

The
Caverns
of
Upper Ease Gill

Published by the

**Northern Pennine Club,
Greenclose House,
Clapham,
via Lancaster.**

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Preface to the 1987 impression

"The Caverns of Upper Ease Gill" was first published in 1952, shortly after the 'Promised land' was reentered through Oxford Pot. It chronicles the exploration of some of Britain's finest cave passages forming a part of what is now known as the "Three Counties System".

The publication has been out of print for many years and has become increasingly difficult to obtain. When quoted as a reference in the recent N.P.C. Journal, I was surprised to find that many people did not even know of its existence. Since it is an important work of historical interest, it deserves a wider readership.

As part of the continuing process of upgrading the N.P.C. records, many of our older publications are being stored on computer media. Several people have expressed an interest in obtaining a copy of 'The Caverns of Upper Ease Gill', so the opportunity has been taken to reprint it using the power of modern technology. The text remains the same, but we hope that reprinting with the aid of a laser printer has improved the appearance of the final product.

Since we have no way to predict the demand for a reprint such as this, and the club is already heavily committed through the publication of the recent journal, only a small run has been printed. However, the method of reproduction has been chosen so that if demand is there, we should be able to meet it with a further print run. The catch, of course, is that this means a rather high cover price. We feel that the quality and historical value of the content justify this.

Andrew Waddington

Hon. Recorder and Librarian. Northern Pennine Club.

Note to the 2021 (digital) impression

Soon after most of the original 1987 print run of fifty had gone, demand was judged not to justify further printing, but instead, this (and much other) material was turned into web pages to ensure its continued availability. It's not terribly convenient to print from that format, and the pages are looking a bit dated and unloved, so it was thought about time that these journals were made available in a format for readers to print-on-demand, or download and read on portable devices as you may see fit. The original on paper was typed and duplicated, whilst the 1987 reprint looked somewhat better in its laser-printed guise. The PDF closely follows the 1987 format - there seems little point in changing the design as the value of the document is in its information content not for its graphic design. However, the tools with which the 1987 version were produced (a development of the View Word Processor on the BBC Micro, written in 6502 assembler) are long gone, and it is hoped that moving to Open Document Text as the source will keep the document maintainable for the foreseeable future.

Most, if not all, of the original explorers have passed on, and most of us that knew them and were inspired by their stories won't last a lot longer, so we hope that yet wider dissemination of these stirring tales of exploration will help keep the memory alive and inspire future generations of cavers.

Andy Waddington, Boldron, 2021

THE CAVERNS OF UPPER EASE GILL

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PREFACE

It is stated in the written constitution of the Northern Pennine Club, that one object of the Club shall be to encourage the unrestricted circulation of information appertaining to caves and potholes amongst clubs and other organised bodies interested in caves and potholes. It is with this object in view that this publication has been prepared.

To describe individual cave passages of this system in full detail would be a most formidable task, probably entailing a publication of the dimensions of a full sized volume. Consequently, excluding any reference to the Near Series (Oxford Pot), the general account is simply the story of approximately one year of continuous exploration and survey work in these caves, and as such is far from complete. Certain details about Oxford Pot have been published in 'Cave Science' Vol.14, October 1950 and another account will be appearing shortly in a new 'Dalesman' publication, 'Underground Adventure'. We feel, however, that all the information we possess should be made available without undue delay. Details can be filled in at leisure.

For the purpose of the publication, the whole of the Ease Gill cave system has been divided into two sections, the arbitrary boundary being Stop Pot. All the caverns easily negotiable from Oxford Pot are regarded as being the caverns of Upper Ease Gill, while those caverns which could be entered by climbing Stop Pot are termed the Lower Series (Lancaster Hole).

This publication is concerned solely with the upper series of the caves, which is of major interest since it receives practically all the drainage from various points in Ease Gill.

No direct claims of new exploration have been made, since it is not known which sections of these caves were entered prior to the discovery of the Oxford Pot link-up in October 1950.

THE CAVERNS OF UPPER EASE GILL

INTRODUCTION

Of those who cross Cowan Bridge on the Ingleton-Kirkby Lonsdale road, few can know that the quiet looking Leck Beck beneath them has traversed the finest caverns in England. From the watersheds up on the county boundaries, its highest streams run down into the glacier-scooped valley of Upper Ease Gill, to slip away underground soon after reaching the limestone. Except in times of extreme flood, Ease Gill below Cow Dub is a dry valley until the impressive resurgence of Leck Beck is reached. Here the water comes in from a side valley just above the base of the limestone, and flows onwards as an ordinary surface stream which eventually joins the Lune.

Although there are many well-known caves and potholes on the Leck Fell side of Ease Gill, the only naturally open pots of any size on Casterton Fell are Cow Pot and Bull Pot of the Witches. Neither the original explorers of these holes, nor Fairbanks, Greenwood and Simpson who subsequently worked in Upper Ease Gill in the 'thirties ever succeeded in reaching the main underground drainage system. Eventually R.W. Taylor, G. Cornes, W. Oakes and Wilf Taylor, from Lancaster, members of the British Speleological Association, discovered Lancaster Hole (September 29th, 1946). With their club friends they soon forced a way down to the Ease Gill Master Cave. Oxford Pot in Upper Ease Gill, dug out by the same group on March 30th, 1947 and again by Simpson, Rawdin and the Gilberts on May 25th and 26th, and first explored on June 12th, appeared to be a feeder to this system, an idea which received further support in 1948 when 'unofficial' high level exploration from Lancaster Hole by B.S.A. members led through caverns of unprecedented quality to a fine water-passage gradually converging upon Upper Ease Gill to the north of Boundary Pot.

It should be said that, by this time, the B.S.A. had put a steel lid over Lancaster Hole and had obtained a leasehold over the nearby moor in order to control entry to the caverns beneath. The exact terms of this lease have never been made public, but it is believed that only 'authorised' members of the B.S.A. may legally go down, members of all other clubs being barred from entry. For some reason, the B.S.A. did not authorise the discoverers of the Far Reaches of Lancaster Hole to make many more trips into their Promised Land, and indeed, from this time on allowed fewer and fewer parties to go down the hole. When, in August 1950, a great mass of stone and concrete was dumped down over the only convenient entrance so that no-one could readily get in, members of other clubs felt themselves at liberty to tackle the unsolved problems of Upper Ease Gill. With the kind permission of the landowner, they began their investigations in an area into which, as far as was known, the B.S.A.'s leasehold rights did not extend.

BOUNDARY POT

Jowett of the Northern Pennine Club soon revived an old interest in Boundary Pot when he wriggled through a gap on the left-hand wall of the sandy crawl beyond the Second Chamber. Just below a rift passage, he came to a heavy waterfall. It was drier on July 30th when Leach, Cornes, Bradshaw and Aspin went down. Leaving the others, Bradshaw crawled off along a narrow tube (Bar Steward's passage). The sound of his cursings and scrapings gradually died away. It seemed ages before he returned, talking of a stream inlet from the left, and a 50ft pitch leading down into a great chamber. On August 5th, Bradshaw, Leach and Whitehead took in a ladder and descended the 50ft pitch. They found themselves in a chamber of large dimensions, with several choked inlets. A stream ran along its floor, disappearing at the end into a boulder choke, revealing a narrow cave passage. Soon they entered a highly shattered chamber full of unstable boulders (Hiroshima Cavern). There was a rift in the floor which could not be descended without a rope, so they came

out. Next day, Bradshaw and Leach returned, accompanied by Myers. They went down the fissure, but could not clear the choke at the bottom. They looked everywhere, but could find no way out. When next they came back they found that Bar Steward's Passage was flooded, a state of affairs that persisted until the following Easter, when at long last the survey was completed (see below).

OXFORD POT AND THE NEW WAY IN

Meanwhile, the Red Rose Cave and Pothole Club had been breaking new ground in the restricted depths of Pippikin Pot. When the first hailstorms of autumn began to sweep across the moor, they turned their attention to Oxford Pot, where they looked for new high-level passages. There was a false alarm when, after an intricate crawl, they came to a fine 'new' stream passage. Ignorance is Bliss! Cornes and W.Taylor, who came down with them the next weekend soon found themselves back at Platypus Junction, in the original Oxford Pot system.

The tortuosities of The Snake which guards the entrance to Oxford Pot seemed to present no difficulties to these young enthusiasts. On October 29th, Bliss, Sykes, Leyland and Leeks of the Red Rose went down again. Just below Spout Chamber, Bliss spotted a roof passage about 12ft up. With a lot of shoving, he and his friends pushed Leeks up a chimney into the mouth of this low cave. With Sykes, he disappeared inside. The others did not follow at once, but when they did, they found that after crawling for about 24ft along the crystal floor of a bedding cave, they came to a narrow stream passage which had cut down some 5ft below them. Downstream, this passage soon ended at a 20ft pitch leading to what looked like a large passage. They came out in high spirits.

Bliss, Leyland and Sykes returned to Oxford Pot on 5th November. With much cursing, they dragged their camera-cases and rope ladder through The Snake. For a breather, they went up to look at the other roof passages. Then they crawled through Poetic Justice Passage to the head of their pitch. Belaying the ladder to a big stalagmite boss, they climbed down into a roomy passage which soon led off into an extremely high boulder chamber. A stream came in from the right. Bliss was the first to scramble down the boulder slope to the stream passage below, and Sykes following him had hardly begun to move when there was a fearful grinding sound. Bliss set off downstream at a trot, closely followed by a rock the size of a grand piano. Happily, he won the race. Sykes and Leyland then came down more circumspectly. Straddling the water chutes, they entered a steadily descending passage of good height. A noisy torrent rushed along between the rounded cockled walls. Plaques of pebbles cemented by dripstone showed that at one time the channel had been blocked by fill up to 5ft at least. On the average, this, 'Pierce's Passage', was 20ft high and 4ft wide. They splashed on excitedly, forgetting the coldness of the water. Taking to a sandy bank on the left, they soon came to a very much larger stream passage (Eureka Junction). They followed this passage downstream for a hundred yards or more. Unfortunately, the roof then came lower, and although it rose again, the passage soon became a low bedding cave with the stream stretching across the whole width. After a certain amount of crawling in the water, they decided to turn back. They were again in high spirits as they returned across the dark moor, at last a big 'find' for the Red Rose Club.

And yet, when their story was told, did they receive thanks for breaking through where all others had failed? "You fools!" said those who knew about Lancaster Hole and its further connections, "You should have gone upstream!"

On 12th November, a combined party including W.Taylor, Sykes, Leyland, Eyre, Kitchen and Cornes and Bradshaw of the Northern Pennine Club, with Aspin as 'surface man' marched across the hail-swept sodden moor to Ease Gill. Bliss had caught a nasty cold and wondered whether he ought to go down. In the end he decided that he had to. He daren't let them explore his new passages and him not there. Turning upstream at Eureka Junction along the main drain, the party

soon had to take to a roof-crawl beside a foot-high shale band. At a sudden descent over polished black boulders, this crawl opened out into a vast chamber. Two pinpoints of light bobbing about in the blackness high up on a boulder-slope to the left proved to be Eyre's and Kitchen's headlamps. They had climbed up to Stop Pot, whence the B.S.A. had come down from Lancaster Hole three years ago. As a further, and quite indisputable confirmation, Aspin's survey-tabs were presently found on the big blocks. There was no doubt about it. They had re-entered the Promised Land. The pitch down which they had climbed must have been the waterfall reached from below on August 15th, 1948 by Pierce, Crossley and Holden of the B.S.A. in the course of downstream exploration from Stop Pot. Today, Cornes and Taylor led the party upstream along the Ease Gill Master Cave, over limestone platforms and huge fallen blocks edged across the stream passage. Those with bright lights could occasionally see a flat marbled roof through jagged rifts high above the precarious boulder slopes. In the first dry section, yard-thick slabs of fallen dripstone lay at all angles on the earthy floor. Thin new curtains were growing to replace them at the edge of the shale partings just below the flat roof. Reentrants and oxbows were common, with striking interconnecting bored passages suggesting some temporary return to phreatic conditions. Just beyond a corner where an arete of jammed washed in pebbles came down from the right, they reached an important topographical feature known as Holbeck Junction. Here a hole in the floor led down to the stream passage. Today, they kept to the high level, soon reaching the famous Gypsum Cavern, where the very sand of the floor hid a treasure of amber, and deep red composite crystals, some more than six inches in length. The muddy covering of stones in the central depression had burst apart, pushed away by the myriads of white gypsum needles. The lower parts of some of these stones and also certain stalactites and stalagmites in this chamber showed underwater gypsum encrustations over the calcite, evidence of a long-past reflooding with gypsum-bearing water. There was no time today to do more than glance at all these wonders, from the central taped pathway, before beginning the long return journey.

At Stop Pot it was obvious that the water was rising fast, but Cornes and Taylor insisted on surveying back part of the way up Pierce's Passage. What was going on above, on the surface? Aspin had been putting pretty colours into the Leck Fell side streams above Oxford Pot, proving that they all debouched into Ease Gill, after short underground courses. He came back eventually towards the ladder pitch. To his horror, he found that the bog-cut water was roaring down in full spate. The usually trickling stream outside Oxford Hole was a raging torrent rising every minute, threatening to flood the pitch and trap those below. After putting various puny barricades to hold back the water, he hastened across the moor to the farm and thence to the club headquarters to make arrangements for a rescue-party, should rescue be needed. Down in Pierce's Passage, Bliss and the others had at last realised that the position was getting serious. In Bliss's own words:

It was a nightmare journey back up the passage, holding onto the walls, our feet nearly swept away from beneath us. My shins were barked by boulders coming down the stream.

"When we reached the ladder pitch, I viewed it with dismay. The ladder itself could hardly be seen through the white spray which filled the chamber. Bradshaw went up first, saying "Catch me if I fall". I soon saw his head break through at the top of the pitch, and heard his shout "Come on up". I took a deep breath, rushed through the blinding spray and grasped the ladder. To my surprise I found it quite dryish, merely 'raining'. The ladder was hanging against the wall, behind the waterfall, although to Kitchen it must have looked as if I was right in the midst of it. I climbed on. Glancing up near the top, I saw the solid sheet of water slipping over my head. I got up as high as I could, then, pulling down my helmet to protect my face, I thrust through and was soon on top. We kept moving. It wasn't long before The Snake was safely navigated. I had to help Bradshaw up the chockstone climb. He was done in, and so was I. I dreaded the 50ft pitch. I always do, but I got out safely. On top, we found Ease Gill roaring down in flood, licking a barrier of stones built in front of the entrance to the pot.

Back at the farm, Walter the shepherd was greatly relieved to see the explorers, and so was Aspin who presently returned from Settle with rescue gear. Proudly the potholers showed him a small fallen stalactite with a skew crystal at the end. He knew at once where they had been, for that type of encrustation grows only in the Gypsum Cavern. There was happy talk in the 'local' that night before the long drive home.

THE LINK-UP SURVEY

During the week that followed, we realised the importance of completing the survey of Pierce's Passage. On 19th November, Aspin, Gemmell, Kitchen and Eyre went down. With a struggle, the elder fatter members of the party got up the chimney from Spout passage, wriggled along the Poetic Justice crawl, and after descending the pitch into Pierce's passage, went along to Stop Pot. Returning to Eureka Junction, Gemmell and Aspin surveyed back to The Snake (most abominable of places). Sleet was being driven across the moor by a high wind as they returned to Bullpot, and it was chill changing in the open beside the car. When the survey was drawn out, a fascinating prospect lay before us. It looked as though the main drain beyond Stop Pot would run on, gradually converging on Upper Ease Gill right up to the Top Sinks beyond the ruined sheepfold. Probably the sinks in Ease Gill all sent down their waters to this master cave. Perhaps one of them might yield a simple entrance which would allow us to complete the various scientific and semi-scientific studies which were near to our hearts. In the account which follows, there is a description of the way in which joint parties of Northern Pennine Club and Red Rose Club members tried to deal with these problems.

WINTER VENTURES

December 3rd was a snowy day. We thought ourselves lucky to reach Bullpot at all. Some of the Red Rose people had already set off when Cornes, Ashworth, Bradshaw, Gemmell and Aspin went out across the moor. Overhead all was grey, although away down beyond Barbondale, the sun glowed over Hutton Roof. In the South a steely blue sky hung over the Bentham parts. Nearer to hand, the strong wind was chasing little tormentils of dry powdery snow down the bog-valleys. The very sheep were seeking shelter in Ease Gill, coming down from the high fell along their secret well-contoured tracks. At Oxford Pot itself, where only the icy stream was not white, Aspin saw the party descend. He thought them mad, not for venturing into caverns far warmer than the upper air, but for ignoring the prospect of emerging wet to the skin and marching back across the freezing moor in the face of the blizzard. When eventually they returned to the farm, they were solidly welded inside iced sheets of clothing, and clamoured for someone with warm fingers to unfasten their buttons and unlace their boots. Gradually the story came out. There had been trouble with the lights. The surveyor imported at much cost in time and petrol had been led astray by those with exploratory urges, and distracted by the unreasonable vocal efforts of others. However, a long new passage from Eureka Junction had been entered by Bradshaw, leading up, and on, - and up to a high aven with piles of grass at its foot and - a rabbit's skeleton. Surely this Wretched Rabbit Passage must come within a few feet of Ease Gill ?

On December 17th after a week's frost and snow, we set off again for the Promised Land. Although the Craven skies were overcast, the distant view was one of astonishing clarity, every detail of farm and field standing out against the snows. From the fell road there was a magnificent prospect of the whole range of Lakeland hills brilliantly sun-lit and hanging like a Himalayan backcloth above the darker foreground.

When the underground parties had gone down (Cornes, Taylor, Gemmell, Bliss and Sykes), Aspin and Leyland walked up the gill to the Borehole. There was much snow and ice, but little water. We used icicles to dig out fluorescein from the sticky mass in the tin, and soon had a fine green stream

running down the Borehole. To this we added a Drain-testing cartridge, supposed to give off a 'very powerful odour'. It certainly did ! We left hurriedly, going for a walk across the fell before returning to the fireside at Bullpot.

The others did not come back until seven. They were very pleased with themselves, but most displeased with Aspin and Leyland who had caused them to crawl through green pools and smell abominable smells of phosphine, etc. It appeared that dye had taken about an hour to reach the main drain at Holbeck Junction via this 'Green and Smelly Passage'. They spoke also of an adjoining waterfall passage again 'around a quarter of a mile long' which they thought must lead towards Boundary Pot. They surveyed both these passages. It was interesting to find that the smell had taken another route, reaching the passage some distance from the green inlet. We were very impressed by the possibilities of this method of detecting high-level connections.

From this time on, we spent many happy hours working out the best way in which we could colour the surface sinks in order to label underground streams entering the main drain. Fragments of surveys, knowledge of water flow, intuition, and the foibles of the parties going underground, all these things controlled the amount and the time at which dyestuffs, mainly fluorescein, were to be put into sinks. The underground observers derived no greater interest from the experiments than those on the surface who put in the dye, and waited in the farm to hear what had been seen. Negative results were not without interest, and led to beer-wetted fingers drawing many a plan on tap-room tables, but in the end only positive observations were finally accepted.

Because of Christmas festivities and foul weather, no more work was done until January 28th when Bradshaw and Myers went down after dumping an ounce of fluorescein into the Corner Sink. They found the green water at the junction just below the ladder in Pierce's Passage. Upstream in Trident Passage, there was a beautifully decorated, almost dry, rift section. Soon a flat roof came down to about 8ft above them. Roof, walls and floor were practically covered with pure white dripstone straw stalactites, anemolites, and calcite cascades. One straw, a little knobbly it must be admitted, was 4ft 3ins long. A less ornamented section led to a small Y-chamber from which they dropped back into the green water. They were again in a high rift. The stream passage ran on ahead in the line of a calcite vein. In a terminal expansion called White-line Chamber, this vein ran 25ft upwards to the lip of a green waterfall with more-than-man-sized passage above it. "One day we must deal with Swindon Hole !" they said. Going down to Eureka Junction, they re-entered the Wretched Rabbit Passage. At its head, the expert said that the 'rabbit' was obviously a hare. Climbing up nearly 70ft to a spot near a bedding-plane stream which could not quite be reached, Bradshaw found bits of timber and was sure he could not be far from the Slit Sinks on the true right bank of Ease Gill below the Borehole. But he did not bring back a survey.

Only a small party crossed over to Ease Gill on February 11th, for measles had struck at our head surveyor's family. To celebrate the return of George Thackray to the Promised Land, he and Cornes went off with Leyland up Thackray's Passage (discovered in 1948) in the hope of forcing the final chokes, while Bradshaw and Ashworth (the Green Man) at last began the survey of Wretched Rabbit Passage. Up in the gill, Aspin and Bliss poured dyestuffs down various apertures and puffed smoke down the Slit Sinks, more to their own amusement than anyone else's because no-one below saw a thing. Further down the valley they became interested in the Blind Pot just around the corner from the kidney-shaped pool of Cow Dub. The fill in this pot seemed to have settled during the winter. Water forced up through the boulders ran away again into a bedding plane. A little digging sufficed to lower the level of Cow Dub round the corner by about eighteen inches, and with the ear of faith they could then hear water falling down a pitch beyond the outflow. Could these waters go as far as Butterfield's passage in Oxford Pot ? Or did they enter some new system as yet unknown ?

It was March 4th before the Ford next ground its way up Casterton Fell. In the meantime the snows had again descended and the subsequent floods scoured Ease Gill bed of all but its largest stones. Today the sun was shining. The paired plovers had returned to Bullpot farm. They wheeled and dipped crazily above the rushy pasture where presently they would be nesting, their sudden cry mingling with that of the curlews, also back from the sea's edge. In Ease Gill we sat in the sunshine, enjoying the first good weather for months. Eventually we persuaded Gemmell, Dunnington and Bliss to go underground. The rest of us (Aspin, Bradshaw and Ashworth) dug in Blind Pot and hammered away at the entrance to the Slit Sinks. We put dye down both these places, and in Gelder Hole too. Long after sundown, the potholers came back to the farm bringing interesting news of the colour testing. The Rhodamine put into Blind Pot had not been found in Oxford Pot, but the colour from Gelder Hole had reappeared in the Showerbath passage, much to everyone's surprise. The Slit Sinks colour had not been seen, although the party had spent a long time in Wretched Rabbit Passage. To scotch any further argument, they had brought out.... a fox's skull ! So much for the expert who had pronounced the skeleton to be that of a hare ! Do hares have tails a foot long ? While Gemmell and Dunnington were finishing off the survey of this passage, Bliss had climbed up about 20ft at the beginning of the terminal rift. At about 50ft along this narrow passage, he had chimneyed up to an enormously wide bedding plane between 9ins and 18ins high. Here there was a deafening roar from some nearby but inaccessible waterfall, with gusts of wind carrying spray towards him. We were all late and the drive home was more than usually tedious because of thick fog walls beside the Wharfe at Ilkley.

EASTER CAMP

The next expeditions were planned for the Easter Meet of the NPC. Several hardy souls had said they would camp up at Bullpot, but when the time came, only Gemmell and Dunnington pitched their tents, in a site which, for most of the time, was to be well above the snow-line. On Easter Saturday, these two went below with Bliss. Cornes and Aspin dumped 3 oz of fluorescein down Boundary Pot before attacking the rock defences of the Slit Sinks with hammer, chisel and crowbar. It was a sunny afternoon, although on the moor the wind had been chill, and in the intervals between our digging efforts we lay on the warm stones listening to the curlews' bubbling calls.

Meanwhile the others had gone into Thackray's passage. At first they tried to traverse on the ledges above the smooth swift-flowing canal. Before long they all plopped in, like otters sliding into a millpond, and splashed along rather more than knee deep beside the flood-abraded dripstone curtains. Presently, a stalactite barrier forced them to take to the higher level. It was sad to see muddy footprints on these calcite floors. With care they avoided the main pools, where thin sheets of 'cave-ice' and underwater crystals lay everywhere. A curiously fungoid type of dripstone covered the clayey walls, sometimes orange, sometimes dirty white. Squeezing through a tight stalagmite-guarded letterbox, they slid down a muddy bank into the canal. Sometimes edging along a narrow rift, sometimes crouching beneath a flat roof, they splashed on upstream. Soon they realised that the water-passage was not all. Peeping up out of the rift they saw straw stalactities 4 or 5ft long dropping down from the heights. Through lateral openings they caught sight of massive wall ornaments dripping down onto immaculate crystal cascades. They sidled past lovely white curtains 10ft high and a score of yards long, and stepped carefully under a 5ft stalagmite growing from an unsupported foot-plate a yard across, stuck onto the wall by one edge as if by magic. These things were incidents only in the general display of underground wonders. However the explorers had not escaped entirely from the world above, for right up to the boulder-choke in the final sandy chambers the stream was running bright green with fluorescein. They surveyed back to Holbeck Junction before coming out.

Easter Sunday, by all accounts, was a depressing day, with rain followed by snow. Gemmell, Dunnington and Taylor became interested in a sink in the Leck Fell side valley just above Cow Dub. According to the survey, this sink might lead down into Broadway of Oxford Pot. It was given the name 'Innominate'.

On Easter Monday we went across the moor in a blinding snowstorm, somewhat warmer than the one of February 4th, but still unpleasant. We were determined to settle once and for all the water-drainage of the Slit Sinks, down which we again put dye. We also coloured the new Innominate sink above Cow Dub. Bradshaw and Ashworth had a fine time down below, first of all following the green water up Broadway towards the far aven, then finding more at Eureka Junction. There were still coloured pools in the canal of Thackray's passage (from Saturday's testing) but the new flow came down Green and Smelly Passage. They followed the colour right up to the inlet which had become green when the Borehole water had been tested on December 19th. (Incidentally, Wretched Rabbit Passage showed no green, although an air-connection had been shown likely when the smell put down the Slit Sinks on Saturday had been noticed at Eureka Junction). Bradshaw led on up Thackray's passage. In the first boulder chamber he suddenly decided to climb up through unstable earth-covered boulders into a roof-system of slimy chambers. Climbing still further, he and Ashworth came to a wonderfully adorned chamber, full of milk-white stumps and yard-high stalagmite columns rising from both sides of a central declivity 50ft and more long. Beneath a crystal calcite crust, previously flooded pools were red with ochreous deposits. Nests of cave pearls were everywhere. Myriads of opalescent stalactites hung from the roof, with remarkable horn-like outgrowths, whiskery eccentrics, and all manner of academic curiosities such as Prinz's calcite bells. There were strange ochre beehives, a foot long and six inches wide, overgrown on calcite 'carrots' attached to the roof by slender stems. Unfortunately, the pristine beauty of caverns such as this 'Easter Grotto' can be preserved only in the precious memories of the first explorers. No-one can traverse these places without damaging the crystal floors or roof ornaments. It is no good locking them up, as some would, and saying that no-one else is to be trusted in places like this; that is an ostrich-like form of conceit. Without delving into the depths of philosophy, one can see that the full glories of these places have a real existence only in the memories of those who have seen them. Reluctantly one must admit that much of that which today held Bradshaw and Ashworth spellbound will ultimately be destroyed by those who pass through the Easter Grotto.

Bradshaw and Ashworth returned on April 1st. From the head of the climb up, they traversed out of the chamber by bridging a narrow crevasse, and soon entered a narrow passage leading to a huge incredibly shattered chamber 20 or 30ft wide with a flat roof quite 60ft above. With memories of Boundary Pot's Hiroshima Cavern, they decided to call it Nagasaki Cavern. They scrambled on over the sandy boulder-strewn floor, hearing the sound of water far below through occasional holes. At an elevation, they had to crawl under an immense cleft block called the Rock of Ages. After nearly 50 yards, the passage narrowed. They found that they had to traverse again, this time on undercut and apparently unsupported ledges of glacial fill (the Bridge of Sighs). Beyond the next corner, a comfortable-sized passage led steadily down to a spot where two streams unite (Limerick Junction). Two brand-new passages lay ahead, but today the explorers had seen enough. They turned back and came out of the system.

SPRING

On April 8th, the Leeds contingent set off thinking that spring ought to have arrived. However, it was an overcast morning, with sleet showers just before we reached Crow Nest. The blue sky had reappeared in the west when we climbed the fell road. The Lakeland Peaks were snowier than ever, although Leck Fell was clear. Bradshaw and Ashworth went underground with Bliss, Leyland, and other Red Rose friends. They reentered the new section and followed up the left-hand stream passage beyond Limerick Junction. Alternately wading through the stream and climbing along

high-level deserted meanders they passed another junction where a dry passage entered from the right. Eventually 'around a quarter of a mile' beyond the Easter Grotto they got into a small chamber where there was an unscalable waterfall. A low dry passage went on ahead, but they ignored it and began the long trail back to Oxford Pot. Up at the Slit Sinks, we of the surface party had been trying to divert the stream. Eventually only a trickle ran underground, but even this was too much for those who were invited to go down below ... "We'll wait for dry weather", they said, wisely perhaps.

Back at Oxford Pot, the day's colour testing was planned. Fluorescein was to be put down Blind Pot in the hope of settling once and for all the destination of the Cow Dub water. At a predetermined time more dye was to be put down Innominate sinks so that those below could estimate how near they were to the surface. Also, we decided to loose a powerful brew of Dunnington's Red dye down the new sink which had just opened up below Oxford Pot. By this time, the sun was shining brightly, the first willow-wrens were singing in the ash trees, and the newly-returned cock wheatears were on the fence, splendid in their new plumage. When all the dye had gone we came back to Oxford Pot, to lie full length on the grassy bank, hoping for a snooze. The sterner realities of life had just begun to fade from our minds when above the steady splashing of the gill we heard Gemmell's muffled cry of "I'm up". We went across to help him bring up Dunnington on the lifeline. The green had been found in Broadway ten minutes after it had been put down Innominate Sinks, Butterfield's passage along Mushroom passage, was running bright green, the positive answer after so much speculation. Returning towards Oxford Circus, they found the stream becoming bloodier and bloodier until, at the circus itself, they saw an effluent like a slaughterhouse drain, discharging itself from the high level. Climbing up, they found that the 'blood' came down a 15ft pitch. After all these sights, we thought that the trickle still flowing down the Slit Sinks would not deter them. Alas, it was not so. "Turn off that water too," they said, "and we will go down".

Soon afterwards Bradshaw and the others came out, full of enthusiasm about their new passages beyond Easter Grotto. "You so-and-so's!" said our surveyor, "I'm not going up there until we've found an easier way out !" Obviously he was falling victim to Snakeitis, that progressive, and eventually fatal, disease which had already barred Aspin from the Promised Land. Back at the farm, it was pleasant to be able to idle about in the sunset light, listening to the snipes' drumming and to the curlews' love-calls. The high winds of morning had dropped. Grey smoke trails drifted away from each lowland village, and the lights of Lonsdale were beginning to peep out as we came down from the fell. When we stopped by the roadside to pick golden palm for the children, we heard the evening chorus of birdsong bursting from full throats. The long cold winter was over. The land was alive again, and would be kinder to us in our attempts to discover the secrets of Ease Gill.

On April 22nd, after ten day's drought, we set off in a warm cloudy dawn. Beyond Skipton we saw our hills softly outlined through the springtime haze. Already the primroses lay thickly along the railway embankments, and in Settle the rooks were standing sentry above their nests in the treetops near the railway line. Up at Bullpot the yard was dry, dusty even. No need for wind-proof clothes on our trek across the moor. Today, the cooling breezes came welcome against our opened shirts. In Ease Gill we found a note saying that Bradshaw and Myers had gone to explore the far parts beyond Thackray's passage and asking for dye to be put down the Top Sinks. We dug out this hole. Gemmell climbed down with the fluorescein, finding no more than trickles from the walls running towards the roaring sound of water far below. He had to make swallow's nests of clay, stirring in the dye with his hands. Several times he broke these dams to release the coloured water. He looked very peculiar when he came out, even after washing in the stream. We did a little digging at Slit Sinks, Innominate Sink, and Blind Pot before the underground party came out. They told us that the stream from the final waterfall chamber had been bright green, but that the other entrant at Limerick Junction was clear. (They had followed this passage for 200 yards before reaching the usual black boulder choke).

On April 29th, Bradshaw, Ashworth and Myers were at last able to get down Boundary Pot to survey the new section right down to the final shattered Hiroshima Cavern, in the floor of which no-one dare crawl because of the unstable boulders. When Gemmell linked up the survey, it turned out that this shattered section lay quite close to the end of Thackray's passage. One day some potholer without imagination may find a way through the jumble of loose boulders, and if by that time Lancaster Hole has been entered from Bull Pot, it will be possible to follow the finest underground route in England from Bull Pot to Boundary Pot, natural openings 1.15 miles apart.

On this day and on May 9th, work was done at the Innominate Sinks, which led to Aspin, Jowett and Gemmell getting underground into a short system which led, alas, to a broad but too-low bedding plane heading towards the aven at the far end of Oxford Pot's Broadway. Down at the Dolly Tubs we found that the new Rosy Sink was dry, so we began to dig there also. Eventually we got Gemmell underground. Here too they were stopped, by a large boulder wedged across a promising passage. Meanwhile the underground party of Red Rose members had been surveying Bradshaw's passage beyond the Easter Grotto. When this survey was plotted, we knew that they had followed the extension of the main drain to within a hundred yards of the Top Sinks, passing to the north of the great shakehole near the sheepfold which Gemmell called 'Gertoil'. The pieces were fitting together nicely. If only we could find that easy way in !

SUMMER

During the next weeks, much hard work was done in the Borehole, without important result. The Innominate Sink was tackled again, with no better luck. Blind Pot received attention which was not rewarded. There was digging in the ochre-filled depths of the Top Sinks. Here we all spent a happy hour diverting the stream, in the hope of washing out the clayey fill. We were feeling very discouraged, when heavy work at the Slit Sinks eventually removed enough rock for Ashworth to force himself in. He followed a Snake-like passage to the head of a 15ft pitch on July 9th. Next weekend after more hammering, two parties of "ferrets" slipped in (we hold back our skinnier specimens for occasions like these!). When they came out, their stories were so conflicting that there was much hilarity before we realised that the parties had been down two quite distinct systems, each leading through constricted ways down to 50ft pitches (Dunnington, Ashworth, Eyre and Hodgson). This was no easy entrance. We went away disappointed after all our hard work.

Sunday July 22nd

In Bliss's words (published in 'The British Caver')...

We decided to tackle the nearest pitch first, which meant leaving the passages by our favourite method, climbing up into the roof, over the top, and down into a quite separate passage. That end of the pitch was quite narrow. We lowered the ladders and found it took 50ft to reach the bottom. Hodgson was very anxious to go down. As he had found the pitch the previous week, we named it Hodgson's Hole. At the bottom he shouted up, "Another pitch below!".

As Eyre started to descend, a loud boom came to our ears followed by a low murmur growing louder and louder until it was like the sound of an express train. We shouted for Hodgson to come up, got the bright answer "What for?" ...when he heard the roar, I think he beat all records up the ladder. He had just stepped off when a wall of water carrying rocks with it swept down the passage and over the pitch. We crossed over hastily and had a look at the passage by which we were to return; surprisingly, it was dry. We had surmised that the flooded passage was from the Borehole, which is about a hundred yards higher up Ease Gill. Our only worry now was how long it would be before the water would pour down Slit Sinks,

which has at its entrance an extremely tight squeeze quite impossible when flooded. We all made a dive for the exit sign. At last the entrance squeeze was reached. I think the corners must have been greased at the speed we slipped through. I was just grunting at the tightest place when a trickle of water ran under my arm and down my shirt. A crack in the roof suddenly opened up and let a cascade pour down my back. Suddenly I got through and could see the others, backs towards me, eating sandwiches in the gill. Leyland wasn't far behind me, with nothing worse than a good soaking. The sun was blazing down, and not a cloud in the sky. We found out later that it had not rained at all since we went down earlier. Delayed drainage from the night's storms must have flooded the gill. The following night with Gemmell and Myers we found the next pitch to be 15ft only. From the huge chamber at the bottom, all there was leading off was a 3ft passage half filled with water: 'The Water-Python'. Gemmell and Myers were on holiday for the rest of the week, their magnum opus as far as Ease Gill was concerned being a surface survey of the topographical features between Cow Dub below Oxford Pot, and the Top Sinks, using tape and Abney level.

Next weekend (July 29th) we crossed over to Ease Gill. It was a peerless day of full summer, hot-looking and cloudless over towards the coast, with lofty cumulus towers above the Lakeland hills and nearer peaks. Dunnington and Beaumont went down the Slit Sinks to survey the system. Bradshaw and I hammered away at the rocks, trying to secure a flood-proof entrance. When at last we had our way, we stripped off and washed in the dub above the Borehole. While waiting for the others, we picked bell heather from the fine clumps which overhung the gill. In spite of the surveyor's report, and Bliss's previous account of Wretched Rabbit Passage, which gave us ample reason to hope that there might be some simple connection, we had to admit that our work on the Slit Sinks had largely been wasted in view of the extremely restricted nature of the terminal passages in this system. These things are relative: in some caving areas, the discovery of 600ft of passage and two 50ft pitches might have been an event of major importance.

An ugly note was struck during the summer. Some person or persons unknown twice came across to Oxford Pot and rolled down great boulders over the entrance, presumably in the hope of stopping our access to the Promised Land. How folk can justify such actions, I do not know. On September 9th we spent a long time trying to restore the status quo. At the end of the afternoon, Riley, Shorrocks, Hodgson and Bradshaw went down the Rosy Sink. Eventually Bradshaw said he would come back during the week to deal with the boulder blocking this rather promising passage. On Thursday, with Bliss, he removed the obstruction. Miraculously, after all these months, they made their way down an easy passage, with only a 15ft pitch, into Broadway. At long last The Snake had been bypassed. The Promised Land could now be entered without the fear of the consequences of some trivial accident to a tired potholer, the original sufferers from Snakeitis now realising that a large part of their disease had been due to the fear of finding themselves with a broken limb at the wrong end of this abominably tortuous passage. These fears were now removed.

AUTUMN

On September 24th, we all trudged up Ease Gill in the rain (it was the shooting season and the short way across the moor was out of bounds). Today most of us were sightseers, leisurely inspecting the wonders of the Promised Land. We laid down tracer tape in the special places where we planned to erect warning notices. It is so easy, when entering new caverns, to rush excitedly over precious crystal floors, doing irretrievable damage in an instant, and so automatic after seeing notices to move slowly and with discretion along the indicated paths, preserving the greater part of the treasure for those who follow.

At Holbeck Junction, Cornes, Bradshaw, Dunnington, Eyre and Leyland decided to try to climb the waterfall pitch at the end of the left hand passage of the Green and Smelly system. For 'around a

quarter of a mile' Cornes led the way up a steadily climbing passage. Various minor waterfalls and gaps in the floor were traversed by climbing up into roof-systems before the party reached the top waterfall. According to Eyre:

Here's where the fun started. It seems that because I once did a bit of a climb in Sunset Hole, I have got the reputation of being a human fly. So Cornes promptly seized hold of me and said "There it is! Get up it!" I examined the pitch for about ten minutes. It was only about 15ft, but the walls had been polished by the waterfall to such an extent that I could only see one minute crack (2"x1/4"x1/8") in the whole wall. Even on this dry day, enough water was coming down to soak me, and if I slipped there was a lovely dolly tub at the bottom 4ft deep. I turned to Cornes and said, "Isn't there a way round?", "No! Get up it!", he screamed back at me. I took one look at his blood-flecked eyes and foaming mouth and decided to have a bash. Madman Cornes stood below the fall while I climbed onto his shoulders. I placed one boot-stud in the wee crack and found an even smaller crevice, hardly more than a finger-nail hold, for my left hand. Cornes now decided that I wasn't getting enough assistance. Leaving me up aloft, he walked away, and by intimidation, got Bradshaw up onto his back. Soon I felt hot breath on my neck. "What now?" I shouted, not daring to look round. When the swearing died down it turned out that I was expected to climb onto Bradshaw's shoulders. Well, three seconds later there we were; Atlas Cornes below, then Bradshaw and me perched piggy-back on high. I daren't climb up with the whole lot swaying in the breeze, so I reached up tentatively with one hand and found that we were about three feet from the top. How we got down I don't know, but we did. The only mishap was that Bradshaw stepped backwards into the pool. When we started back I saw Cornes at the foot of the fall, waving his fist at it, so I knew we were in for more trouble next time.

On October 7th it was a misty morning. The autumn tints were well developed on the way to Craven, and from the fell road we saw the cloud cap just rising from Gragareth. Again in Eyre's colourful words:

A strong party of bods, Pennine and Red Rose, arrived at Bullpot Farm. To our amazement, we saw Cornes drag three lengths of iron piping out of his sidecar (he had been reading Chevalier's book, 'Subterranean climbers'). The pipes all screwed together in a gigantic 'T'. A horrible thought assailed me, so I asked him what it was for. "To get up that waterfall with" he said with an ungrammatical leer. "Who are you taking with you?" I innocently asked. "Who do you think?" was the only reply I got.

Soon the party assembled outside Rosy Sink, where there was a little light relief. The now notorious cleft below the entrance crawl claimed Dunnington's camera case. Muffled messages from Bliss, whose feet still protruded from the sink, were relayed to heartless onlookers. He can't reach it. Any string? Dunnington's fast in the cleft himself! (cheers) He's dropped Aspin's hammer in as well. (groans) He's reached the case. (cheers) It's burst open. (groans) Everything's dropped out. (roars of laughter) Eventually Dunnington was persuaded to crawl aside and let the others pass him. Happily he recovered his tackle in the end. Meanwhile, Cornes, Bradshaw, Leyland and Eyre pressed on with the T-piece to the foot of their waterfall. Here the sections were screwed together, and a wire ladder was tied to the top. As Eyre said(

Just at the head of the fall, the water had undermined the rock walls, forming a crack four inches wide which continued across the top of the climb. It was my job to climb up on Cornes' back as before, and with Bradshaw to steady me, Leyland was to pass up the T-piece with the ladder attached. The idea was that I would then wedge the T-piece into the crack and climb up the ladder. This sounded all right but it didn't work out that way. I found that as soon as I began to lift the T-piece, we all swayed with the weight. This was very upsetting but

eventually, they got it right up to me. I now stood on Cornes' shoulders, with Bradshaw pressing me against the waterfall. After waving the thing about for something like five minutes, my arms began to feel like lead. Although we were all suffering from the strain, I just could not get the top piece to grip. We were about to pack up when the thing stuck (or so I thought). My human support was wilting, so I began to climb the ladder. What I feared, happened. One end of the bar began to roll out of the crack at the top. I yelled to Bradshaw, but he couldn't support my whole weight, standing as he was on Cornes shoulders. Luckily I spotted a tiny hold on the left, and with one foot on this I tried to push the bar back into the crack. Every time I jammed it in, it slowly started spinning out. Well I knew I couldn't get down again without someone getting hurt so I decided to make a spurt 'upwards' and risk it. Shouting for them to stand by I climbed the last six rungs in a burst and just grabbed a handhold on top before the bar came right out at one end. Happily it didn't fall. With a sigh of relief, I hauled myself over the lip of the waterfall.

As soon as I had pulled the pipe into the upper passage and made it fast, the others came tearing up like madmen. "Virgin soil" yelled Cornes. But he hadn't yet seen what I had spotted. Another waterfall. His mouth shot open and he muttered something about having to do it all again. When we had all calmed down, we could see that this new fall would be even worse than the other one to climb. It was twice as high and not so wide, more like a very steep chute and with it being narrower, the water was coming down with much more force. We had a good prowl around, and then Bradshaw found an aven just to one side of the main passage. After the first six feet, it looked like a straightforward climb, so we gave him a leg up. Taking a rope with him, he disappeared from view. He had been gone about a quarter of an hour when I spotted a light 50ft above my head. Bradshaw was now trying to traverse back from a roof-passage to the head of the waterfall, and soon he sent the rope down. We dragged up the T-piece and ladder from the lower fall and then Bradshaw pulled up the ladder on the rope. Up on top we found we were in a big passage with a high roof and it wasn't long before we went forging ahead. As usual, the new passage was 'around about a quarter of a mile long', with an earlier branch leading into a choked bedding plane full of rounded black boulders, possibly from the surface stream. There was a terminal Black and White Chamber about 12ft high and 20ft across, with marvellous formations. Time was short, so we had to turn back.

Our return was uneventful except for negotiating the waterfalls. We just could not free the rope at the upper fall, so eventually Bradshaw threw it down saying he would slide down the chute. He could not quite wedge himself across, and rapidly gained speed. Leyland and I saw two boots coming towards us at about 30mph, and heard a plaintive shout "Support me Jim!". We all ended up floundering in the deep pool, happily none the worse except for a ducking. At the T-piece, we held the ladder on the rope and let it go when we were all down. If anyone fancies himself as an acrobat, the T-piece is still there. We retraced our weary steps towards daylight, meeting Gemmell and Aspin who had been surveying Trident passage and investigating new high-level stuff leading towards the waterfall in White Line Chamber.

WINTER AGAIN

As it turned out, Slaughterhouse Drain proved to be a much safer bad-weather entrance than we had expected. Several parties went down between October and the end of the year exploring an extension of the Depot Passage near Stop Pot, and doing important bits of survey and photography. From time to time we saw Ease Gill in real flood. When the snow was melting we watched diverted water crashing down into the Top Sink, hoping that the objectionable clayey fill was being washed away. We looked at the solid waters roaring into the enlarged opening of the Slit Sinks, thinking of those summery days when the entrance had first been forced. Oddly enough, within a fortnight, frost and snow had so sealed the bog drainage as to leave the entrance bone-dry again. On this chill

day, Dunnington and Beaumont took aneroid readings along the route to Nagasaki Cavern, while Gemmell, Marshall and Dickenson rechecked the survey of the middle section between Eureka Junction and Holbeck Junction. We shall now have to wait for the spring droughts before we can return to our other projects in the remoter parts of the system.

It has been an exciting year. To us the Ease Gill Caverns are now familiar places, to be treated with the respect due to anything that is unique. Gladly we will show their wonders to responsible groups of club members who will join with us in protecting them from damage in respecting the landowners' wishes (permission to cross the moor had to be sought on every occasion from the gamekeeper, and large parties are not tolerated). If others are as happy as we have been in the Ease Gill Caverns, we shall be well contented.

APPENDIX I

RECORD OF HYDROLOGICAL TESTS

NOTES

The dye used in the tests was fluorescein except where noted to the contrary. The quantities of dye used were estimated in all cases. The times of placing the dye and of observing the results are generally accurate within a period of ten minutes except where otherwise stated.

No difficulty was experienced in observing dye by artificial light. It was noted that the colour was most distinct where the bed of the stream was of black gravel. Conversely, the dye was most difficult to see where the water was shallow and running over clean limestone.

The quantities of fluorescein used were in nearly all cases adequate. Of the few negative tests carried out, in only two cases was failure probably due to insufficient fluorescein. In the case of the other dyes there were several negative tests due to this cause and it became clear that the alternative dyes are of practical use only in the most favourable circumstances or in cases where a number of minor tests were carried out simultaneously.

A number of negative tests of little value have been omitted from the following record.

DIARY

19th November 1950. 1 oz dye placed in Corner Sink and not seen inside caves up to four hours later. Flood conditions.

Minor tests with various dyes proved that three small streams flowing from Leck Fell and sinking before reaching Ease Gill debouched into Ease Gill between Oxford Pot and Slit Sinks after travelling short distances underground.

17th December 1950. 1 oz dye placed in Borehole Sink. Observed one hour later issuing from choke at end of Green and Smelly passage and flowing down full length of passage. Streams rather low.

28th January 1951. 2 oz dye placed in Corner Sink at zero hour and a further quantity at zero plus thirty minutes. Observed at zero plus forty five minutes issuing from Trident Passage into Pierce's Passage. Still visible three hours later in Lower Pierce's Passage.

11th February 1951. Negative tests. 1 oz dye placed in Boundary Pot and not observed in Thackray's passage up to three hours later. Blue dye placed in Slit Sink not seen in Main drain. Heavy water flow.

4th March 1951. (a) 1 oz dye placed in Gelder Hole at 1.05 pm. Observed at Showerbath inlet in Showerbath passage at 1.50 pm. Quickly became vivid and had passed peak concentration by 2.05 pm. Colour obvious in Lower Spout Passage at 3.10 pm and seen faintly beyond Spout Hall at 6.00 pm.

(b) 2 oz Rhodamine placed in Slit Sinks in three parts at 12.30, 2.30 and 3.00 pm. 1 oz Rhodamine placed in Cow Dub in three parts at 12.00, 1.00 and 2.00 pm. No dye observed underground up to 6.00 pm. Heavy water flow.

24th March 1951. 3 oz dye placed in main inlet inside Boundary Pot (presumed to be from Ease Gill stream bed, which is within a few feet of the inlet) at 12.30 pm. Main Drain clear at 3.00 pm, but Thackray's Passage stream strongly coloured on arrival of party at Holbeck Junction at 3.30 pm. Colour persisted in Thackray's Passage until after 7.00 pm. Fairly heavy water flow.

26th March 1951. (a) 1 oz dye at 12 noon and 1 oz at 12.30 pm placed in Innominate Sink. Observed issuing from inlet at top end of Broadway at some time around 1.00 pm. (b) 2 oz dye at 12.15 pm and 1 oz at 12.30 pm placed in Slit Sinks. Seen between 2.00 pm and 4.00 pm issuing from large inlet at head of Green and Smelly passage. Heavy water flow.

8th April 1951. (a) 1/4 oz dye placed in Innominate Sink at 1.30 pm precisely. Colour appeared at foot of boulder slope at upper end of Broadway at 1.40 pm precisely. (b) 1 oz dye placed in Blind Pot at 12.45 pm and 1 oz placed in Dolly Tubs gully above Cow Dub at 1.00 pm. Observed at Toadstool junction issuing from Butterfield's Passage at 2.05 pm. (c) Part of Ease Gill stream diverted down Rosy Sinks and 3 oz red dye introduced at 1.05 pm and 3 oz at 1.40 pm. Stream issuing from opening in Broadway a few yards above Oxford Circus clear at 1.20 pm and 1.50 pm. Faint colouring seen in Mushroom Passage entrance near Toadstool Junction at 2.10 pm. Mushroom Passage stream vivid red at 2.15 pm but almost clear again at Oxford Circus at 2.20 pm. Heavy water flow.

22nd April 1951. (a) 4 oz dye placed in water trickle at Top Sink at 12.00 noon and 1.00 pm. Observed flowing through Bradshaw's Passage during the afternoon. Inlet at Limerick Junction clear. (b) At 4.30 pm 1/2 oz dye placed in stream feeding Innominate Sink 200 yards above sink, where leakage was suspected. Appeared at first rising above Cow Dub at 5.40 pm. Very distinct at 6.00 pm. Flow below normal.

13th May 1951. Very dry conditions. It was noted that water issuing from a small bedding cave in Leck Fell side of Ease Gill a few yards above Oxford Pot was totally engulfed into joints in the bed of Ease Gill. 1/2 oz dye placed therein observed in Spout Hall. Snake clear. Water assumed to issue from the Showerbath.

30th September 1951. Dye placed in Pool Sink and observed issuing from a small inlet above the lower water falls in "T-piece" Passage.

4th November 1951. Flood conditions. Tests on a small stream flowing from Leck Fell almost opposite Oxford Pot. 2 oz dye introduced 200 yards above final sink. Bedding cave a few yards above Oxford Pot coloured after a few minutes and Gelder Hole coloured after 30 minutes.

APPENDIX II

NOTES ON THE SURVEY

The survey of the Near Series (hitherto known as Oxford Pot), which, prior to the winter of 1950/51, comprised the whole of the known system accessible from Ease Gill itself, was carried out during the summer of 1947. A line and compass were used without any form of levelling instrument. Though carried out in some haste, details of passage widths, heights and other features were taken. Much of this detailed information has, of necessity, been omitted from the plan accompanying these notes.

The survey of Promised Land commenced immediately after the discovery of the connecting link from Spout Passage to Pierce's Passage in October 1950. Work has continued since, as and when circumstances permitted, up to the time of writing.

For various reasons it was decided at the very beginning to concentrate solely on the essentials required for the building up of a skeleton plan which could be used later, if so desired, as a basis for more detailed work. Consequently, particulars of widths, heights, etc., were noted briefly and approximately or in some parts not at all. This decision has not been regretted, for circumstances were anything but favourable towards serious and protracted survey work. There were the obvious difficulties arising from the remoteness of the area, the somewhat restricted entrance passage, the long distances to be traversed underground, and so on. But there were other sides to the picture. Surveying is hardly a popular pastime when there are new passages to be explored. Nor should it be forgotten that the work in Ease Gill has, from the date of the original discovery, been bedevilled by cave politics. It came as no surprise when Oxford Pot was found blocked, fortunately not before our work had progressed far enough to give us the key to the second (and easier and safer) entrance.

During the course of the work, a number of checks were obtained by the completion of circuits or by the resurvey of parts of the system. The closing errors, details of which are given below, are mostly of the order to be expected on a theoretical basis and in the light of the writer's experience (C.R.G. Newsletter No. 16, July 1948).

CLOSING ERRORS

- 1 Circuit of Spout, Razor, Mushroom, and Showerbath Passages.
Closing error, 24ft.
- 2 Circuit of Poetic Justice, Pierce's Passage (upper end) and tortuous alternative route between Spout and Pierce's Passages, completing circuit in Spout Passage.
Closing error, 25ft.
- 3 Circuit of Oxford Pot, Showerbath Passage, Broadway, Rosy Sink, Easegill stream bed (including resurvey of main section of Broadway).
Closing error, 11ft.
- 4 Resurvey of Main Drain from Eureka Junction to Stop Pot.
Difference 10ft.
- 5 Resurvey of Master Cave from Stop Pot to Holbeck Junction.
Difference 135ft. This was not unexpected, since the original survey was done very roughly.

SURVEY GRADING

The surface survey was carried out carefully using a metallic line, prismatic compass and Abney level. Distances were reduced to the horizontal and levels calculated. The standard of accuracy is C.R.G. grade 5.

The survey of the Gypsum Cavern section beyond Holbeck Junction is of doubtful accuracy and must be classified as C.R.G. grade 3.

The rest of the main underground survey, in view of the checks described above, justifies a classification of grade 4.

The survey is far from complete; a number of passages, generally of secondary importance, have not been surveyed and there is little doubt that more will yet be discovered. The following figures may be of interest :-

Total length surveyed :- 12,950 ft. (about 2 1/2 miles)

Estimated length explored but not surveyed :- 5000 ft.

The above figures refer to the Upper Series only and are exclusive of Boundary Pot and the other separate caves in Ease Gill.