to the east. The changes in surface hydrology which led to the decline of streamflow (deposition), the establishment of a percolation regime (flowstone) and reactivation are most likely to have been associated with the climatic changes of the late Pleistocene. Earlier phases still may be represented by the high level passages and their finer fills, such as in Mud Hall and Old World. It is therefore suggested that parts of the cave were well developed before the last glacial advance.

Cave development in the area must be prefaced by a study of the surface valleys and streams. The surveyed cave heads away from the surface Nedd Fechan, towards the south-east, mainly down dip. North (1962) puts forward ample evidence to suggest that the surface drainage of the area once did the same, the Nedd Fechan, Mellte and Hepste drainage originally forming the headwaters of the Cynon. They flowed south-eastwards on a Mesozoic (possibly chalk) rock cover during much of the Tertiary. It is possible that karstification began at the end of this phase when the Mesozoic sediments were thinning. As Atkinson (1968) states, the initial channels of drainage through limestone develop very slowly as a network of extremely narrow conduits in the direction of the steepest hydraulic gradient. During the initiation of the present system, the steepest gradient may well have been to the Mellte.

Later the Tertiary earth movements, together with sea-level changes during the Pleistocene, resulted in the incision and change of flow direction of the Nedd Fechan, Mellte and Hepste. They now flow slightly south-west to join the Neath. The present Nedd Fechan valley is obviously fault-guided, and the dry valleys on the moor to the east suggest that its path once lay there. We might hypothesize that continued incision caused a change in hydraulic gradient, and a subsequent change in flow routes. Thus, although cave development went ahead down the dip, the underground water now resurged at Pwll Du, finding routes along the strike from downstream of the known cave.

Not all the Nedd Fechan sank into the cave so a further effect of the incision was the development of the gorge downstream of Bridge Cave entrance. Collapse along a shattered zone at Pwll y Rhyd carried all but the most extreme floods underground again in a breached White Lady Cave system. Town Drain probably has not been breached, but appears to be a more recent development, largely the result of joint widening by sinking water.

Pleistocene climatic changes resulted in the Fforest Fawr Mountains becoming a centre of ice dispersion, and the valley must have been occupied by a glacier on several occasions. The erosional effects of this may have made mockery of all the developmental phases which have been suggested. The major result of glaciation was the mantling of the valley sides with rubbly boulder clay. During interglacials and the Late Glacial, snow patches and outwash streams would have led to the formation of a typical Alpine karst surface with frequent shaft-like sinks. However, as is frequently the case in South Wales, the joy of exploring such a system is denied us by the boulder clay which covers the surface and blocks underground passages into which it was washed. Mutton Pot (*Pl.* 26, 30) is an example of a plugged shaft whose mantle of drift has

begun to collapse; Y Gwal (*Pl.* 26, 29) is a sizeable dip cave, also blocked by drift. There are several more examples. Thus, as described at the beginning of this account, an era of active cave development was followed by the deposition of sediment, which was followed in turn by very reduced flow and flowstone deposition.

Only three of the present cave streams are thought to have their origin on the surface east of the Nedd Fechan—the North East Inlet, 17th Street, and possibly Foot and Mouth. Many of the avens at the end of the cave may have been connected originally to the surface. The main source of flow is now of course the Nedd Fechan, which has breached its eastern bank at several places to enter the L.N.R.C. system. One of these, just upstream from the bridge, appears to be developing rapidly. Boulders are sinking slowly, and more water goes down there than a few years ago. However, only one of these points allows entry to the cave—Flood Entrance—and an account of the internal morphology of L.N.R.C. must begin there.

Cave passages are directionally controlled by geological structure. Bedding planes, joints and faults are occupied and enlarged by water whose flow is initiated by local or regional hydraulic gradient. Within the Little Neath system the structural guidelines of cave development can be deduced from careful inspection of the roof and walls of the passages. The right-angled bends in the entrance passage are the result of the closely-spaced joints, which are visible in the cliff outside. Local widenings, as at the Duck, are bedding plane developments. Thereafter the dominant influence of dip is seen in nearly all the major passages, both high level and streamway. With the knowledge of the resurgence of cave water back in the Nedd Fechan Valley, it is especially surprising that the cave passages beyond Sump 4 are also down dip. Fault-guiding seems to have taken the upper hand there, though.

The gradient of the cave is initially more gentle than the dip, although parts of Tributary Passage equal the dip, with a planar bed-rock floor. Shale bands, often important in guiding cave formation in bedding planes are not much in evidence, but parts of the Canal and Canal Bypass are formed equally above and below such a band. There is a superb small passage also formed in this way in the east wall of Tributary Passage, just down stream of Gour Passage.

In the Main Streamway just below Junction Chamber there appear to be three major bedding planes which have conditioned development. There are, however, many subsidiary planes, and large boulders, the product of collapse, can frequently be seen in this section, culminating in the very unstable Bouncing Boulder Hall.

Between Genesis Gallery, also along a bedding plane (although its

line is fault-guided), and Old World, the 3-D Maze area shows collapse in blocky form, bounded by rectangular jointing.

Lower down the Main Streamway the gradient is shallower so that the cave has broken through into younger beds. There are several major steps upwards in the roof between Bouncing Boulder Hall and Sump 2 which represent this transition.

Original impressions were that faulting showed little influence on development in L.N.R.C. While this is true of the major faults traced on the Geological Survey map, several minor faults have since been found. Considerable lengths of passage are aligned along them. Even so, dip control remains the dominating factor (see *Fig.* 56).

One key area in any explanation of the cave's development is the rectangle bounded by the Canal, its Bypass and Tributary Passage. Both Canal and Bypass could be interpreted as strike-orientated cross-members linking two separate dip caves. However, this is clearly too simple. The explorer leaving Tributary Passage ascends almost the whole distance to the North East Inlet Series before descending again. This humped profile has fluvial debris in both limbs, and cannot be interpreted as a phreatic forerunner of the North East Inlet. It is more likely that one of the three blocked stream inlets to this part of the bypass (one is actually on the "watershed") was captured by Tributary Passage before finally being blocked and deprived of all water. In the North East Inlet streamway itself there are large grit boulders which must have been carried there when there was both a higher discharge and a larger opening to the surface.

The Canal, too, is puzzling when explanations are based on known passages. If Bridge Cave entrance represents an early point of engulfment of river water, it seems unusual that such a "new-looking" passage as the Canal should appear to be the continuation of Bridge Cave. Similarly, if Tributary Passage and Mud Hall are developing down dip, one searches for a reason for their turning a right-angled bend into the Canal. The possible existence of a large blocked passage continuing down dip from Sand Chamber can only be guessed as being hidden by the large bank of boulders and sediment piled against that wall. Because of this blockage, or due to downcutting in Junction Chamber a strike joint was invaded and the passage widened along the bedding plane. Further work in Sand Chamber area might not yield extensive new passages but it might well help to solve one of the many teasing problems of cave development in L.N.R.C.

FLOODING OF THE NEDD FECHAN

One of the major hydrological problems of L.N.R.C. is flooding. The area has over 2,000 mm. of rainfall per annum, falling mainly in the

period October through to February. The problems are therefore not those posed by the summer torrential storms on Mendip (Hanwell and Newson, 1970). The causes of flooding in south Breconshire are the steep slopes, impermeable surfaces and the fact that persistent drizzle, with occasional heavy showers, is the most likely weather every day throughout the winter. Consequently saturation of soil is almost continual and in such conditions a heavy shower can trap the unwary in the cave by immediate runoff to the Nedd Fechan.

Measurements made near Flood Entrance suggest that at a discharge of just over 3 cumecs exit from the cave would be impossible there. Cole (1966) predicts from empirical work that, for a catchment the size of the Nedd Fechan, the mean annual flood ($Q_{2\cdot33}$) is 21 cumecs, seven times the danger flow.

Cavers visiting L.N.R.C. should discover locally the rainfall over the previous week, and note the state of the ground. Forecasts may be obtained from local radio or by telephone. Using the work of the United States Bureau of Reclamation (1965) one can predict, for a catchment like Nedd Fechan, that 5 mm. of rainfall in five hours will make the Flood Entrance impassable. Since this is approximately the average daily rainfall amount, it only needs to be concentrated into one lengthy shower to cause danger. The safest time to enter the cave, from the rainfall point of view, is in May and June. In spring and summer the catchment is dry and it may need over 20 mm. of rainfall in five hours to cause any trouble.

It is implicit in the hydrograph models used by engineers that more intense rainfall produces "peaky" floods. In the case of the Nedd Fechan, if 5 mm. were to fall on the Beacons in one hour, the peak flow would be three times greater than the danger level. There is no need to emphasise the danger in the fact that the maximum intensity recorded in the area is equivalent to 5 mm. in five minutes! It is just not safe to cave when conditions are even 'average' between October and February.

Many cavers will not, however, take 'no' for an answer, claiming that they can 'sit it out' underground. Here hydrograph studies are on their side—as the peak flow increases the time base of the flood declines. In the examples quoted above the flood resulting from 5 mm. in five hours would take 16·5 hours to pass completely, whereas that resulting from the same fall in one hour would take only six hours to subside. There are two corollaries to this. The higher peak flow could cause damage to the cave entrance. It is also extremely unlikely that such an intense fall would occur in isolation and the drizzle which followed would keep the trapped caver underground for a day or more.

One other important effect of flooding is that erosion of the surface valley and the cave is accelerated. The lowering of the upstream lip of

Pwll y Rhyd is one sign of flood action. Though quantitative studies are missing for the cave itself the results of Williams' work (1963) on Porth-yr-Ogof (Standing and Lloyd, 1970, *p.* 226) show the importance of floods on the erosion regime.

A study of solutional erosion has been made in the Little Neath River Cave by Martell (1970). Water hardnesses were determined at regular intervals and values of total hardness were found to be low. At the cave entrance there are fluctuations between 48 mg/l and 60 mg/l, the higher figures being recorded during the lowest flows. At Pwll Du, the resurgence, the range is 70 mg/l to 118 mg/l. This is indicative of the predominance of 'swallet' (stream sink) rather than percolation water since the latter, as sampled by Martell within the Cave, may reach total hardnesses of 230-249 mg/l. On the basis of these figures an average percolation component of 25% may be assumed, compared with 90% and over in some Mendip catchments.

Evans (1969) has done work on the Hepste in flood, finding that stream lengths expand threefold on the Old Red Sandstone during flood, while suspended sediment increases by twenty times. The transport of cobbles and boulders is probably more rapid than in any other southern limestone area. L.N.R.C., together with Porth-yr-Ogof and the Hepste caves, makes the area worthy of far more study than has been possible to date.

THE CAVE IN FLOOD

Two U.B.S.S. parties have been lucky or unlucky enough to witness the spectacular sight of the L.N.R.C. streamway in high flood. In October, 1968, two members dived into the system via Bridge Cave under moderate flood conditions. During the trip the river rose to a much higher level, but exit through Sump 1 was fortunately still possible. (Standing, 1969b). In February, 1970, another party, who had been exploring the Old World Series, were caught by an even higher flood. They had no diving equipment and had to wait for the floods to subside. The careful observations of these two parties has provided a useful record of the cave in flood.

Flood Entrance becomes impassable, long before Bridge Cave Sump, under relatively mild flood conditions. In the Main Stream Passage, the force of the water beyond the Wet Loop may make progress upstream difficult or impossible. Further upstream however it is possible to keep out of the water for much of the way. The N.E. Inlet Series discharges a tremendous volume of water in flood, and parts of it fill to the roof. The sump near Junction Chamber, which normally takes this stream, quickly backs up. Instead, the water fountains up in the floor of the Canal Bypass

and then cascades out into Junction Chamber. The top end of the Canal and the duck near the Wet Loop both sump in mild flood.

The most spectacular flooding of all takes place beyond Sump 4, though evidence for this has not been gained by direct observation as yet! Froth marks can be seen at the end of New World Passage about 20 m. above the normal level of Sump 6 (*Pl.* 27B). The implications of this are frightening. It means that when the sump backs up, Lake Chamber, Sump Passage, the 6 streamway and most of the 5 streamway fill to the roof. Happily most of the New World Passage is above the highest flood level so that if divers were unfortunate enough to be trapped by a sudden flood and could reach this passage they would not be drowned outright.

SAFETY PRECAUTIONS AND RESCUE PROCEDURES

Much has already been written on the subject of flooding—the greatest hazard posed by the cave. The main risk to a trapped party is exposure, and for this reason wet suits are strongly recommended.

Loose boulders are a danger in certain parts of the cave. In August 1952 a party of scouts in Bridge Cave were trapped for 18 hours when the choke near the entrance collapsed. The scoutmaster had his leg broken by the fall (Jenkins & Harvey, 1953). The choke is relatively stable at present but needs to be treated with respect. Unstable boulders have caused near accidents more recently in Bouncing Boulder Hall and in the New World Passage choke.

The U.B.S.S. have installed two rescue dumps in the cave, which may be used in an emergency. They are situated at the start of Genesis Gallery and in the climb leading up to New World Passage, just past Sump 4 (Wilkins 1970b). In the event of an accident the South Wales Cave Rescue Organisation should be called out by telephoning Bridgend 2444. Evacuation of a seriously injured caver from L.N.R.C. 2 would probably best be undertaken via Bridge Cave Sump using an exposure bag and sump rescue apparatus. Less serious casualties could be taken out via Flood Entrance.

THE NEW SURVEY

Since publication of the original survey in 1967, the greater part of the old cave has been re-surveyed. This was necessary on two accounts. Firstly radio-location disclosed a small error in the survey of the Main Stream Passage and secondly continuous clinometer readings were not taken in 1967, so that relative altitudes could not be calculated for different parts of the system. Spot heights are shown in metres O.D. on the new survey.

Instruments. The survey was carried out with a Suunto hand compass and clinometer, each read to $\frac{1}{2}°$ (Standing, 1970) and a metallized linen tape read to the nearest inch. The compasses were calibrated, on location, by surface bearings, to enable the magnetic variation in each quadrant to be calculated. The re-survey of L.N.R.C. 1 and 2 and the

survey of 3–6 involved over 1,000 stations. Permanent survey points—in the form of chiselled crosses—were made at major passage intersections.

Because of the impossibility of conducting an accurate survey through Sumps 2, 3 and 4, the position of L.N.R.C. 5 and 6 in relation to the rest of the cave had to be fixed by surface radiolocation (Lord, 1963).

The altitudes of Flood Entrance, Town Drain, Pwll Du, and the other surface sites were measured with a high precision altimeter. Minor discrepancies in the ordnance Survey 2½-inch map contours were disclosed.

Computation. All the survey data was processed on an Elliot 503 computer using advanced programmes devised by A. G. Wilkins and R. J. Taylor (U.B.S.S.). These programmes may be applied to any cave system.

For the drawing of the survey, cumulative northing, easting and vertical co-co-ordinates were printed in columns on a line printer output. A graph plotter output mode was, however, used for additional options, these being:—

(*a*) A complete line plan of the cave at any desired scale, with a superimposed grid.

(*b*) Stereoscopic pairs, again at any scale or orientation, which when viewed under a stereoscope give 3D information on the cave.

(*c*) An elevation of the cave, both extended and projected.

(*d*) Polar analysis of cave passage direction (*Fig.* 55).

The survey was drawn up on graph paper at 1:1200 and a master copy then made on tracing film. It has been reduced photographically to 1:1500.

Accuracy. The accuracy of the survey can be judged from closed traverse errors. The loop comprising Bridge Cave, Tributary Passage and the surface valley misclosed by 0·20 m. (eastings), 0·68 m. (northings) and 0·04 m. (vertically)—representing a horizontal error of 0·06%. The Canal-Canal Bypass traverse misclosed by 0·3%. Errors in these and other loops were distributed proportionally around the traverse concerned, by the computer.

An additional check on the accuracy was possible by comparing the surface co-ordinates of the radiolocation stations with the underground co-ordinates as given by the survey data. Close agreement was found in all cases.

Grade 5C accuracy is claimed for the major part of the survey.

Passage Lengths

	Metres	*Feet*
Bridge Cave	311	1,020
Mainstream (including Canal) to Sump 2	863	2,832
Trib. Passage and Canal Bypass	1,312	4,305
N. E. Inlet Series	622	2,042
Genesis Gallery and Inlet	436	1,431
Old World Series	338	1,110
Other side passages off Main Stream	1,144	3,753
Streamway Sumps 2, 3, 4	288	945
Mainstream Sump 4 to Sump 6	399	1,311
New World Passage	436	1,429
17th Street and Tipperary	460	1,509
Foot and Mouth passage	346	1,134
Other side passage off L.N.R.C. 5 and 6	688	2,258
Town Drain	494	1,620
Total	8,138	26,699
	(8·14 km.)	(5·06 miles)

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The society is once again grateful to the Lewis family of Blaen Nedn Isaf for permitting access to the cave and for the interest they have shown in our explorations. Mr. Llewellyn of Berthlwyd Farm has allowed us to roam freely over his land and to examine the surface features overlying the further reaches of the cave.

The new survey, like its predecessor, has grown from the collective efforts of a large number of U.B.S.S. members. We hope that they feel their labours have been worthwhile. Mention must also be made of the support giving by other clubs—in particular the Cave Diving Group, Westminster Spelæological Group and Cwmbran Caving Club. We are grateful to the Mendip Nature Research Committee for information concerning some of the surface sites.

Dr. Harold Lord of the British Speleological Association's Technical Projects Unit provided invaluable assistance with the radiolocation of L.N.R.C. 5 and 6. Mr. Robert Taylor did much of the computer processing of the survey data. Finally we must thank Miss Cherry Coleman, who prepared the typescript of the paper with exemplary efficiency.

APPENDIX
A CHECKLIST OF SITES OF SPELÆOLOGICAL INTEREST IN THE LITTLE NEATH VALLEY

Sites are listed from north to south, in three sections; those in or near the surface course of the Nedd Fechan, those to the west, and those to the east. The numbers refer, where the limits of the surface survey (*Pl.* 26) allow, to the locations marked thereon. The prefix SN has been omitted from all grid references, which are to 8-figures where possible. Altitudes, unless preceeded by *c.*, have been measured by precision altimeter. Most of the sites lie in the parish Ystradfellte, except a few in the north-west which are in Cray.

A. *Caves, sinks and risings in or by the river bed.*

1. Flood Entrance. 91181420. Alt 304 m.
2. Ogof Nantes. 91191417. Alt 304 m. Length 10m. A small opening in the east bank, taking a small proportion of the river flow underground, eventually reappearing in Tributary Passage, L.N.R.C.
   The cave was discovered by the late John Norris of the Shepton Mallet Caving Group in 1968.
3. Bridge Cave. 91171399. Alt 300 m. Length 311 m. Anon (1951).
4. Sinks in river bed:—
   a. 91171404. Main sinks in cliff for Bridge Cave.
   b. 91121400. b, c, d only active under high flow.
   c. 91151390. Above end of West Passage, Bridge Cave.
   d. 91141386.
   Fortnum and Mansfield (1961).
5. Badger Cave. 91151395. Alt 299 m. Length 20 m. There is also another small cave nearby. Fortnum and Mansfield (1961).
6. Pwll y Rhyd. 91131377. Alt 294 m. Total underground length *c.* 200m.
   There are several entrances to the main part of the cave. The remainder of river water not sinking at 4 a–d above pours into the gaping chasm in the river bed, to resurge at White Lady Cave. A series of small muddy tubes also exists in the east bank. Rönnfeldt (1890); Braithwaite (1938).
7. White Lady Cave. 91101367. Alt 288 m. Length *c.*300 m. (of which only 100 m. is accessible to non divers). DeGraaf and George (1960); Standing (1969a).
8. Town Drain (also called Ogof Pwll y Rhyd or Arcade Cave). 91101365. Alt 288 m. Length 494 m. Usually carries a small stream, but terminal sump choked with gravel. It may drain into L.N.R.C.5 (p. 313). The cave fills completely in flood. Braithwaite (1938); Wood (1939).
9. Ogof Cadno (Fox Cave). 912124. Alt 230 m. Length 30 m. A hole in the river bed below Dyffryn Nedd farm. Harvey (1953).

10. Risings:—
R1. 91201227. Alt 227 m. Rising for Pant Mawr systems.
R2. 91191207. Alt 215 m. Rising for L.N.R.C. water.
11. Ogof Cagoule. 91201208. Alt 219 m. Length 10 m. Hitherto unrecorded, a small opening in the cliff a few metres north of Pwll Du, leading to an earth chamber.
12. Pwll Du. 91211206. Alt 215 m. A large circular pool under a cliff, acting as flood resurgence to L.N.R.C. Dived to a depth of 8 m, where large boulders block the way on. DeGraaf and George (1961).

B. *Sites to the west of the Nedd Fechan.*

13. Pant Mawr pothole. 891162. Alt c.1450 m. Length 1,200 m. Alexander and Jones (1959).
14 Ogof o Flaen y Waun. 895158. Alt *c.* 427 m. Length 150 m. Anon (1970).
15. Un-named pot at 906157. Alt *c.* 390 m. A 10-m. pot with a small stream at the bottom, soon becoming too tight. Hudson (1966).
16. Lewis's Pot. 904155. Alt *c.* 430 m. A 7-m. shaft with 10 m. of accessible passage at the bottom. Jones and Hartwell (1965).
17. A small cave dug in a shakehole at 905142. Alt *c.*350 m. Contains a minute streamway of length 15 m. Hudson (1966).
18. Sink at 90251402. Alt 341 m. A blind valley ends abruptly in limestone. A sizeable stream sinks. Well worth investigation by explosives. A minor stream sinks at a shakehole nearby, but ponding occurs here.
19. Sink on Grit/Limestone boundary at 90931316. Alt 319 m. Takes a large volume of water in wet weather, but blocked with large boulders. Would be a lengthy but profitable dig.
20. Pwll Derwen (Oak Tree Pot). 90951310. Alt 306 m. Length 20 m. A small cave at the base of a hole by an oak tree, dug by H.C.C. Hartwright (1968); Mills (1968).
21. Ogof y Darren. 91081253. Alt 263 m. No reference obtainable, but is charted in Hartwright (1968).
22. Pwll y Goeden Gnau. 911125. Alt *c.* 260 m. Exact location is not clear, as original accounts differ. U.B.S.S. failed to re-locate it due to dense afforestation. Pot 20 m. deep after extension by Cwmbran C.C., with 200 m. of lateral development at the bottom. Emits strong draught. Harvey (1953); Probyn (1968); Davies (1968).
23. Ogof Siom (Disappointment Cave). 911123. Alt 228 m. Length 10 m. Has a large entrance, and draughts strongly, but is too tight to follow. Harvey (1953).

C. *Sites to the east of the Nedd Fechan.*

24. Cave at 91721486. Alt *c.* 403 m. Length 10 m. Fortnum and Knee (1964).
25. Theoretical Pot 91611476. Alt *c.*400 m. Depth 21 m. Fortnum and Knee (1964).
26. Cave at 92111461. Alt *c.*390 m. Length 40 m. Occasionally known as Ogof Gwynion. Fortnum and Knee (1964).
27. Cave at 9209158. Alt *c.*390 m. Length 30 m. Fortnum and Knee (1964).
28. Einon's Hole. 91961424. Alt *c.*366 m. Depth 8 m. Fortnum and Knee (1964).
29. Y Gwal (The Burrow). 92141391. Alt 330 m. Surrounded by a fence, a 6-m. pot in a depression leads to 25 m. of large passage descending down dip to a boulder clay choke. Jones (1959).
30. Hole by the Wall. An H.C.C. find (H[awes], 1952). Grid reference and details of location are lacking in this report. However its description resembles Mutton Pot (M.N.R.C. find), and it is certain that the two are the same.
Mutton Pot. 92011351. Alt 308 m. A 4-m. pot leads to a tight rift which is penetrable for 13 m. Roberts (1959).
31. Obvious Cave at 92231350. Alt 334 m. Formed in the P–A unconformity at a small outcrop of grit. Length *c.*8 m.
32. Sink in large wooded depression at 91881340. Alt 307 m. Two small streams draining the surrounding bog sink in boulders up against a cliff face. Currently being dug by U.B.S.S.
33. Berthlwyd Swallet.91321313. Alt 290 m. Sink on the grit boundary for drainage from the valley north-east of the farm. Water may appear in Foot and Mouth Passage, L.N.R.C.5, though the height difference of 45 m. discourages digging! A large shakehole by the roadside opposite the farm also takes water in wet weather, but is half full of rubbish.
34. Pwll y Gelynen. 91851283. Alt 289 m. A wooded shakehole, partly in grit, taking two wet weather streams. A series of swallets 100 m. further north-west also become active after prolonged rain.

35. Ogof Lliwiog (also known as Ogof y Defeid Meirw). 91551275. Alt 291 m. Length 40 m. The cave is in two sections, one each side of the entrance depression; both go in under the grit.

35a. Ogof Berthlwyd. Listed in Caves of Wales and the Marches at 915128, this probably referes to Ogof Lliwiog. Fortnum and Mansfield (1961); Hartwell (1963).

36. Pwll y Fford Cave. Alt 289 m. Length 10 m. The cave is at the bottom of a deep wooded depression at the roadside. Fortnum and Mansfield (1961).

37. Rhododendron Hole. 925128; and 38.

38. Gulping Holes 1 & 2. 925127. Alt *c.* 306 m. Three caves formed in the P–A unconformity, each about 10 m. long. Fortnum and Knee (1964).

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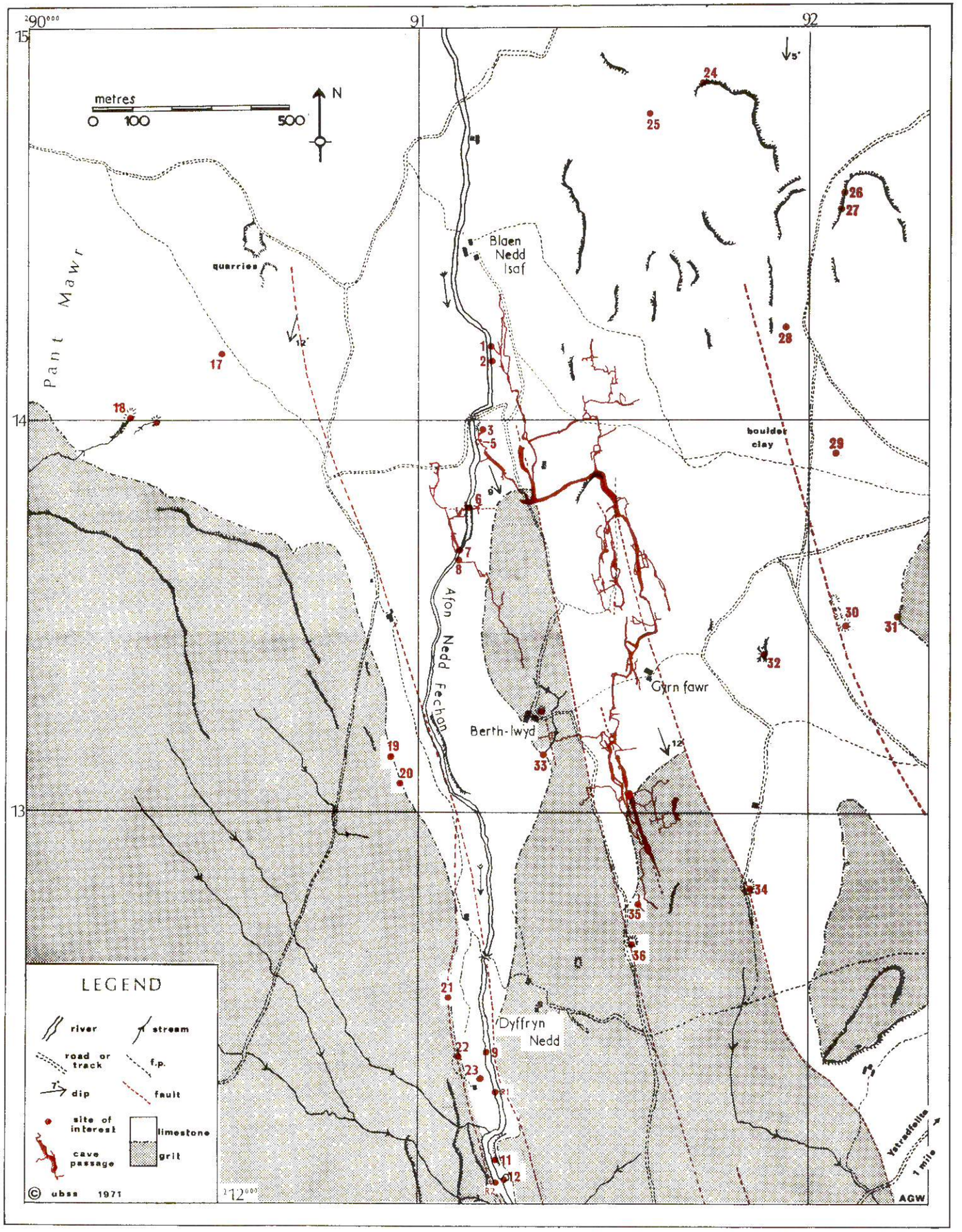

PLATE 26

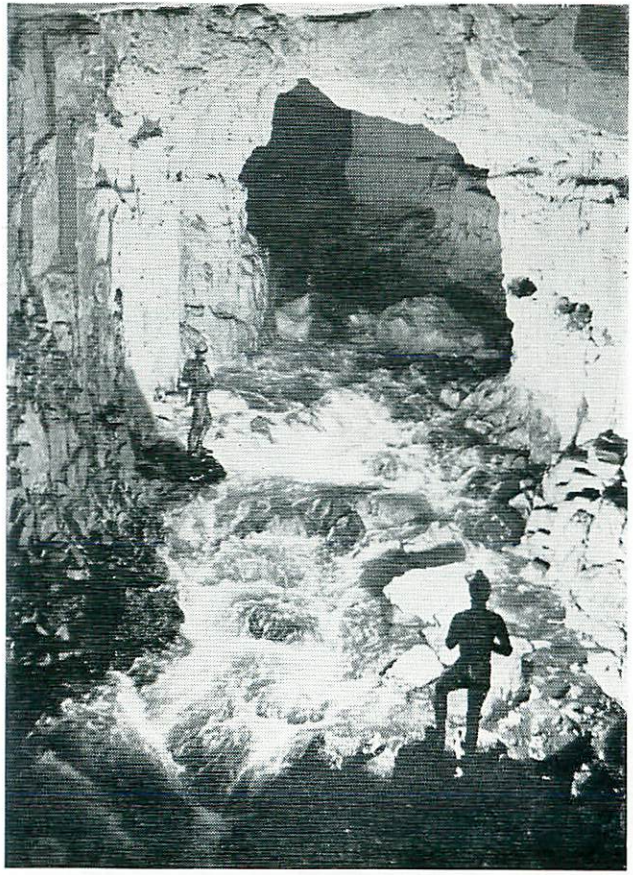

PLATE 27A

Bridge Cave streamway in flood. Under such conditions Flood Entrance is impassable.

Photograph: P. A. Standing

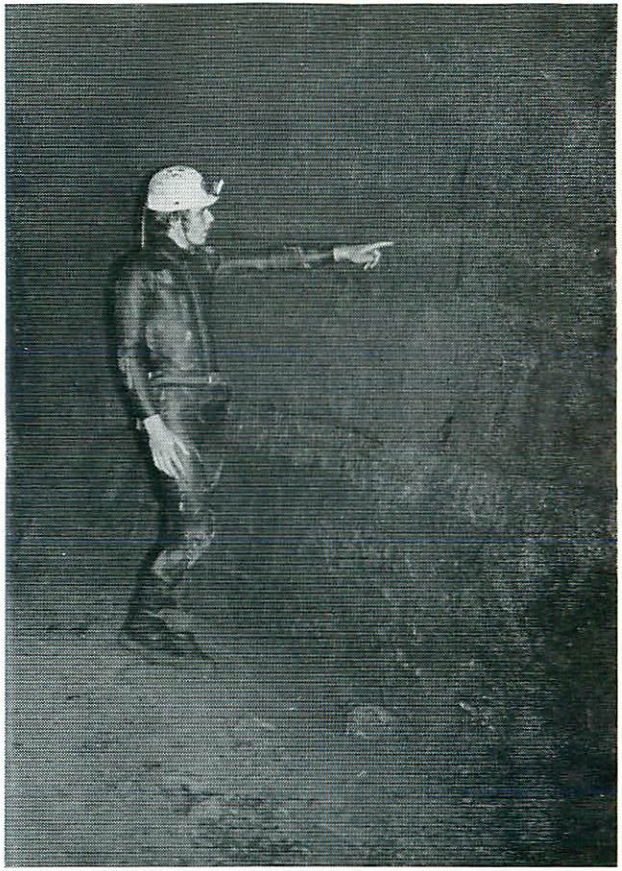

PLATE 27B

Multiple flood levels at end of New World Passage. Top level is 20m. above sump 6. At this level L.N.R.C. 5 and 6 are mostly full to the roof.

Photograph: P. A. Standing

PLATE 28

Gour Passage of Canal Bypass.

Photograph: D. M. M. Thomson

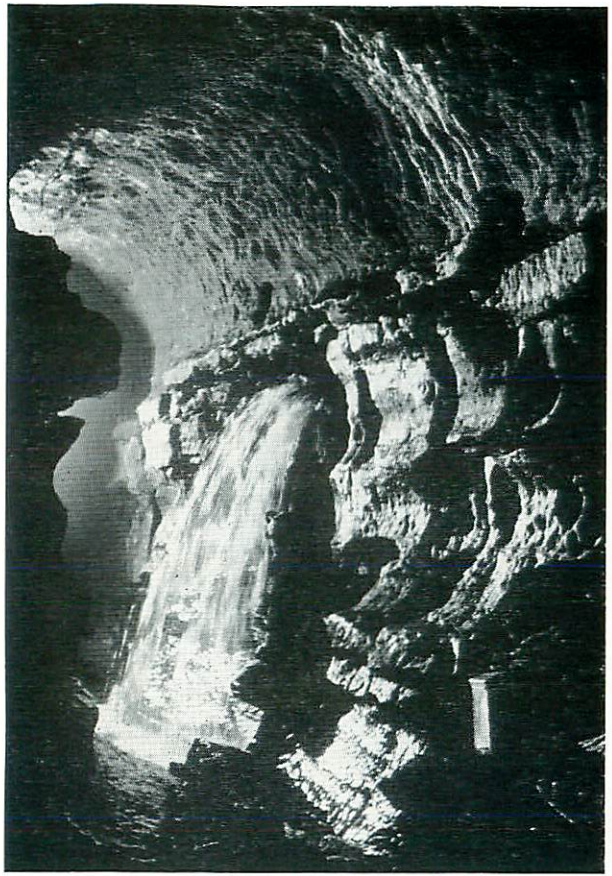

PLATE 29A

Canal Bypass. Water from the N.E. Inlet Series entering Bypass on right. Striking variations in the scalloping of the roof and walls are seen.

Photograph: D. M. M. Thomson

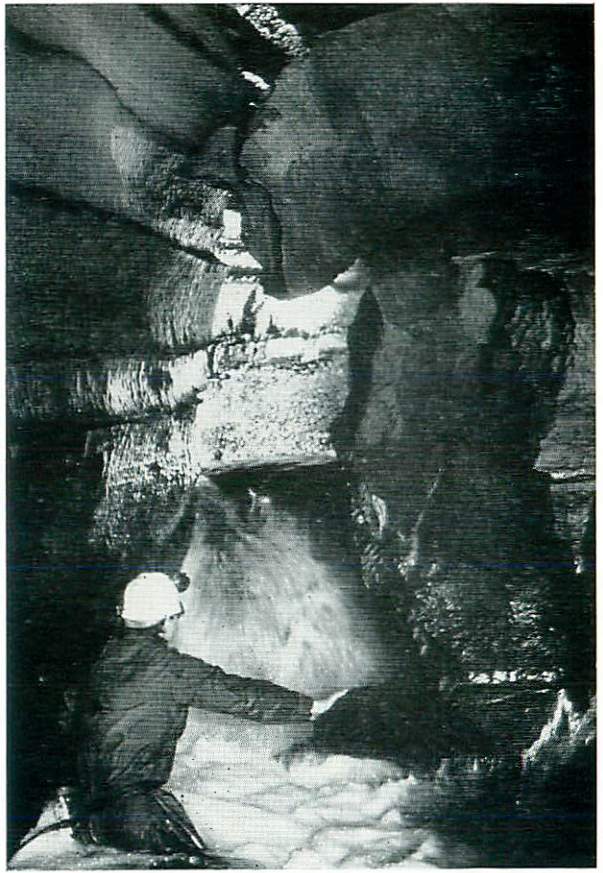

PLATE 29B

Stream canyon in Bouncing Boulder Hall. Differential solution along bedding planes is demonstrated.

Photograph: D. M. M. Thomson

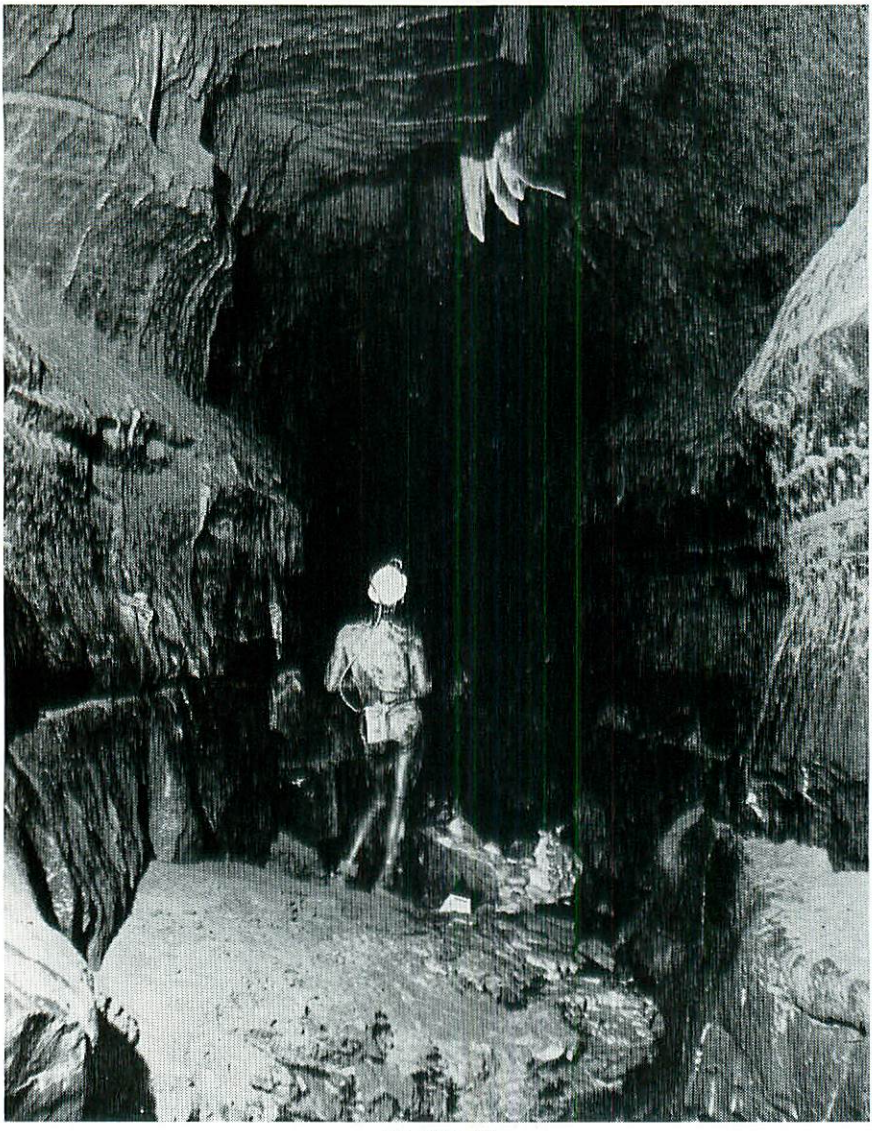

PLATE 30

New World Oxbow. A keyhole type canyon passage with a phreatic precursor in the roof. Eroded bedding planes are seen in the walls. The floor is stalagmite over mud and boulders.

Photograph: P. A. Standing

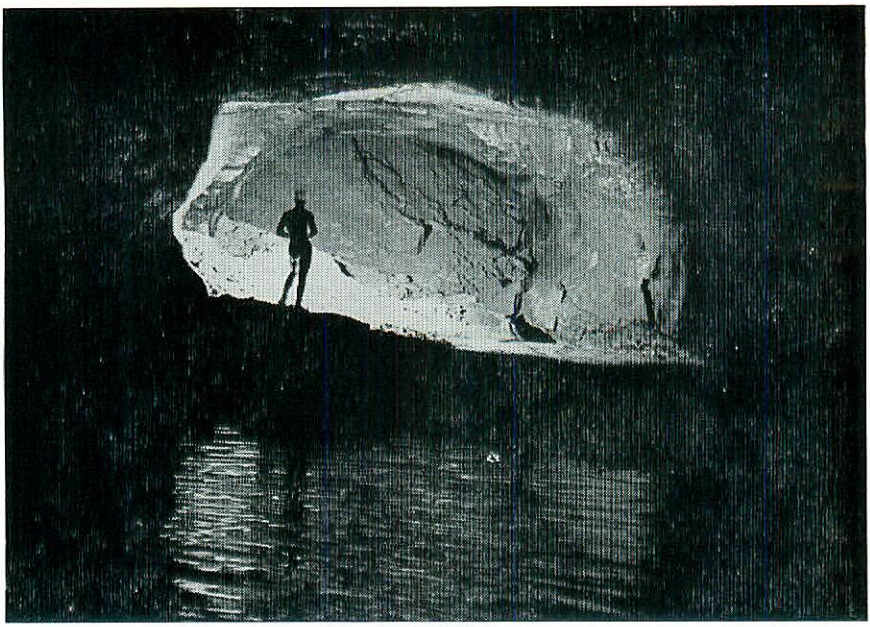

PLATE 31A

Lake Chamber and the boulder and mud choke leading up to New World Passage.

Photograph: P. A. Standing

PLATE 31B

Oxbow near entrance to Perspicuity Passage. Half tubes and early erosion of a bedding plane are shown.

Photograph: P. A. Standing

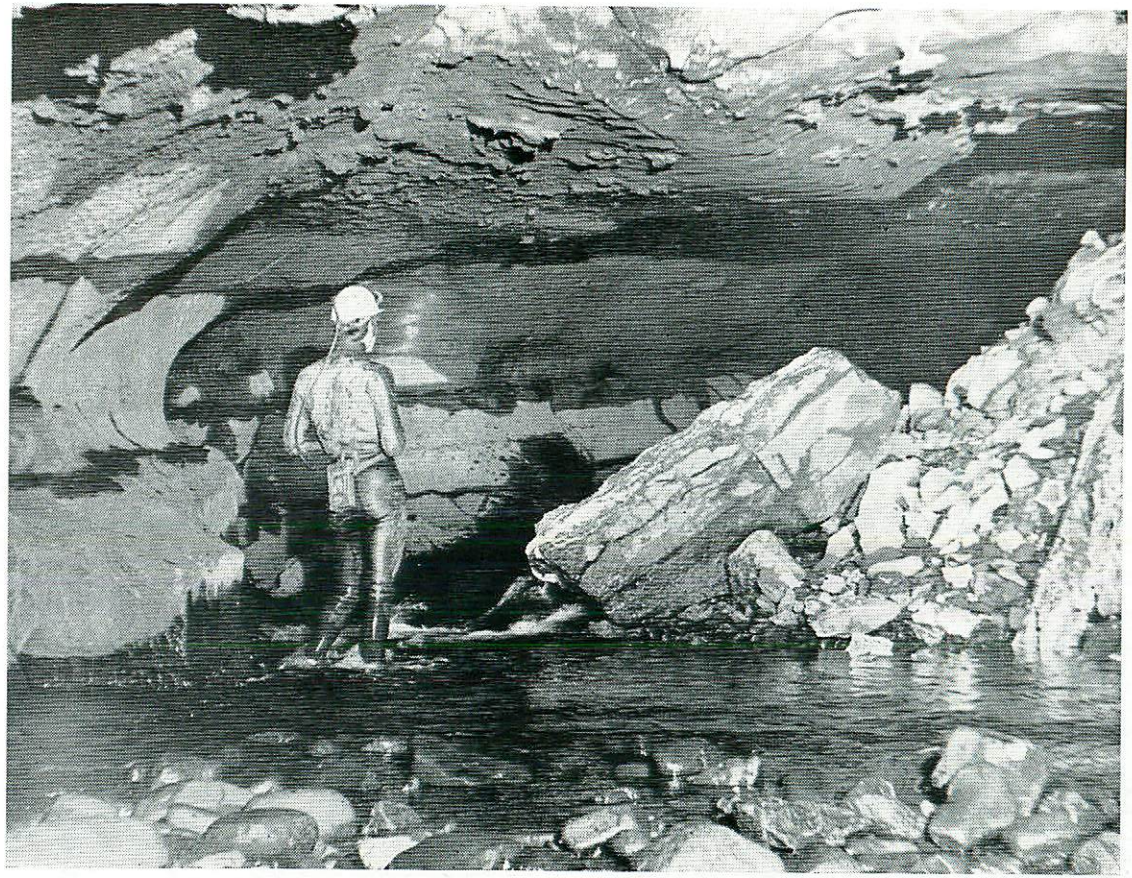

PLATE 32

L.N.R.C. 5 Streamway. The left wall shows development along bedding planes whilst a collapsed bed is seen on right.
Photograph: P. A. Standing

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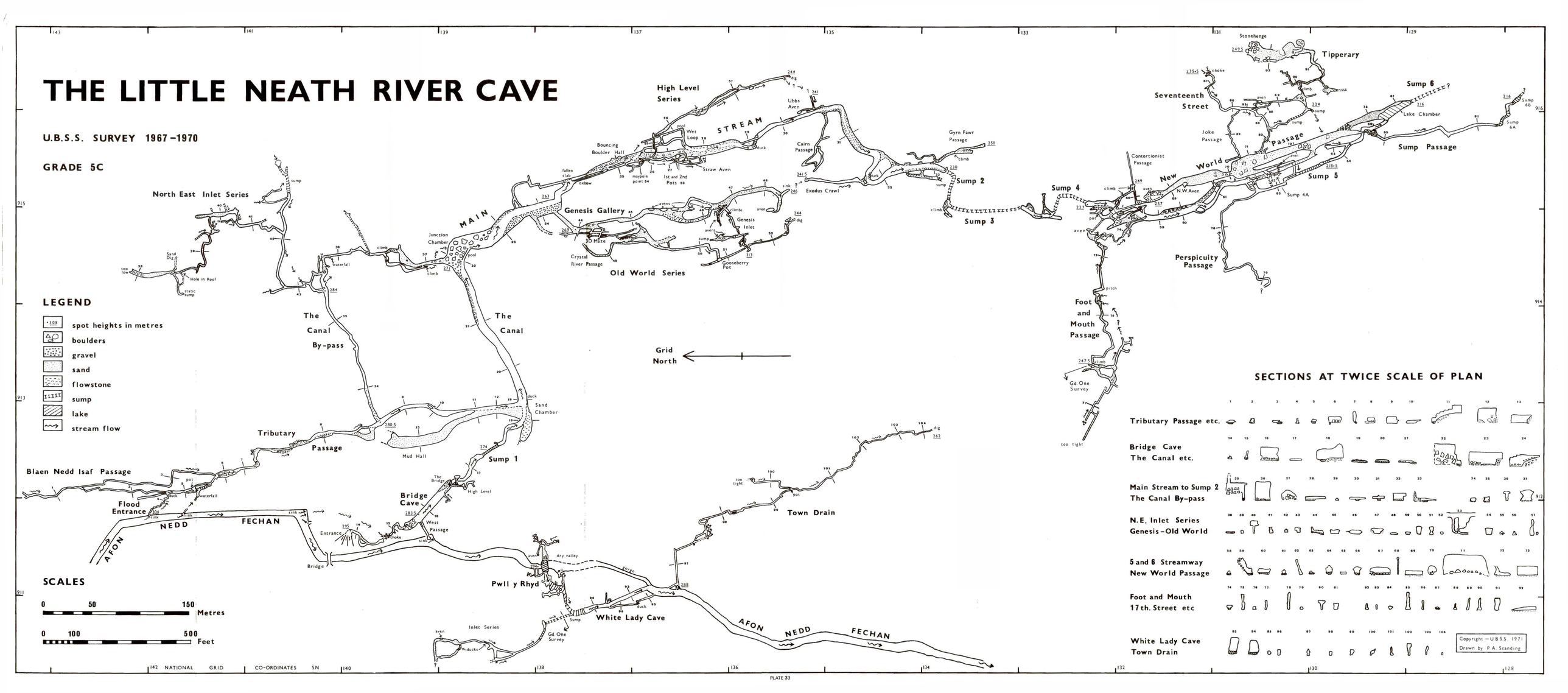
THE LITTLE NEATH RIVER CAVE

U.B.S.S. SURVEY 1967–1970

GRADE 5C



LEGEND

- spot heights in metres
- boulders
- gravel
- sand
- flowstone
- sump
- lake
- stream flow

SCALES

0 50 150 Metres

0 100 500 Feet

SECTIONS AT TWICE SCALE OF PLAN