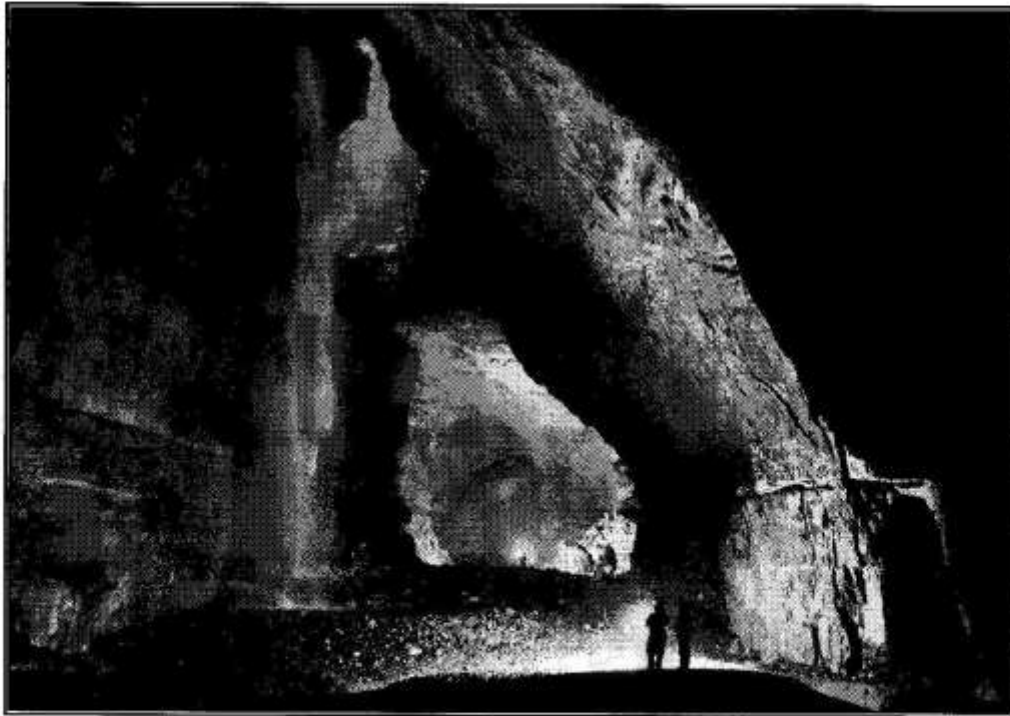


The Bradford Pothole Club



Guide to Gaping Gill

www.bpc-cave.org.uk

“There is the feeble light of day, which, filtering through the water, produces the effect of a myriad prisms by its falling drops. The charm of its ethereal delicacy is utterly unlike anything else upon which the human eye has ever gazed. I thought it was one of the most extraordinary spectacles it has ever been my pleasure to behold.”

E A Martel

First explorer of Gaping Gill Main Chamber, 1895.

INTRODUCTION

Gaping Gill is the most spectacular pothole in the British Isles, formed where Fell Beck, which has collected on the flanks of Ingleborough, flows onto the limestone rock and plunges down an awesome drop of over 100 metres into the fascinating underground world below.

Many visitors to Gaping Gill descend via the winch run by the Bradford Pothole Club at Spring Bank Holiday, and this booklet is intended to give these people an insight into the features of the pothole, its related cave system, and the history of its exploration.

THE DESCENT

From the moor top to the bottom of Gaping Gill Main Chamber is some 110 metres - the same height as St Paul's Cathedral. The descent from the scaffold gantry is a little less than this, and the winch lowers visitors down to the floor in approximately one minute. The Bradford Pothole Club have been running a winch at Gaping Gill every year since 1950, and although the winch has become more sophisticated and reliable over the years, the thrill of the descent remains the same.

As you are fastened into the chair and succumb to the temptation of keeping your eyes firmly shut, resist and have a good look at your surroundings as the descent begins. At first your knees appear to be too close to the rock, and it is for this reason that visitors are told to sit still in the chair. Then as the descent continues, the shaft widens and the smooth ride into the blackness soon becomes interrupted by the sound of water-drops hitting the chair. This is just a short shower as you pass through the spray of the water which, despite attempts at diverting Fell Beck, still finds its way down the shaft.

Halfway down the shaft a scooped out ledge to your right marks the point of the first exploration into Gaping Gill - Birkbeck's Ledge. Then you soon become aware that you are now passing through the roof of an enormous chamber, where to your left a waterfall shoots out from the chamber roof to land crashing into the boulders far below. All too soon the chair comes to rest on the cobbled floor, and the Marshall's fingers fumble for the catch to release you from the chair.

THE MAIN CHAMBER

As first-time visitors leave the chair and stumble towards the floodlights in the centre of the chamber, they are usually staggered by the scale of their surroundings. Their eyes are drawn to the column of light and water shimmering and hissing as it plummets down from the world they left moments before. For a while they often stand and just stare.

Having allowed yourself a few minutes to adjust to this new world, take yourself on a tour of the chamber, noting on the way some of its special features.

The Main Chamber is approximately 145 metres long, 25 metres wide and 35 metres high to the point of its roof. It is Britain's largest natural chamber, and is said to be big enough to house the nave of York Minster. Its floor consists of boulders, cobbles, mud and sand and if this debris could be cleared away, the chamber would be about twice its current size. The spray falling down the main shaft constitutes the highest free-hanging waterfall in England - nearly twice the height of Niagara Falls.

As you look up the shaft you will notice that the apex of the roof is formed along a straight line, and this is the

Main Chamber Fault, a geological feature which is principally responsible for the formation of the chamber.

From the lights, move off to your right (as you face the chair) to visit the Eastern end of the chamber. The first thing you may notice is the small stream flowing from the pool at the foot of the main shaft, which passes over shingle banks to sink amongst boulders at the foot of a slope. A hazardous route has been forced, by experienced cavers, down a hole through these boulders to a depth approximately 25 metres below the chamber floor.

To the right at this point you will see a rock buttress, and above this is a small opening which marks the start of South Passage. This forms one of the cavers' main 'trade routes' into other parts of the system, and you will often see their lamps disappearing into this passage as they set off on their way to the far reaches of the cave.

Another way out of the chamber is found above the huge boulder slope rearing up in front of you. This is East Slope, and at the top a short steel ladder provides the caver with an exit into Old East Passage which again leads to a 'trade route' into another major section of the system. From where you are standing, look back now into the middle of the Main Chamber, and again the Main Chamber Fault can be clearly seen forming the point of the roof. Walking back towards the chair, look up to your right, after a few steps, and in a dark recess you should be able to make out the huge North Passage which comes into the chamber at this point. This passage has been explored by cavers for a little way until it is blocked by sand.

Continuing back towards the chair you will notice the difference between the vertical right hand wall of the chamber and the sloping wall-cum-roof of the left. Again this is caused by the Main Chamber Fault, which instead of being the more 'normal' geological fault, which is either vertical or horizontal, is a rotational fault which has wrenched the rocks in several planes. To demonstrate this further, stand by the lights and look back towards East Slope. About 6 to 8 metres up the left hand wall you will see a band of rock, about one metre thick, which is much paler than the rest of the wall. This is the Porcellanous Band - an important bed of rock in this cave system. Follow its progress along the left hand wall, and then compare its height there with its relative height on the right hand wall. You will see the right hand wall is about 4 metres lower than that on the left. Turn immediately to the opposite end of the chamber, and you will see that there the Porcellanous Band is at the same level on both walls. This is a clear demonstration of the displacement caused by the fault.

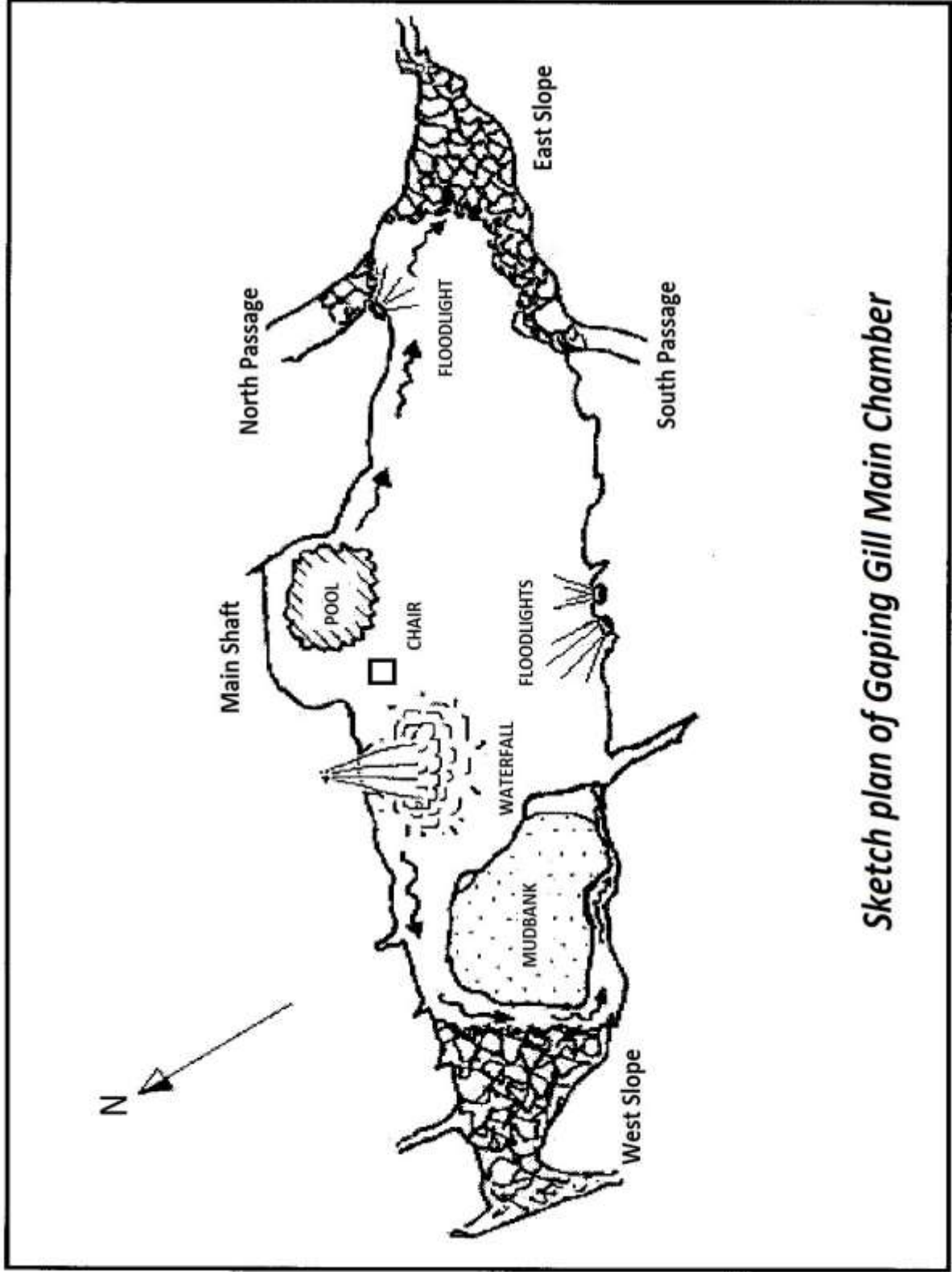
Head now towards the western end of the chamber. Immediately on your right a large cascade crashes to the floor with much noise and spray. This is the water from the surface sink of Rat Hole. Beyond the waterfall's entry into the chamber, if you look carefully, you will see a cluster of chocolate-coloured stalactites hanging in a fringe from the point of the roof. These were only discovered when the chamber was floodlit for the first time a few years ago, and are estimated to be about 8 metres in length.

Skirting the foot of the waterfall, the boulders slope gently away, and the water can now be seen running along the right hand wall. Soon you will find yourself on a muddy 'island' surrounded on three sides by a drop into the stream bed. In wet weather the water from Rat Hole flows all the way round to sink in a gloomy crack in the left hand wall. In drier weather it will be found pouring off down a small cleft in the right hand wall. Ahead, across the stream, can be seen West Slope, which ascends to yet another exit from the Main Chamber, and another route for cavers to explore.

Turn back now towards the centre of the chamber and enjoy the excellent view of the water and light erupting through the roof of the Main Chamber. Savour the noise of the cascades, and feel the spray-laden wind flying round this wilderness of nature.

And as you return towards the chair and prepare for your turn to be winched back to the surface, consider the common view of potholers and their strange pastime "I'd get claustrophobia", "It's all grovelling about in narrow, muddy tunnels", "I can't understand why they want to go down such awful places and get stuck!"

Hopefully your visit to Gaping Gill has changed your view of potholing once and for all. Now you can understand why people take the risks and endure the discomfort to visit such a place as this.



Sketch plan of Gaping Gill Main Chamber

THE GAPING GILL-INGLEBOROUGH CAVE SYSTEM

The Main Chamber forms only a tiny part of the Gaping Gill-Ingleborough Cave system. Altogether there are over sixteen and a half kilometres of passages in the system, and its vertical range covers approximately 200 metres. The system contains Britain's two largest chambers. For a short time a few years ago, it was possible for cavers to enter Gaping Gill and after several hours of extremely serious and difficult caving to emerge at Ingleborough Cave. Since then a boulder collapse in the far reaches has blocked this route but nevertheless the connection was made, and will always remain.

The reason for the cave's existence lies in the rock in which it has been formed. This is limestone, which was formed by countless billions of tiny sea creatures which lived over 300 million years ago in a shallow warm sea. Their calcareous skeletons built up on the sea bed and formed a mud that gradually compressed to become the limestone rocks of the area today. This rock is slowly dissolved by rainwater, so that the processes of mechanical and chemical attack enlarge the faults and fissures in the rock until cave passages are formed.

Various beds of rock have different resistance to attack, such as the Porcellanous Band seen in the Main Chamber. This resistance to penetration can sometimes influence the formation of major horizontal networks of passage, and in the Gaping Gill-Ingleborough Cave system a major part of the cave is formed on or just above the Porcellanous Band.

Another feature of the system is the number of vertical shafts descending from the moor level either in one huge drop, like Gaping Gill itself, or in a series of steps, like the nearby Disappointment Pot, the entrance to which you pass just before you get to Gaping Gill. These shafts are usually formed where the water has attacked a vertical fault or joint in the rock. These provide a natural conduit down through the rock until the water's progress is interrupted by a horizontal barrier like that described above, or a band of shale.

The third important feature of the system is its underwater routes. These take the water from its sinks, like those in the Main Chamber, and carry it through the 'basement' of the system in huge drainage tunnels. These are permanently flooded and have only been partially explored. One such passage forms part of the connection between Gaping Gill and Ingleborough Cave and provides one of the most serious obstacles to the caver.

It is the water's natural tendency to migrate to the lowest level that has drained the upper levels of the system. Proof that the cave was formed largely under-water is given by the round or elliptical cross-section of many of the passages in the system - a classic feature of solution caves.

Even now, there are occasions when the volume of water entering the system exceeds the capacity of the lower drainage routes, and the water backs up above its normal level. On very exceptional occasions, perhaps once every few years, even the sinks in the Main Chamber are overwhelmed by the huge torrent of flood waters which pour down the Main Shaft. At such times a lake gradually builds up to cover the whole of the chamber floor to a depth of a few metres.

It is this blend of old abandoned dry passages and young well-watered streamways and shafts that provides part of the fascination of the system. That and the dream of discovering previously unknown passages ...

A HISTORY OF EXPLORATION

Until the nineteenth century caves were generally regarded with fear and suspicion. Traditionally they were thought to provide a gateway to Hell, inhabited by all manner of spirits and demons.

It was only when a curiosity in science and natural history began to overcome these suspicions that people took an interest in caves and their formation. At the same time a few hardy individuals started to explore caves with a more professional approach, and they were often drawn to the more famous and spectacular caves and potholes as the scene for their exploits.

Gaping Gill was, of course, well known even at that time, but it was still a local man, John Birkbeck of Settle, who first attempted a descent of the hole. In 1842, having plumbed the hole and decided that it was not bottomless as many folk believed, he set about his task by getting a trench dug, one kilometre in length, in order to divert Fell Beck away from the shaft. He was then lowered into the shaft on a rope but when this became frayed his foray into the unknown had to be stopped short. Undeterred he made another attempt later, and reached a large ledge 55 metres down the shaft when once again a frayed rope prevented further progress, but at least he had shown that the shaft was not to be feared, only respected and admired. He also had the consolation of having the ledge he had reached named after him - Birkbeck's Ledge - as it is still known to this day.

It was in 1895 that Gaping Gill finally attracted the attentions of the great French explorer Edouard Alfred Martel. He was well known for his cautious and systematic approach to cave exploration, which had resulted in him making discoveries in many of the great caves and potholes of France. He appreciated Birkbeck's wisdom in attempting to divert Fell Beck, and had the trench re-opened. He also plumbed the shaft and found it to be deeper than his rope ladder. He therefore decided to descend the first 20 metres by being lowered on a rope alone, then on reaching the ladder set off down into the gloom. He found himself under a waterfall some 40 metres down, then having passed Birkbeck's ledge, he became aware that he was suspended in an immense void, 25 metres above the boulders of the floor. Soon afterwards his progress was halted while another rope was tied on, then after 23 minutes, which must have seemed even longer, he at last touched down on the floor of Gaping Gill Main Chamber - the first human being ever to have set foot there.

Despite being wet through from the waterfall, cold and probably already tired from his exertions, Martel set about exploring the Main Chamber. He noted various features including the sound of a stream running away by East Slope. His observations later allowed him to sketch the chamber, but being alone, and in the short time available, he failed to find any way out of the chamber into the passages which he believed must exist.

After about one and a half hours he prepared to make the ascent. His telephone connection to the surface was waterlogged, and it was only after much shouting that he felt his rope tighten, and his climb began. Once again, there were delays on the way up caused by the rope snagging. But at last Martel reached the surface, a tired but elated man. As he related the tale of his exploration, he predicted that long passages would one day be found down Gaping Gill.

Little did Martel realise just how quickly this prediction would be fulfilled. Unknown to him, another party of would-be explorers had already made plans to visit Gaping Gill, and a month later in September 1895 this group from the Yorkshire Ramblers Club led by Edward Calvert assembled at the entrance. Although their first attempt to bottom the shaft was thwarted by ropes tangling and jamming, nevertheless Calvert reached a point 65 metres down, and Birkbeck's Ledge was reached by another member of the group, a man called Booth. Disappointed but undaunted they launched another attempt a few months later using Jib Tunnel which runs off behind a large block, just to the right at the top of the Main Shaft. On 9th May 1896 a system of ropes and pulleys resulted in Calvert becoming the second man to visit the Main Chamber.

The next day, five of the party were lowered into the Main Chamber and the exploration of the Gaping Gill system began in earnest. One pair headed up West Slope and found a low passage leading off, which in turn led to a chamber with a strong draught, indicating more passages ahead. Meanwhile the rest of the party had clambered up East Slope and had entered a continuation at the top which was well decorated with formations and led off into the distance. This subsequently became known as Old East Passage.

At Whitsuntide shortly after, another visit into Gaping Gill resulted in an accurate survey of the Main Chamber being carried out. By the end of this meet Old East Passage had been explored through to Mud Hall, which still remains the second largest chamber in Britain. Furthermore, South Passage had been found, leading in turn to South East Passage, and South West Passage to Sand Caverns, besides West Chamber.

Although a number of trips down Gaping Gill were made over the following few years, it was not until 1908 that the next significant discovery was made. During a visit to South East Passage two members of the Yorkshire Speleological Association found a large red worm. The significance of this find was that it suggested that somewhere in this vicinity must be an alternative entrance from the surface. By calculating their position underground and later relating this to the surface, they found a small hole on the moor blocked by rocks and mud. After some work digging in this, over the next few months they eventually entered a series of shafts which dropped them into South East Passage. The discovery of this new entrance meant that access to the system could be gained even when Gaping Gill Main Shaft was in flood. Logically then, the new way into the system was named Flood Entrance.

A repeat of this type of find was promised a year later when another small hole nearer Gaping Gill was explored. With great excitement and optimism the cavers pushed on down a small horizontal passage, but they were dismayed to find the roof met water only 40 metres in. The cave was instantly christened Disappointment Pot.

This opening chapter of exploration was now closed, and it was 1937 before the next major discovery was made. It was in that year that the British Speleological Association decided to spend two weeks at Gaping Gill carrying out a final survey to produce a definitive map of the system.

One of the party was busy surveying one of the crawls near the Main Chamber when he noticed a low opening to one side. He crawled into this to check just how far it went. A quarter of a mile later he found he could at last sit up, most of the passage he had just explored being a flat out crawl on his stomach in a passage 5 metres wide but less than half a metre high. Eric Hensler's determination was rewarded however, as he found himself in a large stream passage with a number of other leads going off. The series of crawls and the main passage are now known as Hensler's Series, and form a major part of the horizontal network in Gaping Gill. They were also to prove to be the key to further extensions in later years.

The position of the main stream passage in Hensler's Series relative to Disappointment Pot on the surface initiated a return visit to the latter by Bob Leakey in January 1944. Leakey was renowned for his toughness and determination, and on reaching the place where water met the roof, he promptly undressed and set off into the water with a lamp clenched in his teeth.

Having gone in feet first, to keep his head above water as long as possible, he felt the roof with his feet, trying to find a possible airspace. After only a couple of metres or so he found a narrow airspace to one side and shuffled through, underwater, to reach a small canal passage. Continuing ahead another short submerged section was passed into a relatively dry passage. Here Leakey found that the pools were caused by a gravel dam which held the water back. Once this had been dug away the water level dropped and gave free access to the way on. The exploration downwards continued over the next couple of months until eventually, having descended a number of shafts, they found themselves in a chamber which looked familiar. Indeed it was, because this was the chamber at the upstream end of Hensler's stream passage. A new way into the system had been discovered - and Disappointment Pot had turned out to be not such a disappointment after all.

Four years later two other holes near Gaping Gill were dug in the hope of finding new passages. The first hole, Car Pot, was pushed by the Brindle brothers of the Craven Pothole Club. They passed various tight passages into a major lower series, part of which provided a visual link to Far East Passage in Gaping Gill through a very small passage. The second hole, Bar Pot, was the large square depression passed just after the stile over the wall on the approach to Gaping Gill. In the bottom of this hole members of the British Speleological Association dug through a boulder choke to reveal a narrow rift 15 metres deep. This was descended and led down through bouldery chambers to another big shaft of 30 metres. This drops into South East Passage, very near to its junction with Flood Entrance Pot.

In 1949 the Northern Pennine Club dug its way into another cave, Stream Passage Pot, through some precarious boulders. This led along a winding stream passage to three deep shafts, each around 30 metres deep. This fine pothole linked into a series beyond Sand Caverns.

Despite the number of cavers visiting the system during the fifties and sixties via the winch meets run by the Bradford Pothole Club and the Craven Pothole Club, no other major find was made until Whitsuntide 1968. Then during the Bradford winch meet some of its members visited the end of Far East Passage and dug at the roof of a passage which had a pool with very little airspace. This allowed them to pass this obstacle and discover approximately 700 metres of passages heading towards Ingleborough Cave. These passages, known as Whitsun Series, ended in a boulder chamber with little hope of further extensions.

Only one week later another major discovery was made, this time at the end of Hensler's Passage. Here a party from the University of Leeds Speleological Association had discovered a small hole in a roof passage, through which a powerful draught blew. They set to work with a small pick and, after four hours, they managed to squeeze through the hole. The Blowhole gave access to a shaft at the bottom of which they found a low passage with only a small airspace over a long pool. This was passed to discover approximately 2 kilometres of new passages and chambers which was named Far Country.

Once again this series trended towards Ingleborough Cave but no connection between the two could be found. It was not until three years later that once again a connection appeared to be a possibility. Mike Wooding of Lancaster University Speleological Society had already been hunting for the connection by diving underwater passages at the end of Ingleborough Cave. There he had found a high level series of dry passages which appeared to be very close to the end of Far Country in Gaping Gill. He therefore undertook a solo trip to the end of Far Country and, after some work, forced a way through into another series of passages - Far Waters. This series proved to be even nearer to Ingleborough Cave, but yet again the connection was nowhere to be found.

Various attempts to link the two caves were made by diving the underwater passages in the far reaches of the systems. Attempts to verify the accuracy of the cave surveys, particularly with regard to the relative positions of the two caves were given a tremendous boost by the invention of the 'Molephone' by Dr Bob Mackin of Lancaster University. This is basically a radio that will operate through rock, but in addition to its normal communication facility, it can be used to transmit a signal as a beacon, which can be located with extreme accuracy on the surface. Armed with this device in 1982 two cave divers - Geoff Yeadon of the Kendal Caving Club and Geoff Crossley of the Bradford Pothole Club - visited the Ingleborough Cave extensions while friends on the surface pinpointed the end of the passages nearest Gaping Gill.

Further trips were carried out into Far Waters and Ingleborough Cave and vital data was obtained by accurately resurveying and radio-locating reference points. Then the results from all these trips were processed and calculations made to reveal that the two caves were only 3.4 metres vertically and 1.2 metres horizontally away from each other, with only a boulder choke between them! It seemed that at last the connection between the two systems was there for the taking.

The next thing was to get a party of divers through into the Ingleborough Cave extensions while a party of cavers went to the choke in Far Waters. This would prove the survey to be accurate as the two parties would be able to hear each other. On 22nd January 1983 the two Geoffs accompanied by Julian Griffiths were assisted to Terminal Lake in Ingleborough Cave by an enthusiastic team of Bradford Pothole Club sherpas.

Meanwhile Jim Abbott, Gerald Benn, Mick Sharp and Ian Wilkinson of the Bradford Pothole Club descended Bar Pot into the Gaping Gill system and proceeded to the choke in Far Waters. Each party had a Molephone set with them so that they could communicate with the surface, and thereby relay messages to one another.

A vocal connection between the divers and the cavers was established immediately and the boulder choke was attacked feverishly. Finally the gap was whittled down between the two parties, and Gerald Benn managed to 'shake hands' with Geoff Crossley's wellington boot. The connection had been made!

Further work was done subsequently to make a way through the choke and on 28th May 1983 Geoff Crossley and Geoff Yeadon abseiled down Gaping Gill while Jim Abbott and Julian Griffiths entered Ingleborough Cave with diving gear. The two pairs met at the connection where the diving gear was handed over. Then, while the two Geoffs dived through to Ingleborough cave, Jim and Julian headed out through Far Waters, back to the Main Chamber and the winch. They emerged to become the first people to have made the through trip between the two caves. Interestingly only four other people made the trip before the connection boulder choke collapsed. It has not been re-opened.

Although the prize of the connection has gone exploration work still continues.

During the last twenty years several Bradford Pothole Club teams have lugged diving gear down to Deep Well in Far Country - some five hours into the system from the Main Chamber - for a lone diver to explore the submerged passage carrying the water originating in Fell Beck towards Ingleborough Cave.

In 2011 a point was reached in this passage nearly half a kilometre from the nearest airspace and over forty metres below water level. This necessitated the use of special rebreather equipment which allows the diver to maximise gas supplies whilst reducing decompression problems (or 'the Bends' as it is commonly known). This passage represents the deepest point so far explored in the whole system – some two hundred metres below the top of Gaping Gill, and an estimated thirty-five metres below the level where Fell Beck re-emerges into daylight by Ingleborough Cave. This exploration also made Gaping Gill the deepest cave in the Dales.

Also in the last few years, the club has used radio-location equipment to check the accuracy of the underground surveys. This work led in turn to identifying surface shakeholes and depressions which might represent blocked entrances into the system below. As a result cavers have been able to excavate several new ways in – Hensler's, Marilyn, OBJ, Small Mammal, Stile & Corky's Pots – all of which provide new sporting challenges for the expert caver. There are now over twenty entrances through which cavers can access the Gaping Gill – Ingleborough Cave System.

Such explorations demonstrate the enthusiasm and determination needed to fulfil the cavers' dreams of new discoveries.

As Captain James Cook said: "Exploration is not about going further than any other man. It is about going as far as it is possible to go."

Who knows what lies around the next bend, or past that jammed boulder?

The cavers' dreams of discovery live on.

We hope you enjoy your visit to Gaping Gill, and gain some sense of the wonders underground which draw cavers to endure hardship, discomfort, and sometimes danger to witness these marvellous sights and to explore where no man has gone before.

In the 21st Century, discovering parts of this crowded planet which no-one knew existed is a privilege extended to a lucky and dedicated few – and all so close to home!

If you interested in trying or taking up caving it is essential you do so with proper training gained with experienced cavers. Many clubs exist throughout the UK, and they welcome new members.

Details of how to start caving and find your local caving clubs can be found on the website www.trycaving.co.uk – part of the British Caving Association's www.caves.org.uk website.

Please take care when visiting caving areas as there are many open shafts and caves containing vertical drops. Supervise pets and children appropriately. Do not be tempted to explore the caves on your own unless you have the knowledge and experience to do so safely.



