

The Little Neath River Cave, South Wales

By

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ACKNOWLEDGEMENT

The society is very grateful to Mr. Tom Lewis of Blaen Nedd Isaf Farm for his friendly co-operation with us in all our activities on his land and in the cave beneath it. Without his co-operation the exploration and surveying recorded in this paper could not have been done.

INTRODUCTION

This paper covers the work done by the society in the Little Neath River Cave (LNRC) up to May 1967. Most of the cave description has been written by MGN, whilst the geological detail, the survey notes and the drawing up of the survey has been the work of DS. The sections on history, underground drainage of the valley and bibliography have been contributed by PAS. All three authors, however, accept responsibility for the article as a whole.

The decision having been taken in 1966 that all new work by the society should be recorded in the metric system, soon to be compulsory, all measurements in the following account are in metric terms.

LOCATION

The Nedd Fechan or Little Neath River lies in Brecknockshire to the east of the Tawe or Swansea valley and to the west of the Afon Mellte. A certain amount of controversy exists over the naming of the Nedd Fechan and readers interested in reviewing the evidence should consult F. J. North's excellent book "The River Scenery at the Head of the Vale of Neath". The U.B.S.S. has adopted the nomenclature favoured by North, *i.e.* that the Nedd Fechan is "the river that rises between Fan Nedd and Fan Gyhirch and flows southwards receiving the river Pyrddin from the west". The Afon Nedd (River Neath) results from the confluence of the Nedd Fechan with the Afon Mellte. In this article we are primarily concerned with the stretch of the Little Neath between Blaen Nedd Isaf Farm (SN 912144) and Cwm Pwll y Rhyd (SN 912137).

HISTORY

The first person to make a serious spelæological investigation of the Nedd Fechan was T. A. J. Braithwaite, who visited Pwll y Rhyd, White

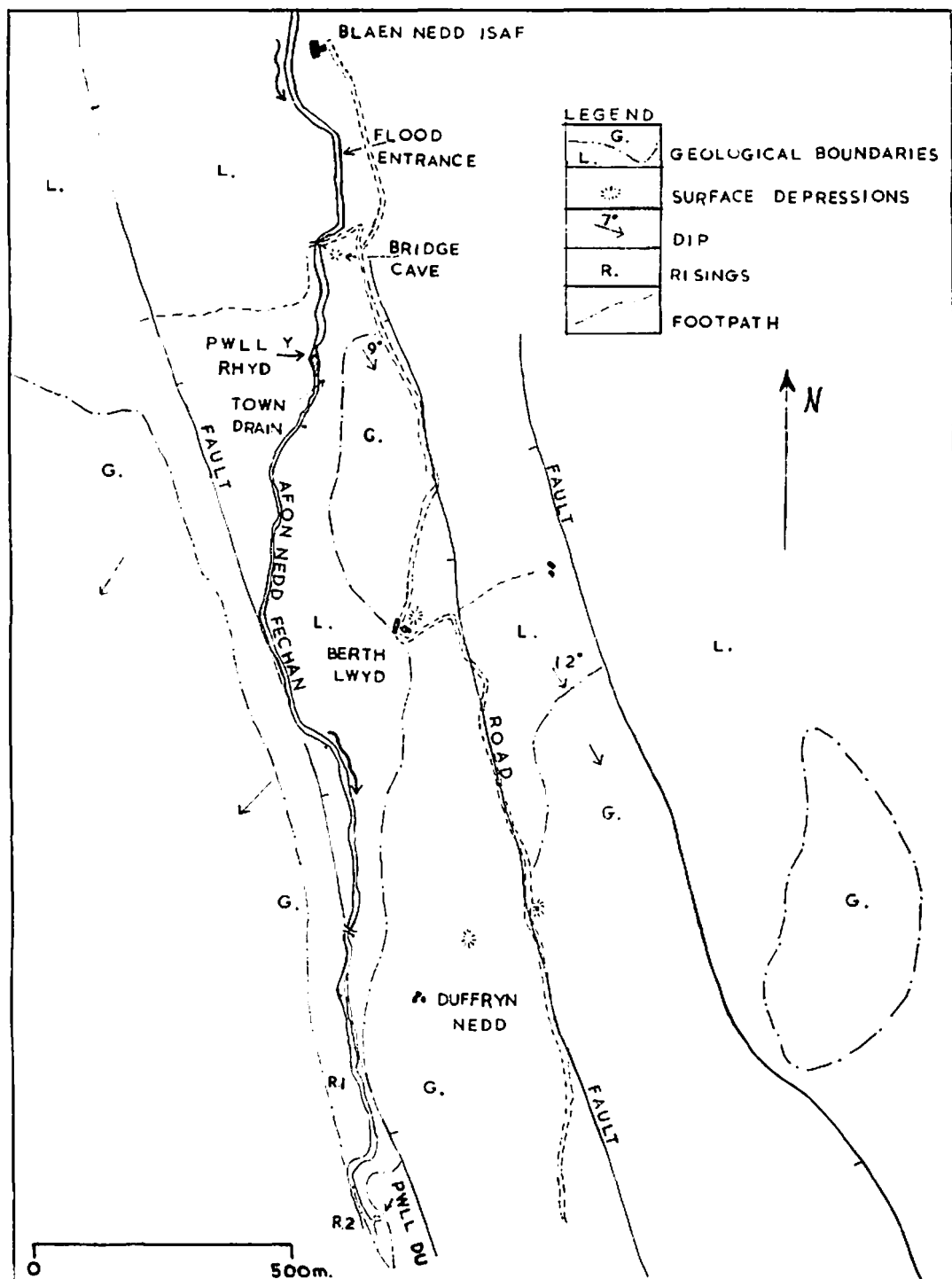


Fig. 50. The Nedd Fechan between Blaen Nedd Isaf and Pwll Du.
(Based on Geological Survey. Crown Copyright Reserved).

Lady Cave and Town Drain in the mid 1930s. F. J. North described the hydrology of the valley briefly in his book, concentrating more on the Mellte. In 1947 the South Wales Caving Club made an important discovery by forcing a boulder choke 45 m. inside Bridge Cave, as it is now known. Some 90 m. of large roomy streamway was explored to a sump (Hill, 1949). Bridge Cave was the scene of a serious accident a few years later when loose boulders in the above-mentioned choke collapsed on to a caver (Jenkins and Harvey, 1953). This incident and the wealth of caves in the Swansea Valley did, perhaps, prevent the S.W.C.C. from taking a more active interest in the area during the following years. In 1953, however, they did make a substantial extension to Pant Mawr, a fine system of 1,150 m. on the hillside to the north-west of Bridge Cave (Alexander and Jones, 1959). Although topographically and hydrologically part of the Neath Valley, Pant Mawr is often approached from the Swansea Valley.

Many clubs have worked in the area over the past decade. The M.N.R.C. made a thorough investigation of the valley floor between Bridge Cave and Pwll y Rhyd (Mansfield and Fortnum, 1961). They recorded a number of swallets and small caves east of Blaen Nedd Isaf Farm (Fortnum and Knee, 1963). Much field work remains to be done however.

With the opening of the Severn Bridge in September 1966 access to South Wales became easy for Mendip Clubs. C.D.G. divers of the U.B.S.S. began a systematic investigation of sumps in the northern outcrop of the limestone and, after disappointing results at Cwm Clydach and elsewhere, turned their attention to the Nedd Fechan. Perseverance was rewarded on January 22, 1967 when C. J. Gilmore passed a 30 m. sump at the end of Bridge Cave. On January 28 he returned with D. Savage and P. W. Kaye and explored a large tributary upstream to a dry entrance some 180 m. further up the valley than Bridge Cave. The Main River Passage was then explored, access to it being via the Canal Bypass, as the beginning of the Canal appeared to be a sump. Over 1,800 m. of passage were found on this first trip and many possibilities for further extensions were noted. It became obvious that the further exploration and surveying of the system required more manpower than could be provided by the diving contingent of the society.

On the weekend of February 11/12, with the full consent of Mr. Lewis, the dry entrance was therefore widened to permit access. Most of the discoveries made so far were surveyed. On the following weekend the 370 m. Blaen Nedd Isaf passage was found and most of the N.E. Inlet Series explored. The weekend was also memorable for the heavy rain, which caused the Nedd Fechan to rise 45 cm. in half an hour and rendered

the "dry" entrance impassable. Unfortunately three members of the society were still underground completing the survey work and were unable to get out against the force of the water. The Glyn Neath Fire Brigade and the South Wales Cave Rescue Organisation were called to divert the river away from the entrance, a task successfully performed on this occasion, but one which would have been impossible had the river been in full spate. The incident prompted the renaming of the dry entrance!

Many more visits were made to the cave in March and April. Those of particular note were the diving of the second sump on March 11th, and the discovery of Genesis Gallery a week later. Since the initial breakthrough by the divers the exploration and surveying of the system has involved many members of the society and it would be unfair to single out any individual.

We are grateful to the South Wales Caving Club for the frequent use we made of their headquarters and also to all cavers who allowed us to complete our preliminary work unhindered.

DESCRIPTION OF THE LITTLE NEATH RIVER CAVE

The LNRC was discovered via Bridge Cave, this being entered from a large shakehole 20 m. south-east of Pont Cwm Pyll y Rhyd (SN 912139). A description of Bridge Cave was published by S.W.C.C. (Anon., 1951), but a brief account is relevant here. The water sinking from the Little Neath at the bend in the river is met after a crawl of 60 m., when it appears from underneath boulders. It flows in a winding streamway for 30 m. before entering a huge chamber, where a large stream joins from the right out of West Passage. This water again comes straight from the Little Neath river bed about 120 m. downstream of the bridge. The united streams flow on, but after 45 m. of passage over 9 m. high, the roof descends and the sump is only another 45 m. away.

The Main River Passage of LNRC can be looked upon as a continuation of Bridge Cave, the latter's water being supplemented by tributaries, some of which come from the Little Neath and others from swallets on the east side of the valley.

The Main River Passage from Flood Entrance. Flood entrance is at the base of an unstable looking cliff on the left bank (east) of the river bed, about 180 m. upstream from the bridge (SN 912142). It takes water in all but very dry conditions, and after rain becomes impassable very quickly.

The first 2.5 m. are a flat-out crawl, after which a larger stream joins from underneath boulders on the left (north) and the passage turns south. The way on gets roomier to a hands-and-knees crawl, winds its way along

and then changes to a rift-like section for 15 m. After an easy duck, the passage attains a reasonable size (H. 3 m., W. 2.5 m.) where two small crawls lead off due north. The first closes after only 30 m., while the other leads to Blaen-Neddd-Isaf Passage. The stream turns south some metres further on and falls down 1.5 m. into a circular pool.

The southern end of this chamber is partly blocked by fallen slabs and a crawl over these is necessary before the streamway, now 0.5 m. high is regained. This low section gives way quickly to a small boulder chamber where, by returning upstream, through the boulders this time a 3.5 m. waterfall is reached, with, at the top, a rather loose passage, which must run back to the river.

Downstream a climb over some boulders leads to a chamber where BNI streamway joins the Tributary Passage stream underneath some large blocks. There is a climb down and the streamway has become roomy (H. 6 m., W. 2.5 m.) with a clean sloping rock floor; it passes a bank of stalagmite on the left, and goes into a low section (H. 1.4 m.) for 30 m. An easier route follows a dry oxbow, readily seen before this low part, and rejoins the stream, soon after which the passage widens and the pebbly floor levels out. Further on, however, the streamway again becomes low and there is a duck; this can be avoided by a climb on the right to a muddy crawl, which meets the stream in a spacious passage (H. 5.5 m., W. 6 m.) just before Gour Passage leaves on the left over a bank of stalagmite.

The tributary stream flows on while the roof descends and a low bedding plane is followed for 15 m. before it opens out on the right to 18 m., over banks of sandy mud. This large passage, Mud Hall, goes back north for 90 m. over stalagmite flow and dried mud and ends in boulders very close to the corresponding pile near the entrance of Gour Passage.

In the continuation south the tributary stream runs along the left (east) side of Sand Chamber and joins the main river flowing east just before the Canal. Crossing Sand Chamber and following the river upstream it is only 40 m. before the end of Bridge Cave sump is seen. A tight rift penetrates some 6 m. into the sump, but even with this start there is still some 21 m. to dive before Bridge Cave is reached. There are a number of pale, almost white fish swimming in the sump, but it is unlikely that they are indigenous to the cave.

9 m. after the Tributary joins the river, the passage, although 7–8 m. wide, becomes low and the Canal begins. At this point it is nearly 1.2 m. high, but with only 15–25 cm. of air space under normal conditions for the first 4.5 m. In wet weather this section may sump quite readily. The air space gradually increases to a more comfortable 60 cm. while the water becomes shallower (50 cm.). The arched roof remains low for

another 120 m. where it begins to rise and the stream flows down some rapids towards Junction Chamber.

The Canal Bypass enters from the left in Junction Chamber, where major collapse has left huge slabs of rock lying in the middle of the chamber. The stream flows underneath the southern end of these through some deep pools before the passage turns south-east and becomes rather large (H. 10 m., W. 10 m.) as the boulders are left behind. The basic width of the passage is nearer 18 m., but a huge mound of mud and rock debris is piled 7.5 m. high and deep on the right side (S.W.) and the pile nearly reaches the roof. By climbing up this mound one can enter passages going off at roof level; two crawls lead off to the right but close down soon, while a third, 90 m. downstream of Junction Chamber, leads to Genesis Gallery and 425 m. of well-decorated passage. On the left side of the streamway a high-level oxbow leaves to rejoin the main passage 60 m. further on, at the bend in the streamway just past Genesis Gallery.

After a left then right bend, the stream flows under some fallen blocks at the start of Bouncing Boulder Hall, where a huge mass of debris is overhanging by 3-5 m. The stream runs in a canyon passage separated from the rest of the Hall by a wall of rock on the left. This wall is in process of toppling to the right. It is safer to follow the stream along the canyon passage because of the instability of the boulders, which give the Hall its name. After 30 m. the wall on the left has crumbled and the passage becomes colossal, 15 m. high and wide. The river crosses the Hall and disappears into the Wet Loop while the main passage carries straight on with the roof dropping suddenly by 6 m. exposing the entrance to a large roof passage (H. 3 m., W. 1.8 m.) leading to a high level series.

Both the Wet Loop and the Main Passage can be followed; the latter becomes partially blocked by boulders, and one drops down to the streamway as an alternative to a longer length of stream passage (H. 4.5 m., W. 1.2 m.) containing deep water. These two ways on meet in a metre-deep pool, and a few metres downstream two small tubes on the right lead off to Straw Aven. Here the passage is 2.4 m. high and 7.5 m. wide, but gets progressively lower till the "Duck" is reached. Again under normal conditions, (those which allow access via Flood entrance), there is 15 cm. of air space, but a dry by-pass in the roof is fairly obvious before the Duck and this can be used if the water is high. The roof lifts again after the Duck and the streamway varies between 1.5 and 2.5 m. in height for about 60 m. On the right Cairn Passage goes off and opposite this another passage doubles back on the streamway and leads to Ubbs Aven.

Downstream the river curves gently round and then heads due west for 60 m. in a short section of canyon passage (H. 4.5 m., W. 2.4 m.). Immediately after this it veers round once more to the south in a sharp

bend where Exodus Crawl comes in on the right. A short crawl through boulders on the left cuts off this corner.

In another 60 m. the roof dips down to meet the water at Sump 2 and before this a muddy climb leads to an equally muddy upper section for 45 m. but all ways are silted to the roof. On the other side of the main passage a crawl leads to a static sump 7.5 m. upstream. Sump 2 has been dived and a chamber reached after 40 m. It is some 12×6 m. with a stream entering from a passage 6 m. up in the roof. Sump 3, at the end of the chamber, has been dived for 80 m. and opens into a roomy stream passage. After 70 m. yet another sump is reached.

The Canal By-pass. From Tributary Passage, the Canal By-pass leaves 180 m. short of Sand Chamber. The route is over a 2 m. high bank of stalagmite on the left. Over this bank a small stream flows. The passage starts off 3.5 m. wide and 1.5 m. over some doomed gour pools but gets lower to a flat-out crawl before opening into a chamber 3 m. wide. The passage continues larger and dry. Beyond some straws it becomes 2.5 m. square and water flows in from the N.E. Inlet Series on the left. Most of this water sinks away on the right immediately, while the passage turns south. After a few metres the N.E. Inlet stream reappears from the roof as a 3 m. waterfall, which quite effectively blocks the passage in flood. The active streamway, now 3.5 m. high and 2 m. wide, goes on for 60 m. becoming lower, until the water goes into an even lower passage on the right. A climb past a stalagmite pillar leads to a larger dry series, which descends a boulder slope to join Junction Chamber after 45 m. Instead of climbing up one can follow the streamway, which is both wet and low, to come up into the passage just before Junction Chamber through a hole in the floor. The stream goes on to a sump.

Blaen-Nedd-Isaf Passage. Just after the duck near Flood Entrance two passages go north. The second of these carries on north as a crawl or a stoop in a dry, but in places muddy, passage for 90 m. On the left a climb leads to a chamber in boulders, some 4.5 m. across, while continuing along the passage, a stream can be heard but the way on becomes too low and too tight to follow, just 4.5 m. from the stream.

Again from the boulder chamber, a very unpleasant crawl off the northern end leads to BNI streamway about 30 m. upstream of the audible connection. BNI streamway is quite large in places (H. 2.5 m., W. 2 m.) and goes on upstream for 60 m. when the incoming water runs in several channels and each of these gets too low to be passable.

Downstream BNI varies in size, but is generally awkward due to the abundance of chert ledges across the passage. After 140 m. its water joins the Tributary Passage stream less than 60 m. down from where one left it.

North-East Inlet Series. This is a complex of 800 m. and it is entered



PLATE 30
Gour Passage on the Canal By-pass

(Photograph: D. M. M. Thomson)



PLATE 31

(Photograph: D. M. M. Thomson)

The Main River Passage shortly after Junction Chamber

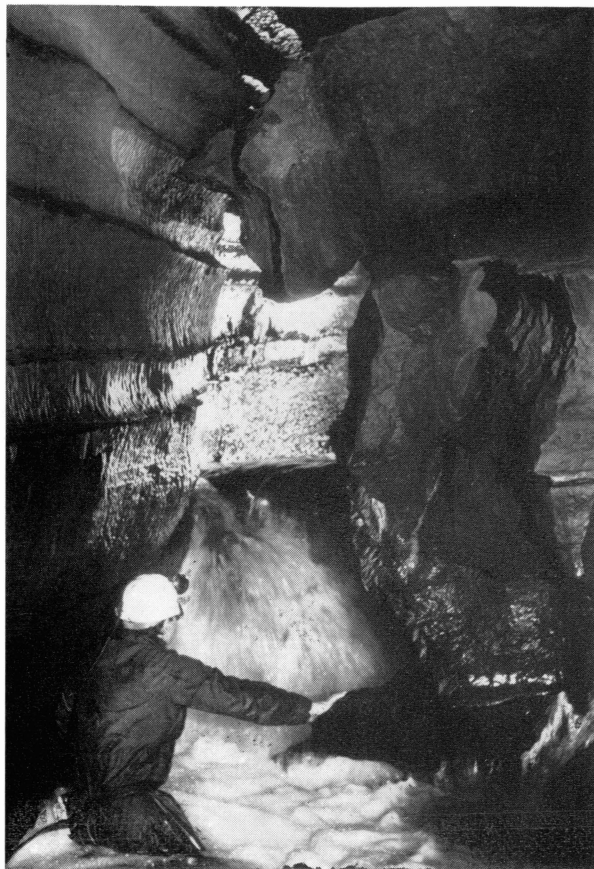


PLATE 32A

(Photograph: D. M. M. Thomson)

Stream canyon at Bouncing Boulder Hall

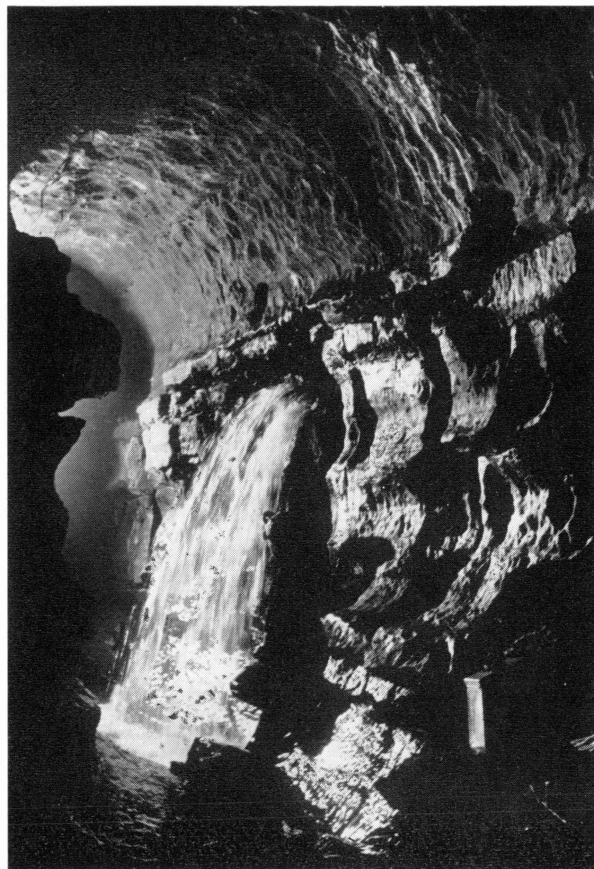


PLATE 32B

(Photograph: D. M. M. Thomson)

The Canal By-pass. Water from the N. E. Inlet Series
enters on the right

by following an active inlet off the Canal By-pass. It starts as an easy walk with many fine gours. It divides after 50 m. The left branch quickly closes down to a tight bedding plane but the right one continues east for some 105 m. to an inlet sump. This has been dived and opens after 30 m. into a chamber H. 6 m. W. 6 m. with a small stream entering from boulders in the roof. No way on was found. A passage on the left shortly before the sump almost forms a by-pass to it but requires blasting to extend it further.

The stream flowing from the sump contributes about half of the water entering the Canal By-pass from the series. Most of the remainder comes from a complicated set of passages to the north and these can be reached via a dry sandy crawl at roof level 45 m. before the sump. A stream is soon encountered and is seen to flow from both branches of a fork after 60 m. The right branch leads to a lofty section of passage (H. 6 m., W. 1.2 m.) which closes down, disappointingly, after 45 m. Its stream enters from a slot under the eastern wall. A low crawl on the left is the way on, however, and gives access to a further section of the stream, which was seen earlier in the left branch of the fork just mentioned. Upstream it can be followed for 15 m. where it emerges from a tight crawl. It is not met again. The way on is a muddy crawl to the west and this soon opens into a larger passage (H. 1 m., W. 1.2 m.), which ascends gradually with the roof rising to 5 m. Further progress at floor level becomes impossible but a very slippery climb up to a hole in the roof bypasses the blockage and gives access to the largest passage in the series (H. 6 m., W. 3.6 m.). Exploration is halted by flowstone which comes to within a few centimetres of the roof. A further 300 m. of muddy passage ending in a static sump can be entered via a very tight and wet crawl just before the hole in the roof or by an easier route just after the hole.

Genesis Gallery and Exodus Crawl. 90 m. downstream of Junction Chamber, a crawl in the roof on the west side of the streamway opens, after 30 m., into a chamber, 4.5 m. wide and 6 m. high, aligned parallel to the main streamway. This is the start of Genesis Gallery. There are several ways on and around at different levels, but by following the left wall a passage goes on 0.5 m. wide. A little water is collected from an aven and flows on while the passage becomes lower amid some fine formations. A crawl past these goes into the continuation of the passage (H. 1.2 m., W. 6 m.) with a large bank of mud on the right. The roof is bedecked with straws. The continuing passage gets very high in one or two places (9 m.) but after 60 m. it closes down to an impenetrable bedding plane.

Before this, a crawl over a bank of mud on the right leads to a 6 m. squeeze, which comes out near the bottom of an aven, 7.5 m. high. A

stream cascades down this, and flows south into a crawl before disappearing into a narrow bedding plane. A dry section of passage through boulders leads back north-east to an aven which has been climbed.

At the sharp bend in the Main River Passage, just before sump 2, Exodus Crawl comes in from the north. It can be followed for 75m. and carries the same volume of water that left Genesis Gallery in a low crawl. The water emerges from a tight rift which is only 30 m. from the end of Genesis Gallery. The two streams can be assumed to be the same one.

Other Passages. Immediately after the Wet Loop, two small tubes go off, and by climbing up through boulders, after 6 m. the bottom of Straw Aven is reached. It has been climbed, and the roof passage led to a 6 m. pot with a passage continuing on the other side. (It is now called the 2nd pot).

Downstream from the Duck, Cairn Passage leaves on the right over a bank of fill. It leads to a complex of small muddy passages with a length of 105 m. Directly opposite Cairn Passage is the route to Ubbs aven. The passages double back on the Main Streamway, and, just before a hole connects with the stream below, a climb leads to the base of an aven. One climbs 13.5 m. from the stream to the bottom of the aven and this is estimated to be 21 m. high. A heavy drip falls from above, and a more substantial stream emerges from an impenetrable rift at the south end of the aven.

High Level Series. On June 10th, 1967 the large opening in the roof of the Main River Passage, shortly after Bouncing Boulder Hall, was entered by maypoling. The passage leads via the 1st and 2nd Pots (each about 6 m. deep) to the top of Straw Aven. A very tight and awkward route from the bottom of the 2nd Pot, was forced back down to streamway and requires no tackle. Alternatively the series can be entered by freeclimbing Straw Aven (35 ft. ladder useful).

About 350 m. of passage has so far been found in the series. Upstream of the maypoling point it continues for 35 m. to come out in the roof of Bouncing Boulder Hall. A tight crawl to the east just before the 1st Pot, gives access to 200 m. of large passage ending in an impenetrable bedding plane. A small stream enters from a boulder choke half way along. The series is well decorated.

Sump 4 and Beyond. Since the main part of this paper was submitted for publication further discoveries have been made by diving down the streamway. On June 10th Sump 4 was passed and found to be 52m. long. The passage beyond is large and continues in a southerly direction for 250m. to Sump 5. This was dived on July 8th, and consists of two shallow sections of 30m. and 7m. which are separated by a chamber 10m. long. Beyond the streamway is large

again and continues south for about 150m. to the inevitable Sump 6.

Over 400m. of inlet and high level passage has been explored between Sumps 4 and 6, but much work remains to be done. The practical difficulties of organising a trip to Sump 6 are considerable and the long section of underwater passage from Sump 2 to 4 makes the continuation of the Grade 5 survey impossible by conventional methods. Electromagnetic surface location of points along the streamway is planned and a separate account of the system beyond Sump 2 will be published later.

The relation of Town Drain to the LNRC is still not clear. It probably enters the streamway somewhere beyond Sump 5. An inlet passage on the western side of the streamway between Sumps 4 and 5 has been surveyed for about 200m. and appears to be heading for the large depression by the roadside, south of Berthlwydd Farm at SN 916126.

Length of the Cave. The total length of passages surveyed to grade 4-5 in the Little Neath River Cave is around 3,800 m. The vertical drop from Bridge Cave entrance, the bottom of the shakehole, to sump 2 is near 60 m.

WARNING

Flood Entrance is subject to very rapid and severe flooding and may easily become impassable within half an hour of heavy rain. This entrance should not be used in any but settled conditions when the river is already low. In general if there is water flowing down to and sinking into Pwll y Rhyd it is unsafe to use Flood Entrance.

The boulders in Bouncing Boulder Hall are very unstable and should be avoided at all costs. The route following the stream is much safer.

ACCESS

Both entrances to the Little Neath River Cave lie on the land of Mr. Tom Lewis and it is requested that cavers should ask permission to go to the cave at Blaen-Nedd-Isaf Farm, and pay 1/- for access. If cavers change by the bridge, they should walk up the west side of the river and not through the hayfield on the east side. The farm is 400 m. further along the road from where one drops down to Pont Cwm Pwll y Rhyd.

UNDERGROUND DRAINAGE OF THE NEDD FECHAN

Sinks. The underground drainage of the Little Neath Valley has been dealt with by many authors and need only be summarized here in the light of recent discoveries. The number of swallets that the river utilizes depends entirely upon the weather. Under dry conditions it sinks

into five small fissures on the bend just above Pont Cwm Pwll y Rhyd, the combined waters entering the upstream end of Bridge Cave. In moderately wet weather water flows on under the bridge to two swallets on the east bank about 120 m. further downstream, eventually reaching West Passage in Bridge Cave. In very wet weather water flows on still further cascading over into the chasm of Pwll y Rhyd and resurging 140 m. downstream at White Lady Cave. The underwater passage between sink and rising has been followed by divers (De Graaf and George, 1960). North reports that after very heavy storms the dry gorge between the two is occupied by a raging torrent several feet deep but this is certainly a rare occurrence.

The M.N.R.C. have recorded nine sinks of the Nedd Fechan in all, upstream of Pwll y Rhyd. Regrettably their survey ends at the bend of the river just above the bridge and one more important sink must be added to their list. This is Flood Entrance. It is indeed surprising that this entrance, which is an open swallet in an obvious position, was only discovered by exploration from inside the cave. Water sinks at the base of a small limestone cliff, some flowing into the entrance directly and some entering a short way inside.

The discovery of the River Cave has clarified our knowledge of the drainage patterns described above but it has also raised several problems. The Nedd Fechan is the main but not the only contributor to the underground river. Sizeable streams enter from Blaen Nedd Isaf Passage and the N.E. Inlet series, presumably draining from the hillside to the east of Blaen Nedd Isaf Farm. Several possible swallets have been recorded in this area by the M.N.R.C. and water tracing or direct exploration is now required to complete the picture. Smaller streams enter the system from an aven in Genesis Gallery, Ubbs Aven and the aven between sumps 2 and 3.

Risings. When Pwll y Rhyd is inactive the Nedd Fechan is dry for about a mile, downstream of White Lady Cave. The first major rising (R₁) occurs in the bed of the river about 250 m. downstream of the foot-bridge at SN 912127. Further down the valley on the east bank at SN 912121, there is a large circular pool known as Pwll Du. In dry weather it is virtually static but under flood conditions it discharges a considerable volume of water. Immediately opposite Pwll Du in the bed of the river there is another all weather rising (R₂). Many more resurgences on the west bank near R₂ become active in wet weather.

The S.W.C.C. carried out several water tests prior to 1960 but regrettably no accurate records of these exist (Hartwell, 1963). The Pant Mawr water was traced to either or both R₁ and R₂ in five days. Bridge Cave was also tested to these risings. Both the M.N.R.C. (in 1963) and the

U.B.S.S. (in 1967) have attempted to verify the latter result without success. The fluorescein/activated charcoal method was used and in three separate tests, the last set of detectors were removed from Pwll Du, R1 and R2 after 3, 7 and 16 days respectively. No positives were obtained. No dye has ever been traced to Pwll Du, but the S.W.C.C. workers assumed the site to be a flood rising for Bridge Cave.

Before the discovery of the L.N.R.C. the theory that the Bridge Cave water resurged in the Pwll Du area was widely accepted. Current knowledge goes against such a hydrological link, however, and leads the authors to suggest that the L.N.R.C. does not drain back into the Nedd Fechan but goes to the neighbouring Mellte Valley. The evidence in favour of this is as follows.

The direction of the system so far is away from the Nedd Fechan and Sump 2, the present end of the Grade 5 survey, is about 600 m. east of the valley. The trend of the cave is down dip and along strike joints, development along the latter usually being to the east. The depth of the cave at Sump 2 is about 60 m. and at Sump 5 is probably in excess of 75 m. This is already at a similar altitude to R1 and if a connection did exist there would be evidence of backing up at the lower sumps. No such evidence is to be found and the Main River Passage shows every sign of continuing its pattern of long, spacious sumps and large sections of Streamway between. Under average flow conditions water reaches Sump 5 within two hours of leaving the Nedd Fechan. The L.N.R.C. water has not yet been traced to the Mellte but further tests are planned.

Conclusion. The conclusion that the L.N.R.C. water does not return to the Nedd Fechan has far reaching consequences and necessitates a complete revision of the accepted drainage theories for the area. It divides the Little Neath Valley into two distinct parts—the head-waters, which follow an underground course, via the L.N.R.C., to the Mellte, and a lower part, which derives its water from underground drainage on the high ground to the west, i.e. the Pant Mawr area. In wet weather the lower part is supplemented by overflow from the swallets of the head-waters. Reconsideration of the age of the cave systems and in particular that of the Little Neath River Cave is now required but these points are outside the scope of the present paper.

GEOLOGICAL NOTES ON THE LITTLE NEATH RIVER CAVE

The cave is situated on the Northern rim of the basin of the South Wales coalfield where a succession of Carboniferous Limestone, Millstone Grits and shales rest on the Old Red Sandstone. The general overall dip is about 10 degrees to the South East. The Little Neath River rises on the

Old Red Sandstone and then runs almost due South to sink in the Carboniferous Limestone on its left bank, several hundred feet South of the Sandstone-Limestone junction. The river sinks diffusely on its left hand bank over a distance of nearly 450 m. The various sinks have been described in the main account.

The known parts of the Cave follow the general dip of the limestone and the direction of the major jointing, which is practically coincident with the strike. It seems probable that the factor which has influenced the formation of the cave more than any other is the relationship of the direction of the dip with the Little Neath River. This has caused the cave to develop in a direction away from the river. Had the river direction been more coincident with the dip as in the Mellte and Hepste valleys, then the river would have been continually invading the cave before the latter could reach maturity.

Several faults trending N.N.W.—S.S.E. traverse the Millstone Grit and Carboniferous Limestone of the area. The effects that these faults may have had on the development of the cave are not immediately obvious since none of them are coincident with known cave passages. There are lines of avens in the cave which although not coincident with the major faults run in the same general direction. A particular example of this is the line of avens seen in Genesis Gallery which may have developed along a subsidiary line of weakness related to a major fault. Considerable shattering and high rift like passages can be seen in the Main Streamway just upstream of Bouncing Boulder Hall and these may indicate some relation between faulting and the nature of the passage in this area.

Along considerable stretches of the Main Streamway are remnants of very extensive deposits of fill material which often contains quite large boulders of sandstone and grit, mixed with a matrix of sand and clay. This fill also occurs extensively in the North East Inlet Series and along Genesis Gallery. The evidence suggests that until relatively recently the entire cave was almost completely infilled and the present stream has done little more than to re-excavate the original cave passage, and perhaps marginally increase its dimensions.

The cave down as far as the second sump is following the general trend of the dip of the limestone. Diving in the second sump has revealed that the cave passage beyond this point has been developed almost entirely along the major jointing in an Easterly direction for over 300 ft. This seems to indicate a complete change in the overall direction of the cave taking it in the direction of the Mellte Valley.

Although the overall geological picture is relatively simple, the development of the cave is undoubtedly a complex matter and it is hoped that subsequent work will enable a detailed account to appear in the future.

APPENDIX

NOTES ON SURVEY

Instruments and Technique. The survey was carried out by several surveying parties over a series of visits to the cave from February to April 1967. The instruments used were: ex R.A.F. hand-bearing, liquid-filled, prismatic compasses, which were read to the nearest 1° and 30 m., metal-reinforced, linen tapes read to the nearest 10 cm. and, when necessary, an Abney level read to the nearest 1°.

The method of surveying was to select a permanent survey station and then continue the traverse by taking a bearing forward and measuring the distance from one station to the next. The position of each station relative to either the left or right hand wall of the cave was noted and the passage width at each station was taken together with a record of the passage cross-section. If levels were also required then these were taken at the same time as the compass bearing.

Accuracy of Survey. Along the whole of the Main Stream route from the Bridge Cave entrance downstream to the terminal sump, and also along part of the Tributary Passage and the Canal Bypass, the above mentioned method was used, with clinometer readings being taken wherever there was a significant slope that demanded its use. For the rest of the cave the clinometer readings were dispensed with, except when the passage gradient justified its use for additional accuracy.

There were two major traverse loops to test the accuracy of the survey. These were, (1) The Canal Bypass—The Canal—Tributary Passage and (2) Tributary Passage—Surface—Bridge Cave. The survey data were computed into eastings and northings. The first loop was found to misclose by 4.5 m. eastings and 6.2 m. northings. The second traverse misclosed by 9.6 m. eastings and 7.2 m. northings.

A large misclosure was expected in the second traverse due to the difficulty of surveying through a sump, however the misclosure represents an error of 0.8 per cent of the total length. In both traverses the errors were equally distributed between each survey leg before drawing out the final plan.

Grading. In consideration of the instruments used and the techniques employed a C.R.G. grading of 5 is claimed for the main stream route from Bridge Cave to the terminal sump, for the first part of the Tributary Passage and the Canal Bypass. For the rest of the cave a C.R.G. grade 4 is claimed.

Surface Features and Geology. Surface topographical features have been taken directly from the O.S. 1:2500 map and geological information from the 1:10650 Geological Survey map. In both cases Crown copyright is reserved.

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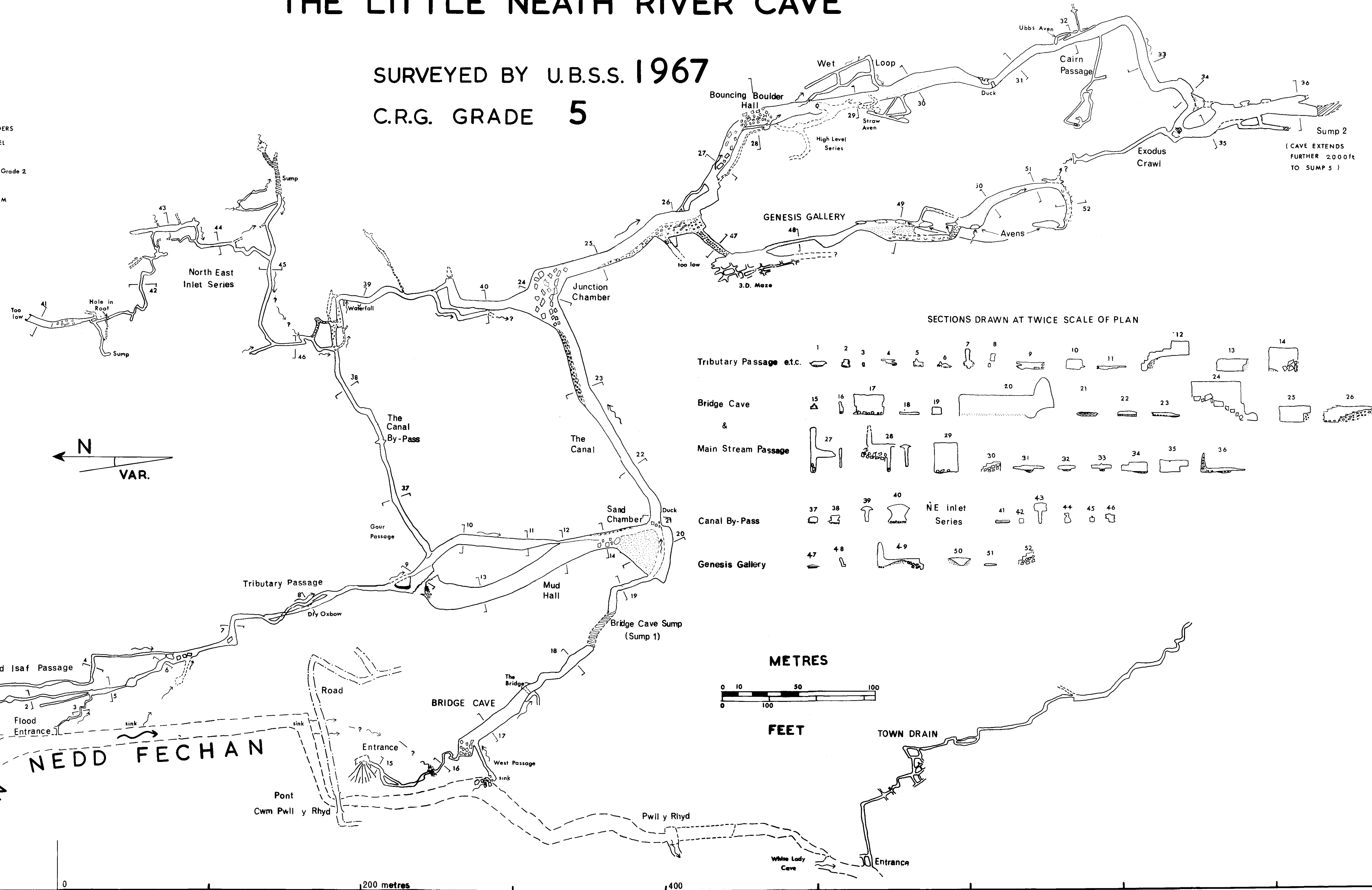
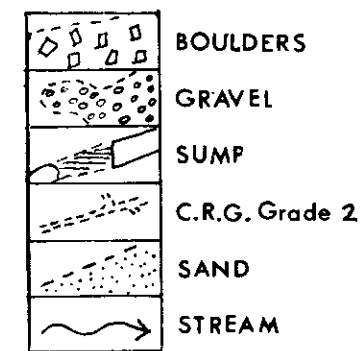
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THE LITTLE NEATH RIVER CAVE

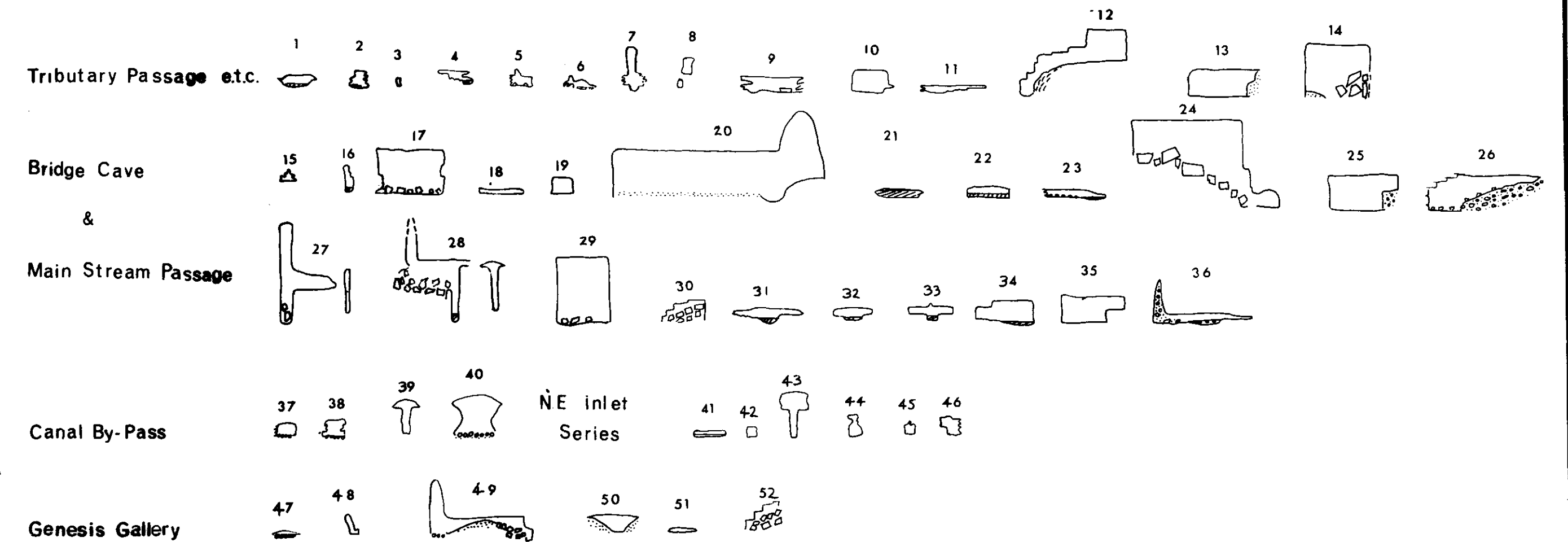
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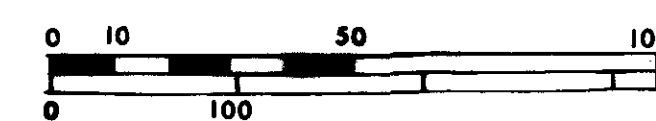
LEGEND



SECTIONS DRAWN AT TWICE SCALE OF PLAN



METRES



FEET