

FOREWORD

We must apologise for the absence of a separate July issue, the reason being an almost complete lack of articles, etc. We have seen this coming, but there was little we could do about it. Members cannot be forced to write for the Journal, or even to keep their promises, and, frankly, the outlook for the continuation of the Journal in its present form is far from good. For some time now we have been living on our 'stock', and it is obvious this could not go on for very long. Even if we lower the standard and include details of the exploits of The 'lunatic fringe' at the tap-room level, this would only interest a minite proportion of the membership.

It is most unlikely that it will be found possible to continue to issue six Journals a year, and this brings me to the proposal that the annual subscription should be increased to 15/- for ordinary members and £1 for joint membership. When I received this proposal from Derek Ford a few days before he left for Canada I was more than a little surprised as he being a member of the Committee, has never at any time said that he was in favour of and increased subscription, although at a recent meeting the question of subscriptions was fully discussed. I mention this in case any member should think that his proposal represents the views of the Committee as a whole.

I gather one of the reasons he suggests the increase is that we will have more money to spend on the Journal, and so enable it to be published as at present, but, as I hope I have made quite clear,

it is the shortage of suitable articles that is our trouble which together with the amount of work involved, makes its continuation rather a problem.

The Journal is the only thing the majority of members get for their subscriptions and if we have to reduce the frequency of issue, and at the same time increase the subscription it is fairly obvious what will be the result - the loss of a large number of non-active members.

It is well to remember that to a certain extent the members making regular use of the Club's facilities are being subsidized by the arm-chair cavers, and as long as we keep a correct sense of proportion this is right and proper.

At the moment our financial position is quite sound and this is due to the care that is taken to avoid unwarranted expenditure, and apart from the small day-to-day outlay, we always obtain at least a rough estimate before embarking on work which will cost more than a pound or so. The matter is always discussed in committee before the money is spent. In my view this disciplined spending is the only way to run any club.

Before leaving the subject of increased subscriptions it should be explained that under the joint membership scheme the couple receive one copy of each issue of the Journal, and the wife has no vote in any Club election, and in practice all the scheme means is that the Club is half-a-crown better off.

We have now had the Club's Public Liability Policy examined by an Oxford University legal expert and he holds the view that it is quite a good policy. This is most gratifying to those of us who were instrumental in obtaining this policy

nearly ten years ago. Our expert did however point out that a member caving in a foolhardy way or breaking the rules of the Club may find he was not protected in the event of a claim against him. Of course what constitutes bad caving is anyone's guess. What for instance, would be the position of a member who did a rock climb, at say the 20ft in Swildons, encouraging others to attempt the same, although a ladder was there to be used?

All members who have visited Mendip during the last few months will have heard that the Bristol Water Works Company have taken over the Axbridge R.D. water catchment area, and this included G.B. and Longwood/August Hole. A meeting was held at Bristol University to try and thresh out a method whereby caving clubs could still have access to these caves. The B.W.W. have decided they can only deal with a single body who will arrange with them the terms under which we can continue to visit the caves. It is well known that the U.B.B.S. have a special interest in this area, particularly in regards to G.B. and it would be unfair if they have to give up their work in this cave. No firm result came from this meeting and another has been arranged for early November. This is after the date of the A.G.M. so members will have an opportunity of discussing this matter. The B.W.W. are extending their control of Mendip, by taking over the Wells and Shepton Mallet water undertakings.

A sincere word of thanks to Harry Stanbury and Ray Hughes for relieving me of the task of painting the front of my house, thus enabling me to complete the work on this issue. Without this help it would not have been possible for me to find the time to get it to members in time to give notice of the A.G.M., etc.

Finally, could I call your urgent attention to the special appeal for financial help from the M.R.O. on pages 253-254.

We welcome the following new Members.

P.G. BRIDGES.

W.F.R. BROOKER.

P. W. DUCK.

P.J. GREEFIELD.

A.M. GULLY.

T. HALL.

A.S. HEMMINGS.

M.A.H. HEWINS.

Mr. & Mrs. L.J. KENT.

C.D. KING.

T. LAMPORT.

P. MACE.

P.H. SMITH.

P.W. SMITH.

J.A. THOMAS.

R.A. WHITTLE.

QUEENS COLLEGE TAUNTON, Caving Club. (affiliation)

The addresses of the above will be found in the list of members at the end of the Journal.

Future Events.

The Annual General Meeting and Dinner will be held on Saturday 17th October, at the Cliff Hotel Cheddar. Annual General Meeting at 3.30 p.m. and the Dinner at 7.30 for 8.00 p.m. Application for tickets to Hon. Sec. enclosing remittance not later than Saturday 3rd October. Guest of the evening - a celebrated International Speleologist.

Hon. Sec. F. Frost, 22, Wolseley Rd., Bishopston, Bristol 7.

Phone Bristol 44211

Hon. Treas. G. Williams, Cedarwood, Cadbury Camp Lane, Clapton-in-Gordano, Bristol

To the Editor

Parkinson' s Laws for Cavers. - A riposte

In the Journal for May 1959 p 236 the diagram appears to be a mirror image of the Lamb Leer situation. May I cry touche. The point is well taken. Who will drive the shaft in? C holds no water. The road to ruin may perhaps lead to another Swildons with less risk of flood. Who reads may run. I shall plug it no more.

E.A.G.
Berkhamsted 11. 5. 59.

Dear Frank,

I notice in the May issue of the Journal that you mention that one of your pet aversions is the caving helmet blazoned with the initials, etc., of the wearer. I agree with the "etc" as I have seen so many caving helmets over decorated. However, I consider that it is a good thing to have ones initials clearly visible on ones helmet. Two important functions are thereby fulfilled.

(1) Owner can easily identify helmet.

(2) When in a cave, various members of a party can be identified by that initial. This is useful when caving with parties of people who do not know each other well, as often a mud besmattered face in the shadow is unrecognizable, even if it belongs to a person whom you know - - - -

Jack Waddon
29. 7. 59.

Dear Frank,

C.A.T. Beauchamps makes one omission from his otherwise excellent list of rules for

cavers. He should add the rule "Never go caving at a time when you should be in bed and asleep. Also, I think his rule 4 is liable to be misunderstood, for surely the vital thing is to disturb ones normal mealtimes as little as possible. I imagine that the best time to enter a cave would be 10.0 am at latest; lunch should be taken on the trip and the party should be out in time for an evening meal.

Oliver Wells.

Emergency foodstuffs in Swildons Two.

A jar and a tin of glucose tablets which I left in Swildons Two four years ago were examined recently and seemed to be in good condition. Since I myself will not be wanting them it seems sensible to leave them in case anyone has genuine need for them. They are in a passage just downstream of Creep One, reached at the top of a small climb.

O.C. Wells.
18. 5. 59.

Mendip Rescue Organization Rescue Apparatus Research Fund

For some time now the M.R.O. has been concerned with the problem of rescuing an incapacitated subject from the far side of a sump, and more recently, that of a caver overcome by foul air. Dr. Oliver Wells of the Cave Diving Group, financed and encouraged by members of the M.R.O. started to design and make apparatus to facilitate rescues from caves with foul air and through sumps. Unfortunately he has had to leave for America before the completion of the work, and the

apparatus is now the property of the M.R.O. who have undertaken to sponsor its further development.

The lines of research indicated are :

A. To discover how foul the air may be in parts of various Mendip caves and how quickly it may get foul in given circumstances. This might cost about £35.

B. To design and develop apparatus to facilitate the rescue of incapacitated subjects from caves with foul air or from beyond sumps. Every effort will be made to develop the apparatus so that it is available throughout the country. This part of the project may eventually cost about £200.

Dr. Allan Rogers has undertaken to direct this research on behalf of the M.R.O., and we are most fortunate in having his help because of his knowledge and experience. Part A of the programme is similar to the work he was doing on Dr. Fuchs' recent South Polar Expedition.

The Club as such, contributes towards the normal running expenses of the M.R.O. but this is something special. The work will take some time and a lot of money, but there is no doubt that it is our duty to do all we can to help further the project. We are very proud of the way members have in the past, contributed to special funds, notably the Hut and Lamb Leer funds, and all will agree that this is a most worthy cause. Please, please send a donation to the Hon. Secretary (and Treasurer) of the Mendip Rescue Organization. Dr. O.C. Lloyd. Withey House, Withey Close West, BRISTOL 9. Do this as soon as possible please, mentioning your membership of the Wessex Cave Club.

Frank Frost

ANNUAL GENERAL MEETING

Nominations for Officers and Committee for 1959 and notices of motions for discussion at the Annual General Meeting must be received by the Hon. Secretary not later than Saturday 25th September. Such nominations and notices of motions must be signed by the proposers and seconders and in the case of nominations, a note from the nominee stating that he or she agrees to being nominated.

The following proposals have been received

" that the annual subscription be increased to 15/- for ordinary members and £1 for joint members". That to this proposal be added an agreement (not for insertion in the permanent rules) "If accepted by a majority of members present at the Annual General Meeting 1959, this ruling shall apply with effect from the moment of acceptance.

Proposed by D.C. Ford.
Seconded by G. Candy.

" that the Hut harden shall be ex officio a member of the Committee".

Proposed by D.C. Ford.
Seconded by M. Pymn.

NOTE. The annual subscription for ordinary membership is 10/- and for 'joint membership' (man and (his) wife), 12/6d. Affiliated members 1/6d. Comments re the proposal will be found in the Foreword.

Hon. Secretary

CAVE EXPLORATION IN IRELAND

For ten years, now, parties from the University of Bristol Speleological Society have been exploring and surveying caves in Co. Clare. The harvest has been a rich one and is not yet complete. It is best appreciated by looking at a map published by the Society in 1956 (1), which shows most of the known cave systems in N.W. Clare related to the surface features, with indications of the underground drainage routes. Most of the driving force in this activity has been provided by Dr. E.K. Tratman, our President, who each July directs the activities of some dozen enthusiasts, mostly undergraduates.

We worked all day our surveys to finish
And spent all the evening drinking Jamieson and Guinness.

Ten years ago the only well known cave in the area was Pollnagollum on Slieve Eiva (2), though the Coolagh River Cave, Faunarooska and a few others were known also. The map published in Proceedings in 1956 shows several other major cave systems discovered and surveyed by the U.B.S.S. , for example the entire Cullaun series of caves and Doolin Cave. In 1955 a connection was established between St. Catherine's I Swallet and Doolin, thus giving the first large through and through cave, a distance of 2¼ miles from the sink to the Fisher- street Pot (3).

During most of this period a detailed examination was being made of all the swallets at the shale-limestone boundary. (The shale collects the water and most of the caves begin where the stream reaches the underlying limestone.) Don Thomsom described the process thus; "You just walk along the shale-limestone boundary jumping into every

swallet you see, and if you disappear, well, there's a cave." Gragan West Cave was discovered in 1955 in very much this way (4).

In 1957 we began to clean up much of the work left incomplete by other explorers.

We surveyed three miles of cave or more
And most of it had never been done before.
Faunanooska was quite a pig
And Pollballiny was nearly as big.
But as for Pollnagollum on Slieve Elva
Its Branch Passage Gallery's the beggest by for.

It is sometimes thought by others that the U.B.S.S. has a monopoly of the caves of N.W. Clare, but this is not so. Many other clubs do exploration in that neighbourhood, and we wait a few years for them to publish their results (which they usually fail to do) before doing the job ourselves. Pollballiny for example was first entered by the Yorkshire Ramblers' Club in 1936, but in 1956 we pushed it to about twice its original length and published a description and survey in 1958 (5). Faunarooska was first explored by Balcombe and others in 1936 (6) and the survey was started by the R.A.F. Potholing Club in 1952. This club very kindly allowed us to make use of their data, and the survey which we completed in 1957/58 is now in the press.

The Branch Passage Gallery of Pollnagollum was also first entered by the R.A.F.P.C., who never surveyed it. They got into it by a separate surface opening (now closed), but since then we have opened up a Muddy Link passage which starts near the main entrance, so that the Gallery is easily accessible. At the lower end of the Gallery the water has entered Branch Passage by a separate opening (by meander undercutting)

falling thence down a 25ft. waterfall. Much effort was made in the past by Coleman and others to enter this opening, but without success; the main opening a few yards further down was not seen. The main opening is dry normally but takes flood water in wet weather, as we found to our cost in 1957, when the force of the water after a day's heavy rain made it impossible for us to climb the ladder from below. The ladder which we abandoned was very kindly retrieved for us by the Sandhurst Club a few weeks later; the life line we found there still intact in 1958. A complete line survey of the whole cave system is now in preparation (including Poll Elva) and while it was being made other new passages were found, such as an extension of Cottar's Gallery (1959).

In 1952 the Craven pothole Club published their exploration of a cave usually known as Poll-an-Ionian, but which they originally called Poll-an-Ionain (7). The name is obscure and it might be well to follow the established practice of calling it after the Townland in which it lies, namely Craggycorridan. This name finely describes the surroundings. The cave is famous for its enormous stalactite in the main chamber. I well remember the first time I saw it. It was on a Sunday morning, and we were due in for lunch at 1.30 p.m. We decided to make a quick trip into Poll-an-Ionian just to see the sights but the first 200 yards of streamway crawl are rather bitter and we were making bad time of it. Suddenly we came into a large, sombre chamber, in the centre of which hung this huge white stalactite, about 30ft. long. It was so awe-inspiring and so beautiful that we felt it was worth while being late for lunch after all. Since then we have made a detailed exploration and survey of this cave, which we hope to publish in 1960, during the course of which new passages and a new chamber were discovered.

Much of the work we do is teamwork of the kind which is only possible among a group of cavers who know one another very well. This was well shown this year, when we surveyed Cullaun III, a really nasty cave. It goes for a matter of 3300 yards, and most of it is winding, dull, featureless and so narrow, that one has to walk sideways. We divided up into four survey parties, each briefed to start at a particular point and work in a particular direction. The points were not easy to find, and on the first day the members of the leading party, after pushing the end of the cave some hundred yards further, were so cold and exhausted that they returned at once, declaring the cave to be unsurveyable. In spite of this we completed the survey (G.R.G. Grade 4) in two days.

And whether it's sunshine or whether it's rain,
We shall never have to do Cullaun III again.

Oliver C. Lloyd,
August 1959

References

- (1) 1956, Proceedings of the U.B.S.S., Vol.7 (3), Plate 6.
- (2) Coleman, J.C. & Dunnington, J.J., 1944, "The Pollnagollum Cave, Co. Clare," Proc. Roy. Irish Acad., Vol. 50 B, 105 - 132.
- (3) Robertson, D.A.S. et al., 1956, "the Doolin Cave System," Proceedings of the U.B.S.S., Vol. 7 (3), 159. Also Plate 7.
- (4) Preston, D.R., 1956, "Gragan West Cave," Proceedings of the U.B.S.S., Vol.7 (3), 172. Also Plate 7.
- (5) Banfield, K and Ineson, C., 1958 "Pollballiny, Co. Clare, Eire," Proceeding of the U.B.S.S., Vol. 8 (2), 130.

(6) Balcombe, F.G. , 1936; "Ireland 1936," privately printed; 4, 10-12

(7) Dickinson, J.M. and Varley, B., 1952, "Poll-an-Ionain," Jour. Craven P.C., Vol. 1(4) , 184.

THE SURVEY OF STOKE LANE SLOCKER

Accompanying this article is a plan of Stoke lane Slocker at a scale of eighty feet to an inch. It is a redrawn and simplified version of a Wessex Survey Group publication which is described below. The original survey is at a scale of twenty feet to an inch and occupies a sheet measuring 43" x 29". It contains a more accurate outline, projected profiles, nearly sixty cross-sections and other detail which has had to be omitted from the simplified version because of problems of size. The 20' : 1" survey will be available to members at the end of August.

TECHNICAL NOTES

The new survey is at Cave Research Group Grade 5 and is intended to replace the older Grade 2 survey made by the Bristol Exploration Club shortly after the discovery of Browne's Passage and the series beyond the first sump. The Wessex survey work was begun in January 1956 and largely completed by May of the following year. There followed a long delay before the last notes were made in June 1959 and the completed map drawn up.

Surveying was carried out using instruments mounted on a folding tripod and sighted at target candles placed on natural prominences. The compass used was an "Air Navigators' Magnetic Azimuthal Compass", bought in an ex-W.D. store. It has a dry card graduated in degrees and read to 15 minutes. It measures 4" in diameter and has a movable prism 1.3" in breadth and depth. So large an instrument is preferable in my opinion because of the ease of reading. By manipulating the prism the card can be accurately read through vertical angles of 45 degrees. This particular instrument is very robust. It has now completed

surveys of Eastwater, Hilliers, Stoke Lane and Swildons 4 with no deterioration in its accuracy - veritably the doyen of Mendip compasses.

Angles of elevation and depression were read with a Watkin Hand Clinometer, held at rest on the tripod table. This instrument is also graduated in degrees and was read to 15 minutes of arc. Linear measurements were made with a 66 feet steel tape read to the nearest half-inch. Tapes proved not so durable as the compass. Stoke Lane consumed two. All instruments were taken from the cave after each survey session, dried and cleaned.

Results were plotted, first graphically and then computed as rectangular co-ordinates on squared tenth graph paper -x On the 20' : 1" plan the walls of the cave, (where they are solid but not where in boulders), have been drawn with a relatively thick line and all detail enclosed within them in thinner lines, as an experiment in easier identification. The symbols used are those recommended by the C.R.G. with one or two additions; e.c. + = the height of a surveyed prominence above Ordnance Datum. At both sumps this height is the surface of the water at a mean level observed on a number of occasions. No geological data is shown, because of problems of space.

The cave offers several closed circuits where the surveyor can check the accuracy of his work. The first traverse done in the cave was the circuit, Changing Room - C.B. - Main Chamber - Streamway - Changing Room. For this, a standard Army oil-filled prismatic compass was used. Plotted, the survey showed a closure error so bad that the work was repeated with the Air compass, which was used thereafter.

On the largest closed circuit, (Changing Room - Streamway - Sump 2 - Traverse - C.B. - Changing Room) a displacement error of 4.6 feet occurred in a total distance of 847 feet - or 0.5% error. This was considered to be an adequate standard for the described method and is the basis of the claim of Grade 5 for the survey.

Findings

On the plan the cave has an aggregate passage length of 3,980 feet. Many of the passages are bedding-controlled to some extent, and as the beds dip at 80 degrees there is considerable foreshortening, so the real length of the cave is somewhat greater. Sump 2 is 267 yards from the entrance on a True bearing of 320.3 degrees.

The Stoke Lane stream sink at the entrance to the cave at 561 feet above Ordnance Datum and rises at St. Dunstan's Well at 490 feet. When last seen at Sump 2 it is only 29 feet above the latter height but has traversed barely one fifth of the horizontal distance from sink to rising. For the unknown part of its journey therefore, the stream will have a mean gradient of 1:100, a very low figure for a cave. It is perhaps a risky postulation, but this suggests that this unknown section is not likely to prove practicable for the ordinary cave explorer unless further high circuits exist, because it will continually be sumping - if it is not one continuous sump, which is rather unlikely. There is very little evidence of high level systems starting from the end of the known cave.

At its highest points, (the roofs of Bone and Main Chambers), the cave lies approximately thirty feet below the surface of the hillside.

THE HUMAN SIDE

The task of surveying the cave was divided into two parts, Denis Warburton taking the entrance complex as far as the First Sump and Phil Davies and I, the system beyond it. Denis completed his work in a series of short, sharp visits. He was assisted throughout by Brenda Willis. The success of this part of the survey owes a great deal to her good nature and enthusiasm, for the assistant's job is never exciting work in these low, wet passages, in winter and the bad old (pre-exposure-suit), days was not pleasant. There was never any point in carrying spare dry clothes as they would be soaked too soon.

Eighteen months' delay followed the completion of this work and the drawing up of a simple outline. During it, Denis' notes deteriorated to the point where they were illegible even to himself. So in April of this year Mike Pym, my wife and I levelled new traverses from a benchmark on the village church to the entrance and thence to water-level in the First Sump. In July David Farr, Phil Davies and I interpolated passage cross-sections and floor deposits from Denis' map. We wore exposure suits.

It was evident that short trips would not serve for the work beyond the sump. Davies planned and supplied a comprehensive base kitchen. This was carried in by a large party in January, 1956 (one recalls Oliver Wells struggling to get a biscuit tin through the Nutmeg Grater), and established in C.B. Chamber. Thereafter it furnished hot food and iron rations to all survey parties. Only the supplies of chocolate and polony had to be replenished. All parties carried dry underclothes and socks in more-or-less watertight bags with them to C.B. Wearing these under wrung-out

top clothes it was found quite practicable to work for nine or ten hours beyond the sump, despite the surveyor-in-chief's penchant for choosing the coldest days of the winter to go underground.

With the exception of Bone Chamber and its re-entrants, all instrumental and notational work in the second section was carried out by me. The survey of Bone Chamber is by Phil Davies and Alan Fincham but I subsequently ran a traverse across it and the plot is according to my findings, so that any errors in situation and orientation beyond the First Sump are entirely my responsibility. The bulk of the work was done with the assistance of Graham Candy, who never complained about the large loads that two-man parties had to carry, even when these included ladders and lifeline, Several others, all of W.C.C., helped me unsparingly and I would particularly like to thank Brian Colingridge and Gary Witts for their aid on a "marathon" trip one snowy day in February, 1957. Work on this section was completed in May of that year and drawn up shortly afterwards.

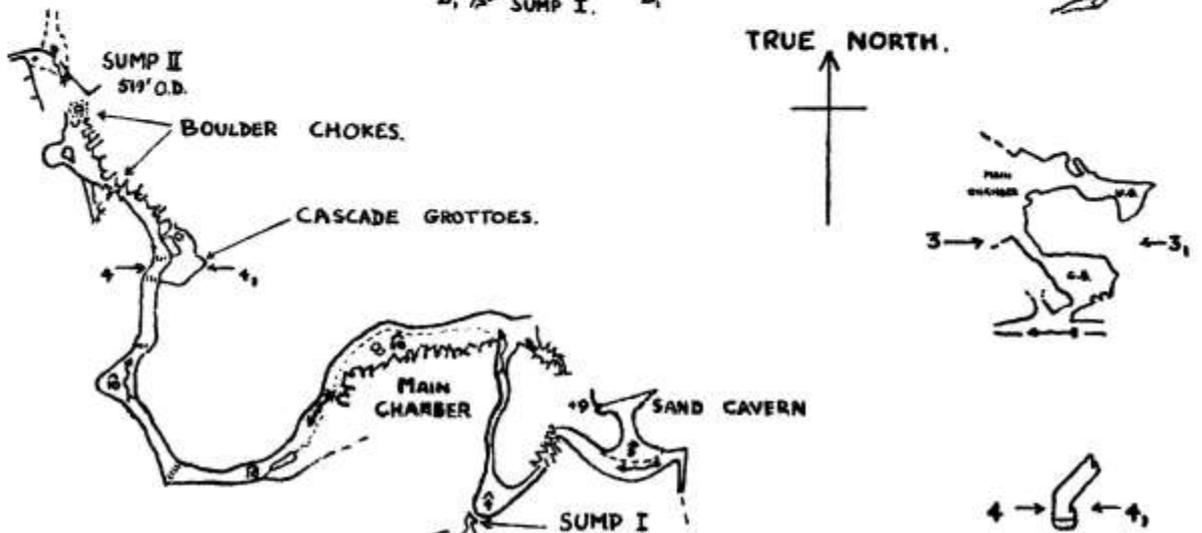
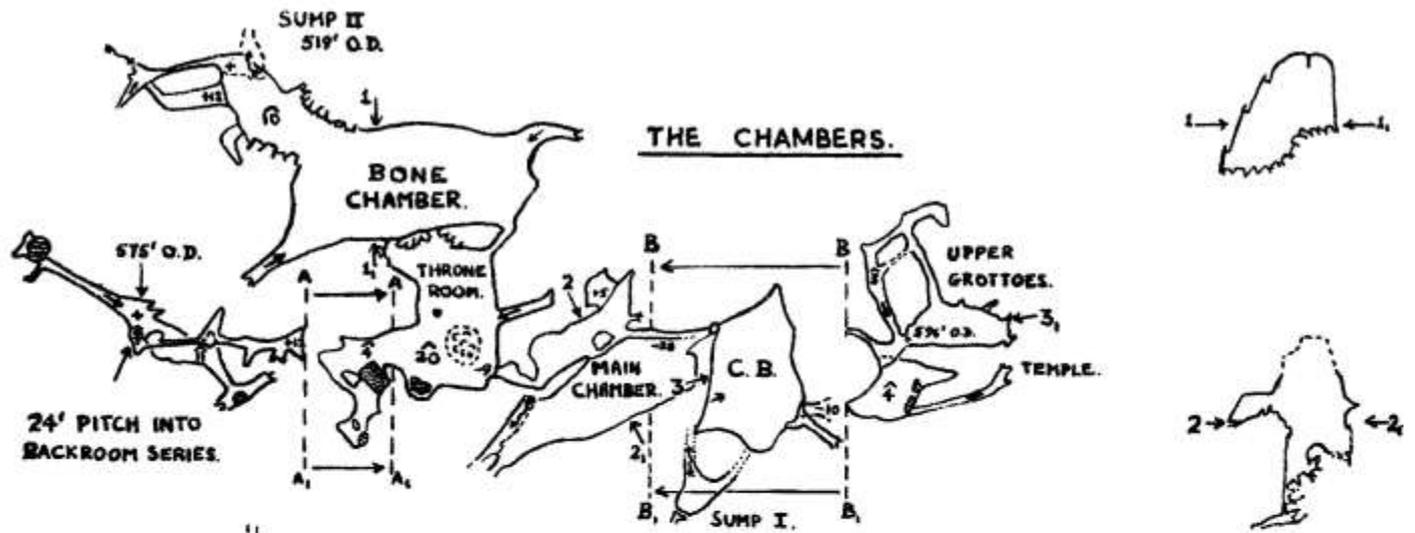
Because the surveyor has to examine every nook and cranny of his cave, mapping parties often make new discoveries. But no extensive additions were made to Stoke Lane. Denis and Phil ferretted out a connection between Pebble Crawl and Tributary Passage, beyond the known limits of "Ridyard's Wriggle"; Graham Candy and I were apparently the first to visit a fine little grotto, the "Godbox", reached by a climb at the western extremity of the Backroom Series.

The survey records the topographical form of Stoke Lane Slocker as it is known today. It does not record the beauties of the formations. This article may be ended with an appeal on their

behalf. As recently as 1956 most of the formations were in much the same condition as the original explorers must have seen them nine years earlier. However, during the last three years the number and frequency of visitors has greatly increased and in some parts of the cave the deterioration of the formations is very noticeable. I would especially ask any who read this not to wander at large around the Throne Room or Princess' Grotto - the original path is still discernable. The cave is notable for its many inviting alcoves, half hidden behind banks of stalagmite. If the latter are to be climbed it is a trifling inconvenience to take muddy boots off beforehand. In this context, Vibram soles do not mark stalagmite to anything like the same degree as nails and they give a better grip.

D.C. Ford,
St. Edmund Hall,
Oxford.
July 1959.

* Available from D. Warburton, 20 Beverley Court Road, Quinton, Birmingham, 32, price 6/6d post free.



STOKE LANE SLOCKER.

SCALE. 1" = 80 FEET.
 0' 40 80 120 160'
 HEIGHTS IN FEET.

SIMPLIFIED FROM A C.R.G. GRADE 5 SURVEY AT 1" = 20 FEET.
 (BY D. FORD, D. WARBURTON & P. DAVIES.)
 1956-59.

D. Ford July 1959.

RECONNAISSANCE OF SUMP II STOKE LANE

On the 9th May a joint Cave Diving Group, Wessex and Shepton Mallet Caving Clubs and University of Bristol Spelaeological Society party made a further attempt on the second Sump of Stoke Lane Swallet. The operation was inspired by Derek Ford who asked me if I would be willing to dive if he did the necessary organisation and laid on the sherpas. The prospects of Sump II being reasonably short and a major extension accessible had always appeared good to me, because it is a job that would have to be done sooner or later, I agreed.

The first attempted dive with breathing apparatus in Sump II took place on the 1st September, 1956; a full account written by Oliver Lloyd appears in No. 60 Vol. 4 of this Journal. The organization for that expedition was necessarily somewhat more elaborate due mainly to the fact that it took place in the "bad old days" before exposure suits had been introduced to Mendip caving and had become standard equipment for long exploration of wet caves. On that occasion, besides the four who made up the diving party, there were 29 other helpers. Due to a technical fault with the breathing apparatus the dive was not a success but it was established that the way ahead was sufficiently roomy for a kitted diver. The failure of the diving kit, wetted soda lime, emphasized that the CO₂ absorber canister is one of the more vulnerable parts of the diving apparatus during portage through a cave.

Derek Ford's organization for the 9th May provided for an "in trip" on the previous weekend to supply the expedition's kitchen and part of its larder at the base in Pool Chamber. Unfortunately

Oliver Lloyd and his party of Spelios were unable to make this provisioning trip and the two packs were added to the five pack (84 lb) of diving apparatus, two sundries packs and photographic gear that were to be carried in on the 9th. Mr. Stock had kindly promised to ask any other parties who intended to enter the cave that day to postpone their visit. Fortunately no other group had made any plans for that particular date.

At 3.20 Ken Dawe, Mike Thompson, Mike Holland and Derek Ford formed the first sherpa party and entered the cave with the heaviest packs only 50 minutes behind schedule! It was decided to call on our two reserves, Norman Tuck and David Farr to help with the portorage in view of the additional load; besides which they wanted to watch the diving. These two joined Chris Hawkes to form the second sherpa party who entered the cave at 4.10 closely followed by the diving party, Oliver Lloyd, John Buxton and myself.

Soon after 5.00 p.m. we were all assembled at the base in Pool Chamber having passed through the first sump snug and dry inside our exposure suits. Oliver Lloyd and Chris Hawkes stayed only long enough to catch their breath before returning to the surface so as not to be in the way during the following operations.

The diving log shows that it was 6.47 before I first entered the water so it must have taken at least an hour and a half to assemble and test the oxygen breathing apparatus which was the standard closed circuit type that has been used at Wookey Hole and Swildons. Meanwhile we had a light meal while Mike Holland and Mike Thompson sorted out the photographic flash gun which was behaving in a very temperamental fashion.

Wearing an exposure suit, modified "by replacing the neck seal with a diving hood to cover and protect the whole head against the coldness of the water, I submerged beneath the scum and the usual debris of floating candles, waterproofed tins and spent flash bulbs that are always to be found at Sump II. Once under the muddy water my torch was of no practical use, visibility was almost nil. I edged downwards into an awkward fissure between the solid roof and the boulders of the floor, somewhat to the left of the point indicated by John Buxton. At a depth of about 7' I found myself with only 2' between floor and roof at the bottom of what appeared to be a U tube; the muddy floor rose slightly, but the rough rock rose more steeply, tending to lead me to the right. As the air in my suit expanded and the water pressure gradually diminished my hopes rose. In complete darkness and without realising it my head broke the water surface, it was only the characteristic heaviness in the less dense medium that indicated this fact. I heard water lapping all round and felt for my torch wondering what the passage ahead looked like. It turned out to be about 3' 6" long, perhaps 2' wide and nowhere much more than a foot in height, sinking back into the water I followed the line back to base to ensure that there were no complications. The first dive had lasted only four minutes. The second dive took only a minute longer. Entering the water as before I followed the left hand wall, locating roof and floor with my feet while lying and moving on my back in a clockwise direction. There appeared to be no way on except to the extreme right at a depth of about 5 feet, still moving to the right I felt the familiar expansion of my suit as the depth decreased. This was sure to be it! No darkness and lapping water greeted me this time but a brilliantly lit chamber full of voices. I had found an oxbow back into Pool Chamber without

encountering the air surface of the first dive, and had surfaced about 6' to the right of my starting point in the position that John Buxton had made his dive without breathing apparatus two and a half years earlier.

To the north-west of Sump II a small tributary stream rises out of an inlet sump and flows down a small passage into Pool Chamber. The water is several degrees colder than the main stream indicating that it has no direct connection with any surface sink but derives its water from small underground seepages which have attained the temperature of the surrounding rock. Into this cold resurgence Derek Ford reluctantly immersed himself, taking a deep breath his head disappeared beneath the surface for a few seconds. He reported that he had found a steeply descending passage with a mud floor and two rock walls meeting to form the roof. At a depth of 7' - 8' this triangular shaped passage became too small for his boots to penetrate being only 1' high and 9" wide; progress upstream was therefore impossible.

After a short rest and more refreshment I re-entered the water by the second and larger of the two underwater passages and following the less constricted route to a depth of 6' soon found the air surface not more than 5' horizontally from the air in Pool Chamber. I examined the right hand wall of this little bell-chamber more closely this time using my hands to follow the rock-mud junction below water. In several places there seemed to be quite deep recesses under the roof but none were large enough to enter, I returned to base after about five minutes.

On the fourth dive, entering as for the third I re-examined the right hand wall. Having completed what I thought was a semi-circle without finding

anything new I turned to the left hand wall, the second half of the irregular circular chamber. I located the original entrance to the bell chamber then followed the rock-wall line with my hands. The mud was very soft and watery in places and it was not always easy to decide the extent of the recesses under the roof. I had just decided that I must have reached and overlapped the furthest point of the first semi-circle when I detected a change in the texture of the mud, it was becoming coarser. I had found the active stream bed where the finer particles had been washed away leaving only gravel on the floor.

A closer examination revealed a rather indefinite passage at what I estimated to be 5' below water level. I entered feet first lying on my back, the roof gradually dropped till there was only 18" between it and the floor, the cylinders on my chest banged noisily against the roof, the breathing bag on my shoulders stirred up the mud of the floor. I pushed myself forward using the sharp projections on the roof as hand holds, the passage had become more uniform in cross-section now being about 4' wide, and just high enough to encourage progress, not quite low enough to be discouraging. 10 - 12 feet from the air space I pulled myself forward on a flake in the roof and instead of moving downstream settled comfortably on the floor still holding a large and jagged piece of rock. Carefully placing it to one side I kicked around with my feet, the passage seemed to be unchanged in size, the roof did not appear to be lifting, I returned slowly to the base, making sure that the line was in the widest part of the passage. The time was 8.20.

Throughout the operation the stream had remained normally low after several days without

rain; no downstream current was noticed underwater even in rather restricted parts of the passage. It seems unlikely that appreciable silting up of the main underwater passage would occur even after a prolonged dry spell, the active stream route being well defined and freed from silt by the concentration of the flow.

Packing up the diving kit and kitchen took a full hour, we left the base as one party around 9.20 carrying all but two of the heaviest diving packs. The first person reaching the surface emerged at 10.30, the eighth and last ten minutes later. A storm was gathering and broke before the last of us left the farm in search of our various club huts.

Next day Oliver Lloyd and a party of Spelios returned to Pool Chamber to recover the two remaining packs, a chore which was combined with the pleasure of visiting the friendlier parts of the cave.

Thanks to all who helped, the organization for the expedition worked admirably well and everything ran smoothly. Although the results of the expedition were not spectacular it was undoubtedly a successful and very useful undertaking. Apart from some excellent colour photographs by Mike Holland and the discovery that Sump II is at least 20' long and definitely not a free swimming sump and that the inlet sump is not a practicable dive, other lessons have been learned which can help the smooth running of the next expedition. No date for this third attempt has yet been mentioned, but such an effort would be well worth while, even if only for the sake of completeness. After the dive was over as on many previous occasions in cave exploration, I had the feeling that "if only" I had pressed on a few more feet I might have been through.

Looking at the survey of the cave elsewhere in this Journal, particularly with regard to relative heights of the entrance, Sump I, Sump II and the resurgence at St. Dunstan's Well the prospects are rather gloomy for the caver without breathing apparatus. Derek Ford's conclusion that little evidence of a continuation of the high level system beyond Sump II exists seem to be well founded. Has he found any geological reason to explain such an abrupt change in the characteristics of the cave he suggests?

Philip Davies.

STOKE LANE.

INLET
SUMP.

PLAN.

SUMP II C.R.G. GRADE TWO.

SECTION OF SUMP II

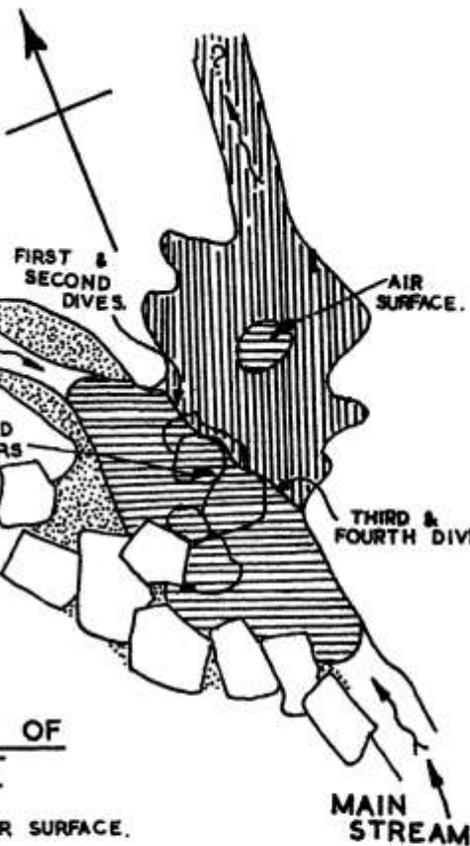
POOL
CHAMBER.

SUBMERGED
BOULDERS.

AIR SURFACE.

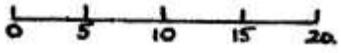
WATER LEVEL

MUD & GRAVEL FLOOR.



Davis

SCALE:
1" REP. 10'



PEN PARK HOLE. INTRODUCTION.

There is a great similarity in the make-up of Pen Park Hole and Lamb Leer, both contain a large main chamber, to reach the bottom of which an 80ft. ladder is necessary. Further, both have been intimately connected with mining operations.

History suggests that as far back as Roman times lead was being extracted from Pen Park Hole and it was thought by Mr. J.F. Nicholls, F.S.A. that two pigs of lead weighing 76 and 89 lbs. respectively found in 1865 at Bristol in excavating the old bank of the River Frome at Wade Street, may have come from Pen Park. We are on firmer ground in Saxon times, as in a Charter of 882 one of the points mentioned in a perambulation of boundaries is a "Leadfedelf" at Pen Park Hole. This may mean an old lead mine, perhaps Roman, but it is more likely the Saxons themselves had "delfed" for lead there, but the mine had become derelict by the middle of the seventeenth century. In view of the above it is rather amusing to learn that a worthy Bristol City Alderman cast doubt on the very existence of the place, during a discussion on the suitability of the land for building purposes. The Corporation therefore called in the services of Prof. L.S. Palmer who, with the help of Dr. Tratman & Brig. E.A. Glennie, using the Geophysical Megger Earth Tester made a survey of the place under which the cave was assumed to lie.

Not only did this result in the finding of the cave, but Prof. Palmer was able to indicate the position of a blocked-up shaft to the East of the main chamber. He gave as his view that this shaft, about 60 ft. in depth, and although completely filled, would give access to the cave proper.

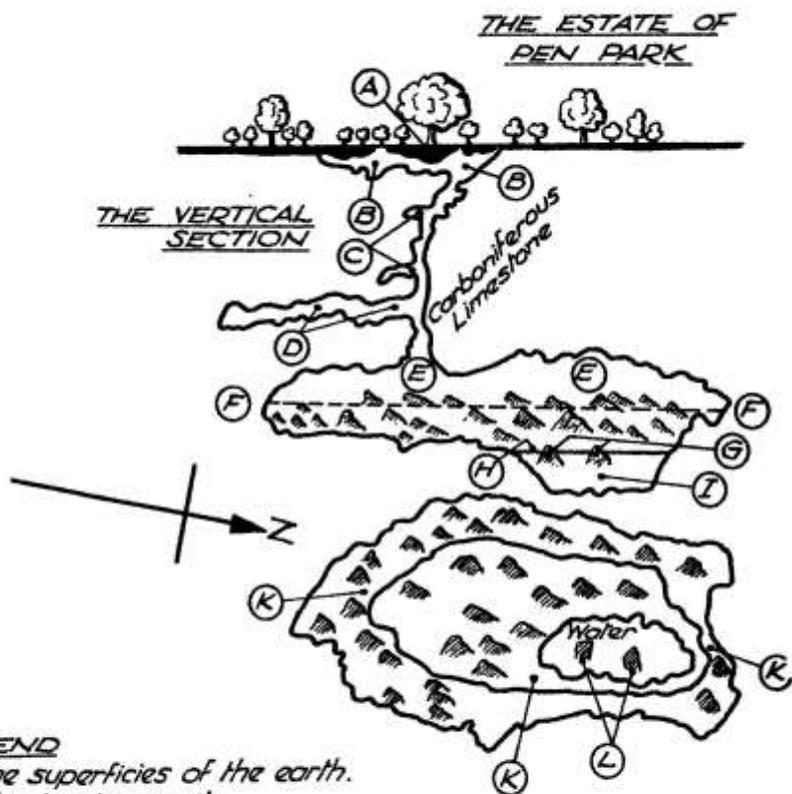
It was decided to excavate at the spot indicated by him, and the Professor's theory was completely vindicated when, at the depth suggested by him, we broke into the cave, although, like the girl in the story "we took the wrong turning".

The task then was to explore, survey and biologically and geologically examine the cave. Details of these surveys were given to the City Engineer's dept. of Bristol Corporation, so that they could decide if the land was a suitable building site. (The hydrogen balloon test of Dennis Warburton & Philip Davies showed that there was possibly less than 15 ft. between the top of the Main Chamber and the surface!!)

To return to past history of the cave, during the 17th century there was considerable interest in the place and this note is followed by two reports, the first published in 1682-3 and the other 1779.

Frank Frost.

THE PROFILE & GROUND PLOT OF
THE CONCAVE IN PEN PARK
 (copied from the Philosophical Transactions 1682-1683,



LEGEND

- A ~ the superficies of the earth.
- B ~ the lead ore pit.
- C ~ the tunnel or passage down.
- D ~ the long gallery.
- E ~ the concave or cell.
- F ~ the upper edge of mud.
- G ~ two small rocks that appear above the water.
- H ~ the upper part of the water.
- I ~ the bottom of the water.
- K ~ the highest mark of water.
- L ~ two rocks

A DESCRIPTION OP PEN PARK HOLE ON GLOUCESTERSHIRE
Communicated by Sir Robert Southwel.

There is a place in Gloucestershire called Pen-Park, about 3 miles from Bristol, and above 3 from the Severn, where some miners for lead discovering a large hole in the earth, one Captain Sturmeý, a warm inquisitive seaman who has written a large folio on navigation would needs descend into it, and his narrative was as follows:

"On the 2nd of July 1669, I descended by ropes affixed at the top of an old lead ore pit, 4 fathoms almost perpendicular, and from thence 3 fathoms more obliquely, between two great rocks, where I found this spacious place, from which a miner and myself lowered ourselves by ropes, 25 fathoms perpendicular, into a very large place, which resembled to us the form of a horseshoe; for we stuck lighted candles all the way we went, to discover what we could find remarkable. At length we came to a river or great water, which I found to be 20 fathoms broad, and 8 fathoms deep. The miner would have persuaded me that this river ebbed and flowed, for that some 10 fathoms above the place where we now were, we found the water had sometime been, but I proved to the contrary, by staying there from 3 hours flood to 2 hours ebb, in which time we found no alteration of this river. Besides its waters were fresh, sweet and cool and the surface of this water as it is now 8 fathoms deep, lies lower than the bottom of any part of the Severn Sea near us, so that it can have no communication with it, and consequently neither flux nor reflux, but in winter and summer, as all stagnant lakes and loughs (which I take this to be) have. As we were walking by this river, 32 fathoms, we

discovered a great hollowness in a rock, some 30 feet above us, so that I got a ladder down to us, and the miner went up a ladder to that place, and walked into it about 70 paces, till he just lost sight of me, and from thence cheerfully called to me, and told me he had found what he looked for, a rich mine, but his joy was presently changed into amazement, and he returned affrighted by the sight of an evil spirit, which we cannot persuade him but he saw, and for that reason he will go thither no more.

"Here are abundance of strange places, the flooring being a kind of white stone, enamelled with lead ore, and the pendant rocks were glazed with salt petre, which distilled upon them from above, and time had petrified.

"After some hours stay there we ascended without much hurt; except scratching ourselves by climbing the sharp rocks. But for 4 days after my return I was troubled with violent head-ache, which I impute to my being in that vault".

Captain Sturmeý falling from his head-ache into a fever, and dying; what from his death, and the opinion of an evil spirit, nobody was willing to have any more to do with the hole from that time to this.

But Captain Colling, commander of the Merlin yacht, who is by his Majesty appointed to take a survey of the coast of England, coming to the Severn for that purpose, and visiting Sir Robert Southwel near Kingroad, Sir Robert told him how the story of this hole had amused the country; and that the narrative had formerly been sent to His Majesty and the Royal Society; and that there wanted only some courage to find out the bottom of it. The captain resolved to adventure, and on

the 18th and 19th of Sept. 1682, he took several of his men, with ropes and tackling fitting to descend, with lines to measure any length of depth, also with candles, torches, and a speaking trumpet. What he found there does much lessen the credit and terror of this hole, as will appear by the figure he took hereof, and the description following:

"It is down the tunnel from the superficies to the opening of the cavity below, 39 yards. Then the hole spreading into an irregular oblong figure, is in the greatest length 75 yards, and in the greatest breadth 41 yards; from the highest part of the roof to the water was then 19 yards; the water was now in a pool at the north east end, being the deepest part, it was in length 27 yards, in breadth 12, and only 5 .yards and $\frac{1}{2}$ deep, 2 rocks appeared above the water all covered with mud, but the water sweet and good; there was a large circle of mud round the pool, and far up towards the south end, which showed that the water has at other times been yards higher than at present.

"The tunnel or passage down was somewhat oblique, very ragged and rocky; in some places it was 2 yards wide, and in some 3 or 4, but nothing observable therein, save here and there some of that spar which usually attends the mines of lead ore. In the way, 30 yards down, there runs in, southward, a passage some 29 yards in length, parallel to the superficies above; it was 2 and 3 yards high, and commonly as broad, and alike rocky as the tunnel, with some appearances of spar, but nothing else in it except a few bats.

"The cavity below was in like manner rocky, and very irregular; the candles and torches burnt clear, so as to discover the extent thereof; nor

was the air anything offensive. The 3 men that went down the first day staid below 2 hours and $\frac{1}{2}$. The next day the captain went down with 7 or 8 men, who staid below for an hour, and observed all things.

'The bottom of this hole, where the land-waters gather, is 59 yards down from the superficies of the earth, and by good calculation the same bottom is 20 yards above the highest rising of the Severn, and lies into the land about 3 miles distant from it.

A New History of Gloucestershire.
Samuel Rudder 1779.

PEN PARK HOLE

There is a prodigious cavern in that estate, called Pen-Park Hole, about a miles and a half north east from the village of Westbury, and six miles eastward from the mouth of the Severn, with a vast depth of water in it at particular seasons. Some account of this cavern has been published in the Philosophical Transactions, but the most accurate survey of it was taken in 1775, by Mr. White, an eminent land surveyor of Bristol, who descended it several times, took the measure of its particular parts, and made drawings of two sections of it, from which the annexed plate is engraven.

Fig. I is the east and west section.

A,L,K,I,H,G,F,E,D, represent the surface of the earth. A, the East end. D, the west end. E, a small cave. F,B, the western passage, 13 yards long. b, small holes leading down to the same. H.I.K., the great mouth of the cavern L, B,M,N,P, the passage down.

m, a short cave to the west of the main funnel

N.O., the lower western cavity, 78 feet long

P.Q.R.S., the surface of the water.

P.Q., the length of the water, 80 feet, but subject to vary

R.S., the breadth of the water, 52 feet, also subject to variation.

L.T, the descent into the eastern funnel.

T,V, the first branch westward.

K,Y,Z,L, the lower branch westward.

a,a, kind of door-way.

b,b,b, small caves

d, small impassable chasms running down the rocks

f,f,f,f, small funnels running upwards in the rocks.

PEN PARK HOLE

Fig. I, E - W Section

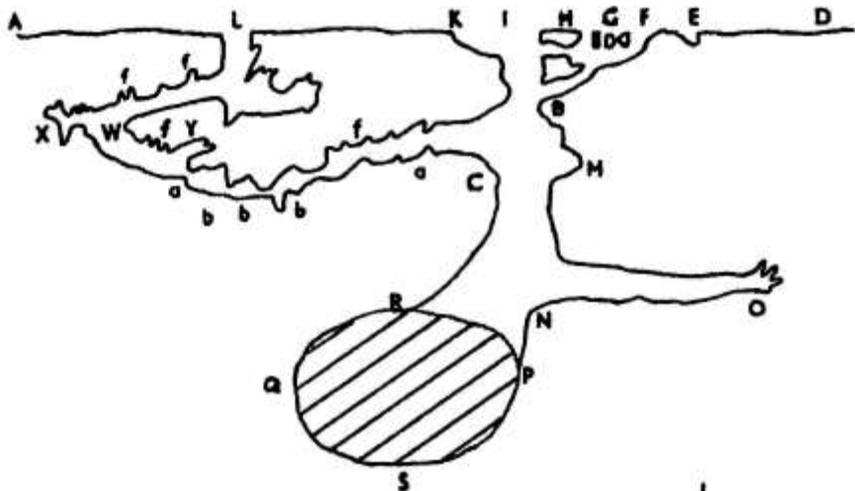
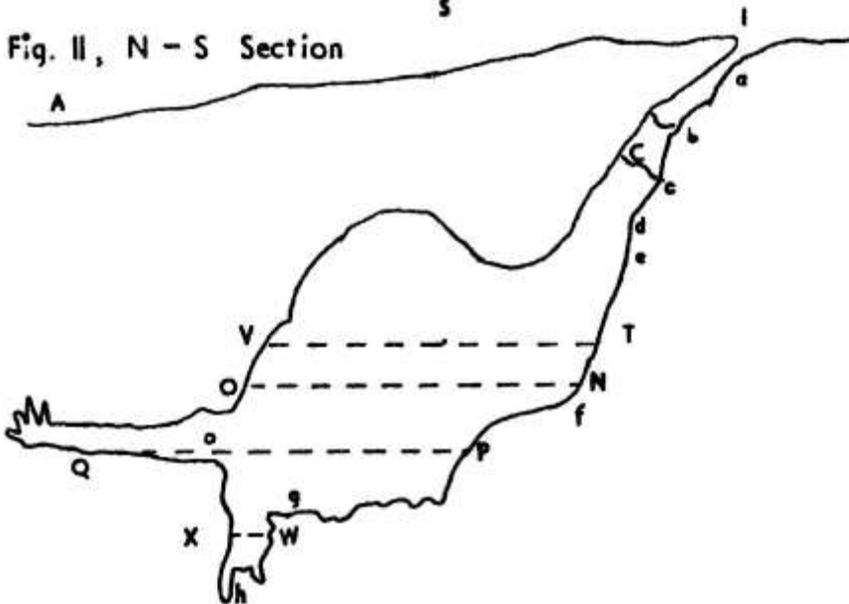


Fig. II, N - S Section



N.B. There is another passage near X, that dips and runs a considerable way to the eastward, the mouth of which, not now discoverable, was stopped up a few years ago; and a person who was in it to search for lead ore, before it was stopped up, says he was about half an hour going to the end and returning, making some observations as he went.

FIG II is the north and south section.

A,I, the surface of the earth.

I, the great mouth of the hole.

a, a prop of stone.

c, the mouth of the East branch.

R, the roof over the bason.

T,V, The highest state of the water, as appears from mud left on the sides, nearly 75 feet deep.

N,O, the height of the water, March 17, 1775, 66 feet.

P,Q, its height 45 feet the 25th of April following.

W,X, its lowest state, as found late in October 1777.

S, the bottom of the hole, 100 feet perpendicular from the roof.

l,b, the first descent 40 feet

b,c, the first perpendicular descent 8 feet

c,d, the second descent 12feet

d,e, the second perpendicular descent 8 feet

e,f, the third descent to the bay 50 feet

j,h, irregular descent to the bottom 97 feet

I,a,b,c,d,e,f,h, the whole depth of hole 215 feet

o, the mouth of the lower east branch, near the same length and form of the west lower branch in fig. I.

g, a massy rock, which appears to have fallen from the roof

This had probably never been taken, but for the following melancholy accident: On Friday 17th of March, 1775, the reverend Thomas Newman, one of the monor canons of Bristol Cathedral, in company with another gentleman, and two ladies (one his sister, the other his intended wife) went to this place to examine the depth with a line; and approaching the mouth of the pit, laid hold, for the greater safety, of a twig that sprung from the root of an ash tree, growing over the mouth of the cavern. But most unfortunately his foot slipt, the twig broke, and he fell to the bottom in sight of his friends. Many persons went down daily for a considerable time in search of the body, and it was found thirty nine days after the accident, floating in the water, with a large contusion on the back part of his head, the eyes wide open, the face red as scarlet, and the body swelled nearly to double its natural size.

Mr. George Catcott, a gentleman of Bristol, was one of many whom curiosity prompted to view this remarkable cavern and has written a very circumstantial account of it, which was sent to me in manuscript, by a gentleman, with his approbation. "The roof", says he, "appears to be nearly of equal height in every part, and very much resembles the ceiling of a Gothic cathedral. The sides are almost straight, at least as much as was then above the water; and, considering the whole to be entirely the work of nature,are remarkably regular. The place is rendered still more awful by the great reverberation that attends the voice when you speak loud, and if thoroughly illuminated must have a very beautiful appearance. When you view the place from hence (i.e. the bottom) objects of the most dismal kind present themselves from every quarter. The deep water almost directly under your feet, rendered still more dreadfull by the faint glimmering rays

of light passing through the openings of the chasms above, and reflected from its surface; together with the black rugged rocks, horrid precipices, and deep caverns overhead, brought to my remembrance the following lines of Milton:

'The dismal situation, waste and sides,
No light, but darkness visible,
Serv'd only to discover sights of woe,
Regions of horror, doleful shades!.'

The same ingenious gentleman gives the dimensions of the several parts of the cavern; but the annexed plate, with the explanation precludes the use of those particulars, as a more perfect idea may be obtained from a drawing, than verbal description is capable of giving. However, I acknowledge my obligations to Mr. Catcott for his paper, though I differ in opinion from him as to the origin of Pen-Park Hole.

By the passage distinguished in Italics, (underlined page 5), he declares it to be the work of nature; and speaking of the eastern branch of the cavern (Fig. 1) give the following and only reason in support of his opinion, viz. 'In the roofs of these caverns, and upper part of the sides, are a great number of cavities in the solid rock, in form of inverted funnels, (see f,f,f,f, in the plate Fig 1) which as they widen in proportion to their depth, prove they could not have been made by art, as some have absurdly asserted; but by the retreat of the water which flowed through the great abyss beneath at the time of the universal deluge, of which great and awful event they still remain as so many undesirable proofs.'

I would be no means attempt to invalidate an argument in support of Sacred History; but it would be unfortunate if the truth of it respecting

the deluge were to rest on deductions to be made from Pen-Park Hole. If Mr. Catcott had observed that many places round about, in the same and the adjoining fields, appear to have been opened from the surface; and that along the field to the northward, the ground is much higher than in other parts, running in tumps like heaps of rubbish brought up out of a mine. If he had been informed of a tradition handed down in a family, that the great grandfather of the present owner received fifteen or sixteen hundred pounds for his share of the ore raised there; and had known, from the information of the late Mrs. Anne Jefferies, that many places thereabout were worked by the company of Royal miners, he then would most likely to have been of the general opinion of all competent judges of this matter, that it is no other than a large lead mine. Of that number is Captain Hamilton, who has visited all the principal mines in Europe, and descended into this no less than five or six times, when he generally continued for four or five hours altogether. As to the cavities which Mr. Catcott thinks could not have been made by art, - Are they not of the very shape commonly made by miners working overhead? But that gentleman, will have been formed by the retreat of the waters through them into the great abyss, he should, however, have shewn, that they now have, or at least formerly had, a communications upwards through the rock to the surface; whereas no such thing appears upon examination.

Upon the supposition of this being a Swallet Hole, how can it be accounted for, that broken pipes of an old make, with very small bowls, pieces of glass bottles, and fragments of old leather shoes, were found intermixed with some gravel and spar, brought up out of the eastern branch of it, about the year 1770s as I have been informed by Mr. Harmer, a gentleman of the

strictest veracity? The workmen then offered to get out one thousand tons of such gravelly stuff, which had most probably been beat off the ore, and was uniformly thrown up on the sides of the passages, so as to clear a carriageway. I would now ask, Does this not look like mining? and can there remain a doubt that Pen-Park Hole is anything but an old mine? Indeed Mr. Catcott himself seems to have been of the general opinion, when he wrote the beginning of his account, where describing past 'a', (Fig. II) he says, "It is proper pillar of stone, which appears to be left with a design to keep the north part from falling down." And it was undoubtedly left by the miners with that very design. I conjecture however, from the ancient make of the tobacco pipes found in the rubbish, that the Hole was worked out in the early times of smoking tobacco, and long before the Pen-Park lands were divided amongst different proprietors, as they now are, which was done in 1650.

THE SURVEY OF PEN PARK HOLE

The survey of Pen Park Hole presented several difficulties, but these were all overcome with the exception of ascertaining the depth of water at the far side of the lake in the Main Chamber, and obtaining access to the Upper East Passage.

This survey was commenced by D. Warburton assisted by P. Davies and the writer, the latter taking over the survey of the Main Chamber and lower parts of the cave from Warburton who found it impossible to continue owing to the distance from his home in Birmingham and his numerous other commitments. Thanks are due to all who have helped especially to N. Tuck, A. Preston, D. Wilson, R. Brain, R. Hughes and A. Morris, for their assistance in the final stages.

Throughout the survey, steel tape, Clinometer and Prismatic compass were used, the writer using the same clinometer but a different tape and compass. On the very long traverses wet string was used for measurement, and to avoid error the string was measured whilst wet.

Both bearings were taken at each station and these were chosen with a view to durability and access, except in certain places in the East and West Passages where the mud floor was the only available site.

Conditions in the upper cave were good, but in the Main Chamber and lower passages the parties often worked in liquid mud up to two feet deep.

A line survey was run from the entrance to the top of the drop into the Main Chamber, detail being noted as each station was logged, the job presenting

no difficulty whatsoever, all the stations being in good position on rock.

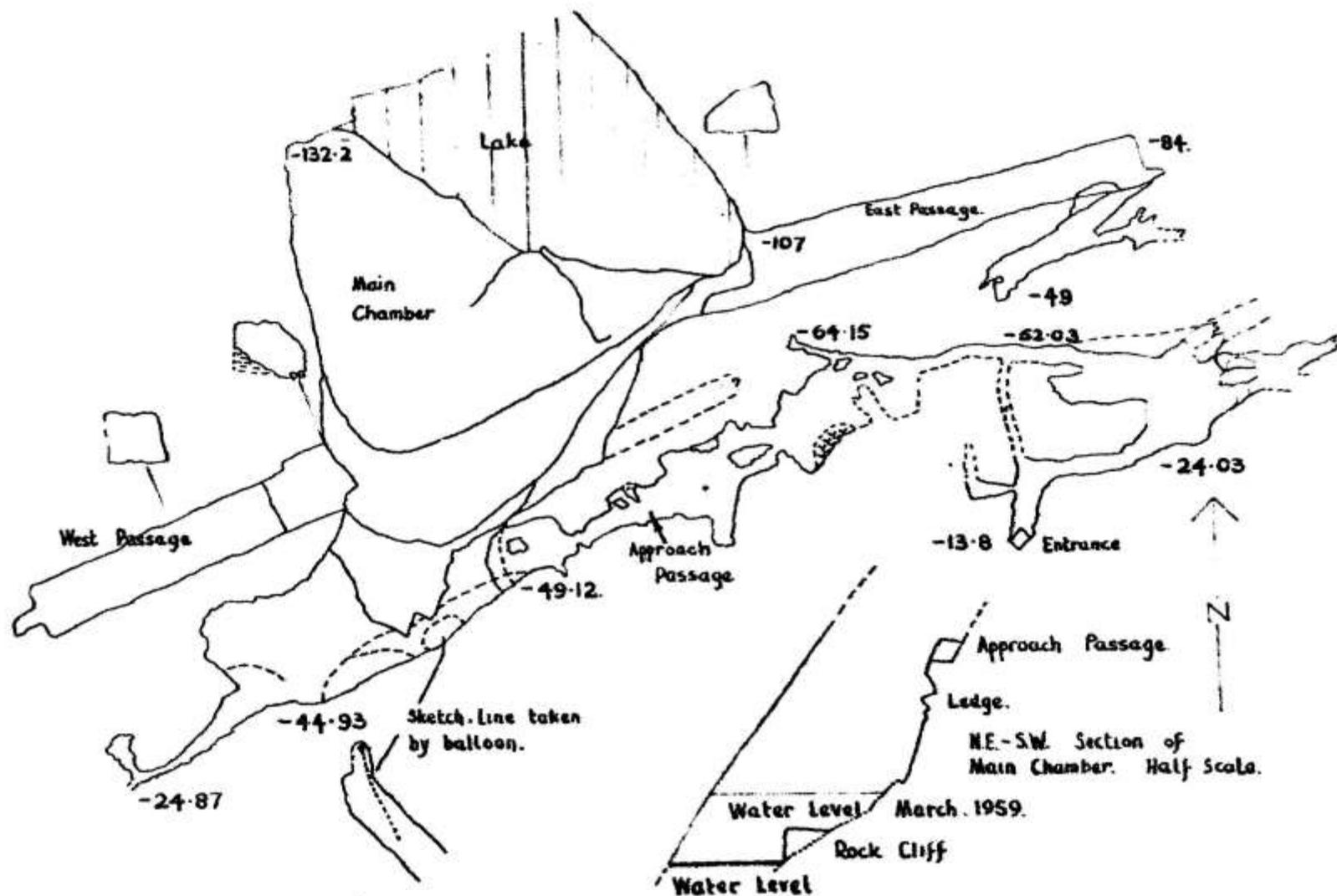
Point Q was situated on the edge of the drop into the Main Chamber and from this spot it was impossible to see the floor of the Chamber so Point R was set up on a small stalagmite boss situated on the edge of the West Platform. Apart from the fact that an intermittent drip frequently extinguished the candle, this was an excellent point. Although still invisible from the floor of the chamber, a good sight could be obtained to a Point V on a ledge (The Ledge) 20 feet down the drop and it also covered Point S at the entrance to the Upper West Passage.

The Upper West Passage presented no difficulties and was surveyed to a choke 25 ft from the surface. It was in this passage that shot holes were seen that had apparently been bored from above.

To reach the rest Platform from the ladder a muddy narrow traverse had to be made from The Ledge and here an intermediate point ZZ was set up on a mud pinnacle, thus enabling a triangle R-V-ZZ to be set up.

Although it had appeared that Point V would be visible from the lower parts of the Main Chamber, it was found, in fact, that this was not the case, and a subsidiary point V was set up 54" above V, from which a line was taken to Point X at the mouth of the West Passage.

The West Passage, a straight, almost square tunnel, presented no difficulties, only two further points being needed to complete it. The mud on the floor was a mass of footprints of unusual shape akin to that of a woman's shoe.



0 10 20 30 40 50'
SCALE

PEN PARK HOLE . 1959.

The Main Chamber was tackled next and it became apparent at once that there would be trouble in accurately ascertaining its height. Warburton and Davies had previously taken down a number of brightly coloured balloons filled with hydrogen and these had been used to "plumb" the upper recesses of the Chamber. The method was far from ideal as the slope of the chamber precluded a vertical lift and the balloons vanished from sight before revealing obstruction. The height was assumed after several "rises" had been made, and it was found that the readings were constant and the distance remaining between the balloon and the surface was so small that they had reached the top of the Chamber.

A central point W was fixed on a small cliff in the centre of the Chamber and a series of triangles were built up. The far side of the lake was fixed by sighting on the spot of a torch fitted at water level. The depth of the Lake is still unknown, no material for making a raft or float being available, but it is known to be at least 40ft deep as a line of that length was thrown in with a weight attached and did not apparently reach bottom before the line ran out, the end being instantly pulled below the surface. In time of "high water", the depth is considerably more, the estimated minimum of 40 ft being from the water level when the survey was made.

The East Passage was reached by cutting steps in a mud bank at the far side of a very large patch of deep soft mud at the far side of the Main Chamber. These steps become more and more unsafe with use and a number of the party had a shock when one gave way and he shot down a 75° slope with the compass Box. Luckily he was stopped as his feet reached the water and was pulled up on the handline. This handline was

belayed at the passage end to an entrenching tool driven into the mud ice-axe fashion and the jerk as the step gave way loosened it.

In the East Passage the mud was worse and the party became plastered in mud from head to foot as they worked. The survey of the Passage was simple but the Point DA at the entrance was on mud and the sighting, both to Point W in the Main Chamber and at DB at the far end of the Passage was the most unpleasant survey job the writer had ever undertaken, completely covering himself with mud in his efforts to keep the instruments clean.

Point DC was carried into an upper Passage running back and upwards at the angle of dip in a S.W. Direction. The mud ended below DB and the upper passage, reached by a tricky climb from the East Passage was encrusted with calcite crystals like the other upper levels of the Cave.

Owing to other commitments it was not possible to continue with the survey at this point for some time and when circumstances permitted a resumption it was found that the water level in the Main Chamber had risen so high that access to the East Passage was impossible except by swimming or by boat. Thus this upper passage at the far end of the East Passage is sketched in from memory only - no detail being taken when DB-DC was plotted.

During this time records had come to hand of a passage running off to the east from the First Chamber, and attention was turned to this whilst the water remained high. To date 15.5.59, signs are very promising, a hole, following the roof has been dug 10 feet into the floor debris at the far eastern end of the First Chamber, smoke marks have been found on the walls, several feet down and the roof appears to be "stepping under". A connection

has been excavated between the Pool Chamber and the First Chamber, further to the north and at a lower level than the original passage.

T.M. Stanbury.

BOOK REVIEW

SCHAUHOHLEN IN OSTERREICH.

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