

'Irelande et Caverns anglaises', Chapter 24 (pages 335-364) by E.-A.Martel 1897. New translation J.A.Helm

This all started at the last Committee meeting when Chas Roberts asked if he could borrow the English transcript in the CPC Library of Martel's own write up of his descent of Gaping Gill. I said no need to borrow the Library copy, I have the original BSA Journal that it was published in and I can email you a copy to keep. I decided to OCR the article and so I had to read it quite closely to ensure that the OCR software had worked correctly. This reminded me of what a fascinating write up it is. I then sent it to Chas as promised but decided the English seemed a bit archaic so I sent a copy to John Helm and asked whether he thought it worthwhile doing a more modern translation. He agreed to do this but then asked if I had a copy of the 1870 English article quoted by Martel as he thought it might have got a bit mangled in going from English to French and back to English. Fortunately I had a 40 year old Xerox of the article and this did indeed reveal that there had been considerable changes. This convinced both of us of the need to do a fresh translation

and John was happy to do this, especially as we both agreed that it was likely that not many members had read the original, let alone the BSA translation. So with many thanks to John for all his hard work, here is a new translation using the original English source quoted by Martel. I'm sure you will agree that the effort has been worthwhile.

Ric Halliwell

Translators note: In translating this historical account of the first descent of Gaping Gill. I have attempted to retain the French writing style of the period whilst making it readable to present day cavers. Thus, amongst other; maintaining Martel's use of Ghyll and not Gill and also keeping to his original metric measurements. An earlier translation exists from the BSA publication of 1951 by J.A.Pilling, and this translation is based on it, however parts of that translation lack precision and contain incorrect translations.

THE DESCENT OF GAPING GHYLL (sic)

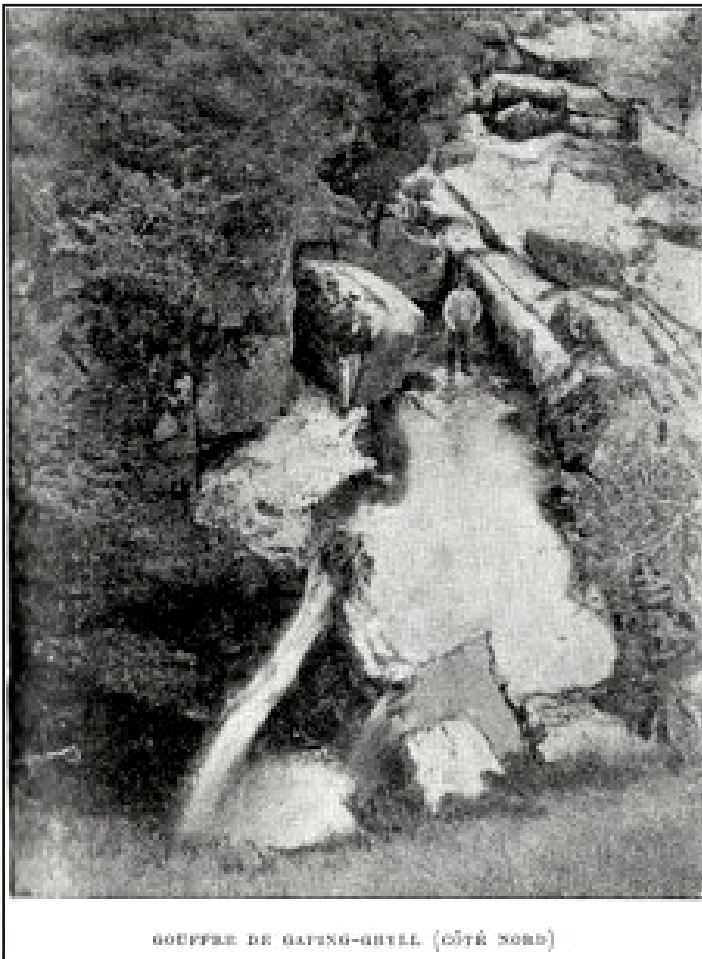
The gorge of Trow Ghyll (sic), former water course – Fell Beck – Gaping Ghyll, attempts by Messrs Birkbeck and Hughes – My descent 1st August 1895 – Origin of Gaping Ghyll, erosion pothole, - Descent of Messrs Calvert, Grey etc.

On leaving Ingleborough Cave, it is necessary, instead of returning to Clapham, to cross Beck Head, go up the dry valley of Clapdale and reach the gorge of Trow Ghyll.

This is one of the most picturesque of rocky scenes, which compares well with those of the Causse Mejean or the Dolomite Alps: it is certainly the now dry bed, of an ancient stream. Higher up the ravine its former course can be seen, hollowed out in the peat plateau - Clapham Bottoms, where one can still see several sink holes filled by rocks and bushes, through which only rain water can pass (Bar Pothole etc). After a walk of two kilometers and an ascent of about 130m one arrives at the greatest of all these sinks, Gaping Ghyll, at an altitude of about 410m. It is not blocked up and is regular in form, 20m wide, and open at the north end by a natural

trench where a stream pours from bed to bed, like on the steps of a gigantic stairway. This is Fell Beck, which gathering its waters from the peaty Fell on the S.E. flank of Ingleborough Hill (where the map indicates a score of springs) is entirely swallowed up by Gaping Ghyll. It is evident that in the past the stream extended beyond this obstacle, which was either not yet open, or else the water in the stream was sufficiently abundant to flow around and down the gorge of Trow Ghyll – identical to what must have occurred at Goules du Réveillon, Roque de Corn etc. (see E.A. Martel 'Les Abimes' page 297).

There is now a gaping mouth, worthy of its' name, about 8 to 10m by 4 to 5m, at the bottom of which there is a hole, black and vertical, like the most perfect 'abime' of the Causses. It is very dangerous as it does not have a wall around it, and this opening is covered by vegetation made slippery by spray and humidity: it takes the Fell Beck in to a mysterious and noisy subterranean cascade. This water can only be that which reappears at Beck Head (1647m away) after having been seen briefly at the foot of Giant's Hall, (Ingleborough cave) 1220m away.



GOUFFRE DE GAPING-GHYLL (CÔTÉ NORD)

"I have watched this wonderful abyss many a day of storm and sunshine"; quote from Prof. Hughes 'On Caves'; "No one has ever been to the bottom of it. I found a passage opened out amongst some blocks on one side of the stream a little above the chasm. I thought that I might perhaps find a zigzag descent, which would lead me down into Gaping Ghyll. So I crept in. I soon got beyond the light and therefore took the precaution of throwing stones in front of me before I advanced; I found the slope increased rapidly, and then all of a sudden the stones dropped into a deep hole, down which they whirred, knocking the sides here and there till they dropped with a booming noise into deep water below". A difficult depth sounding showed Mr. Hughes that the total depth was 110m below fell level. This sounding was remarkably accurate, as we shall presently see.

"With regards to the main shaft" continues Mr. Hughes, "its walls seemed to have undergone a bombardment for hours - and so it had. In that flood hundreds of boulders, carried forward by the rush of water were hurled against the opposite face of the rock and then dropping into the great chasm, were hurried away through the subterranean watercourse."

"Here was the whole story of the formation and infilling of limestone caves, and the sudden breaking up of all the older deposits and the return of the tranquil deposition, to be read in Nature's clearest writings. First we saw the results of chemical action of the acidulated water running off the moor and opening out the crevices in the jointed limestone. Then there was the mechanical action observed on a grander scale in storm - the boulders and pebbles pounding away the solid rock, and next there was the sand and mud left as the water subsided". "Probably there is in Gaping Ghyll somewhere a



GOUFFRE DE GAPING-GHYLL (CÔTÉ SUD)

place where the water in ordinary weather is filtered through coarse gravel, for I have sent down many boards with a notice on each that I would reward any person that brought it back to me, but have never heard of one of my notices being found. These chasms or funnel shaped holes are the feeders of the caves."

Prof. Phillips says: - " Probably not one but many threads of water unite Gaping Gill and Little Beck Head; probably the lines of subterranean current vary from time to time; stalagmites choke the old channels, while others are formed in new directions" (Phillips 'The Rivers Mountains and Sea-coast of Yorkshire', page 34, 1855)

Forty years ago Mr. J. Birkbeck a member of the Alpine Club attempted to descend Gaping Ghyll. The volume of water, a strand of his rope breaking, cut by the rock, placed him in serious danger and forced him to stop on a ledge at less than '200 ft' down. From '80 ft' down he had been hit by a stream, which gushed out of a lateral fissure.

So the reputation of the "terrible hole" of Gaping Ghyll was known all over England. To descend it was thus my greatest desire and the principal objective of my campaign in 1895, and I had the chance and succeeded.

For several months Mr. Farrer - owner of the large Ingleborough Estate and nephew of the first explorer of Ingleborough Cave, graciously promised me every assistance, and, on arriving at Clapham I found the means of transport ready for me and the necessary manpower to help. More than



MA DESCENTE DANS GAPING-GHYLL (1^{er} août 1895).

that, and because of the heavy rains during the last week of July, Mr. Farrer had had a trench made, a mile long (1609m), in order to divert Fell Beck as much as possible from the shaft. These troublesome meteorological conditions seemed to be particularly hindering to my enterprise, and it was decided that, before taking up my cables, telephones and rope ladders, I should make a preliminary inspection of the mouth of the shaft in order to see whether the volume of water might entirely prevent any descent.

On the 30th July, at 10 a.m. guided by Mr. J. Bateman, Mr. Farrer's very courteous steward, I arrived at the entrance of Gaping Ghyll, where I saw the most dispiriting spectacle of a foaming torrent being swallowed up in the shaft. The column of water vapour that came up from the depths was such as to cloud one of the two photographs taken by me (view from the south).

My beautiful project seemed to be sunk!: the weight of the water would have been suffocating, if it had not actually killed me, it would have torn to pieces my rope ladder in the shaft.

However, the weather improved and the water seemed to be rapidly getting lower. Mr. Farrer then suggested that, if I wait 48 hours, and had the trench extended, with the return of sun, it might reduce the size of the cascade.

While this work was being performed, for which I could not thank Mr. Farrer enough, I spent two days inspecting other cavities in the area, and on Thursday the 1st August, at 10 a.m. the cart with my gear joined me, with also about a hundred spectators, at Gaping Ghyll. Once again it threatened to rain.

The trench was not able to take all the Fell Beck, however there only remained a twentieth of its volume seen two days before; nevertheless the waterfall seemed strong and annoying, but not unconquerable.

The depth sounding of the 30th July gave 100m, exactly the same as Mr. Hughes in 1872. But I had only 80m of rope ladder! Thus like on several occasions in the Causses, it was necessary for me to descend the first 20m by means of a single rope, as I preferred to have the security of the rope ladder at the bottom of the shaft, where I should be far from any help, rather than at the top, where help might more easily be afforded me.

But none of those who assisted me as best they could, and in the most obliging manner, had had experience of this kind of operation: neither would any person - and I was sincerely charmed at this discretion - they would not dare to take the responsibility of helping me make the knots for fixing the ladders and ropes. Deprived of the assistance of my devoted Armand (Louis Armand), I myself quite alone, had to attend to all these minute preparations which he customarily takes charge: on the careful execution of which one's life might depend.

I had occasion to appreciate greatly the advantage of British coolness: the spectators, while visibly interested, refrained from indiscreet curiosity; no one interfered in the transmission of my orders; no clumsy offers of help upset my arrangements; and each one at his post accepted his passive or physical role I gave to him.

And then I remember that, in our turbulent Midi (France), such calmness would often have been useful: at Mas-Raynal in Aveyron, for example, when it was almost necessary to fight with the young country people of the area, who actually organised, at the mouth of the hole and regardless of the risk of falling into it, a country dance with violin and accordion, which prevented us from hearing anything by telephone; at Padirac, where, in 1890, I had to make a policeman remove a huntsman whose dogs were making stones fall into the hole; and at lou Cervi, Vaucluse, where, for the same reason, we had to show the orders of the local court which authorised us to call for armed force in case of need, etc.

In short, my audience at Gaping Ghyll was certainly the most calm and serious that I have ever known.

They waited two and a half hours while I spread out the ropes and fixed the ladders; prepared the telephone; explained the operations to be carried out; drove strong stakes into the peat - as there were no trees or suitable rocks; and fixed the ladders, etc. to them.

At one o'clock in the afternoon, I descend the gulley to the edge of the vertical walls of the shaft; a rope held me by the waist, as I threw down the last few meters of the rope ladder

into the hole, I had to be very careful not to lose my foothold.

This first operation succeeded perfectly. At a frightful speed the shaft took the 80m of rope ladder followed by about 35m of single rope: 20m down the shaft and the remainder on the slope of the shake hole, at the top of which were planted wooden stakes, to which the ropes were attached. These did not stir under the falling weight of about 100kg. The rope did not brake, and, if the depth sounding was exact, the end of the ladder should already have touched the bottom of the shaft.

However, at the end of the ladder there was also a 10m long rope, in case the ladder should be a few rungs short of the bottom.

No one knew anything about the operation of my telephones, and my wife had to be posted at the opening of the hole for this important job. She would transmit my orders, which had to be given in English.

Everything appeared to be in good order, my only concern being the lighting. If daylight did not penetrate to the bottom, I wondered what I would do, because there was still a lot of falling water and the volume of spray would certainly prevent all underground lighting remaining lit. Never the less, I attached a lantern to my arm and sat on the wooden bar.

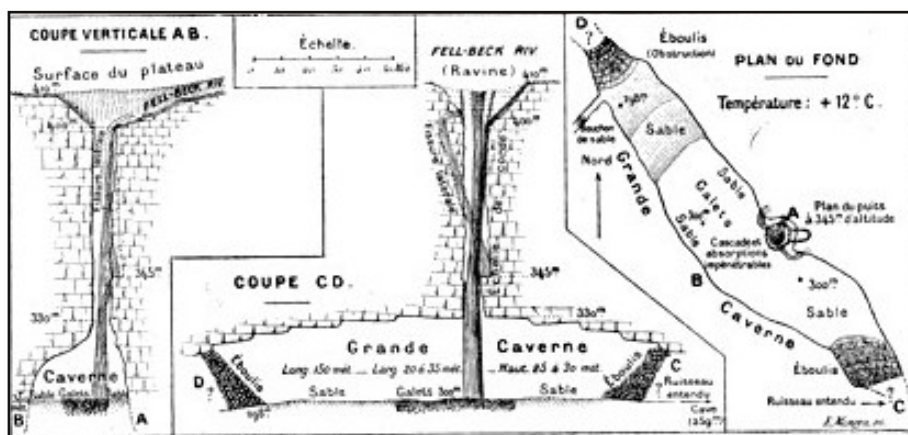
It goes without saying that I had not eaten: the ordeal I had to undergo would hinder any digestion. I cannot dream of carrying my usual bag, full of things so often indispensable – as all would be wet through in less than a minute. It was necessary to make up a long thin packet containing only candles, magnesium flare, matches and a flask of rum – all sealed in waxed cloth, - and, to fix it to the wooden bar. It would be sheltered a little by me and down below I would open it if I were able to set foot on the floor at the bottom.

But, one may ask, does not Gaping Ghyll end in a pool of water? The depth sounding rope, wet along its whole length, does not furnish any precise information and the noise of the waterfall prevents one from knowing whether the tumbling stones reach solid ground or fall into water.

Mr. Farrer's watch is at 1.22 p. m. when I call "Lower me! Gently! "

The first 20m go remarkably well; the rope is slightly inclined and I have only to let myself slide along it; the waterfall remains about 1.5m to my left; its spray wets me, but does not make it difficult for me at all; from time to time the beds of rock offer points of support for my toes. And I reach, almost without interruption, the first step of the ladder: "Stop! Do you hear me without telephone? - Yes. "Good! It is going fine; it is quite light; I am on the first solid rung and I am about to go into the cascade, let go, gently, but hold me firmly. "Lower me".

The water is cold and, in spite of having my collars well buttoned up, it entered by my neck and makes shivering furrows from my shoulders downwards; I am happy to have thought of wearing boots with holes in their soles which



permit the water to run out. But I am not totally numbed by the shock of the water on my head, as I had feared; it is true that I am wearing a strong leather cap. The lantern and the telephone are a nuisance.

40m down I feel myself suddenly stopped: "Hello! Hello! What's the matter? – "It is the knot between the two ropes which has stuck in a crevice in the rocks, and it will take five minutes to get it free!" – "Oh no, not 5 minutes!, I am in the cascade, and it is not warm. – Hurry up!" I have time to get vey annoyed as the delay lengthens and the cascade envelops me in the undulating stream of water.

At last the descent restarts and, at 55m down I am happy to be able to stop on a sort of terrace, a ledge, 4m long by 2m wide. "Stop, rest: I have arrived at the ledge reached by Mr. Birkbeck: I can get out of the cascade. Half the rope ladder has hung-up here: it has been stopped en route down the hole: I must untangle it and throw it down the remainder of the hole. Hold the rope tight!" This was done rapidly and without too much difficulty. The end of the ladder is thrown over the side and 45m of it tumble with a noise, which frightens the people up above; as for me I only just have no time to throw myself backwards to avoid some stones dislodged by the movement of the gear. Lifting my head I admire the elegance of the column of water: this is clearly is how the Avens of the Causes were formed! "Hello, hello! - Hello! "Are you getting on OK? – Yes, very well! I still do not yet know if the ladder reaches quite to the bottom, but I believe there is no lake and that I see clearly to the bottom. Still 45m to go, and in the cascade all the time. Let me down gently, regularly, and do not stop me en route. Lower me down".

The hole becomes narrower, but the daylight falls vertically, and for another 15m the ladder remains close to or against the rock.

Suddenly, at about 70m depth, I feel myself suspended in space: the walls widen abruptly and the cylindrical shape is intersected at right angles, and transformed into a flat vaulted ceiling which is lost in black obscurity: "Stop - Hello, hello! - Hello, hello! What's the matter? - I am stopping to look around: I am coming into an immense cavern; I cannot see the end of it, but the ladder is touching the ground on sand and pebbles, and it seems pretty light at the bottom. Still 25m, lower me down". The swinging movement of the ladder, always so disagreeable in an open space of this kind, gets worse with each rung. It is also very annoying that with each swing of the ladder I find myself alternately in the centre of

the cascade and then out of it. This little game almost stops my breathing. I let my lantern fall, as it only hinders me and will not be of use.

And now there is another sudden stop: "Hello - hello! - Hello! The lifeline rope is too short: we are adding another; two minutes to make the knot! Patience! - Yes! You have stopped me in the middle of the water! One should have lengthened the rope sooner. At least, I shall get to the bottom. The bottom is not more than 10m away"

Annoying though this forced stop is, I sat myself with real joy on a rung of the ladder; happy with my certain success. I set myself to analysis the extraordinary sensation I am experiencing: the attainment of a new unknown, the majesty of the unexpected sight; the strangeness of swinging in a waterfall; the total isolation 100m below ground, the deluge of light and water alone disturbing the mystery of a colossal chamber; the satisfaction of a goal attained, of the will which has conquered bodily discomfort and material obstacles. I did not find these unforgettable minutes of vital sensations too long, I still rejoice that know how to appreciate the intense charm of my surroundings.

The sounding has been so precise and the lengths of ropes so well calculated that the last rung of the ladder reaches within 20cm of the floor of the cavern, but hardly have I put my foot on the ground, when the ladder relieved of my weight, rebounds up by about a meter. It is now 1:45am on Mr. Farrer's watch, and the descent has taken 23 minutes.

"Hello! hello! - Hello! It is done? ... Yes, I am at the bottom. I am untying from the rope and shall explore the cavern. You can have lunch. I am leaving the telephone for at least half-an-hour - Good, we understand."

The floor on which I landed is even, and is formed of black sand and round pebbles, similar to those in Ingleborough Cave.

During an hour and a quarter in this monumental temple of humidity and water vapor, I made the following notes - hurriedly, because of the expected storm.

Gaping Ghyll is a hole formed by erosion, a fissure enlarged by water, in the same manner as the majority of the great avens of the Causses, but with this difference: it is not inactive - not out of service. It is still forming owing to the continual passage of water. The vertical cascade of 100m, which falls in a single column, and whose volume is enormous after a storm, or in snow melt, proves that other natural avens and shafts of this kind must have had an identical origin, even when they are now deeper and dry. Such as Rabanel (Hérault), Trouchiol (Aveyron) and Jean Nouveau (Vaucluse). From this point a view Gaping Ghyll has plenty of other comparable shafts the immediate neighbourhood.

The fissure, 80ft down, from which Mr. Birkbeck saw an inlet, is simply the outlet from the secondary lateral shaft, which Prof. Hughes recognised in 1872 a few metres up the Fell Beck. Thanks to the work ordered by Mr. Farrer; this inlet was not flowing on the day of my descent and did not impede me as it did Mr. Birkbeck.

The ledge on which Mr. Birkbeck landed at about 55m is known as a 'redan' in French caves, 4m by 2m. The sketch cross-section shown here, point's to the history of the chamber. The widest part of the chamber is where the combined effects of the main waterfall and the waterfall from Mr Hughes inlet are felt. It was still not flowing but without doubt must be less voluminous than the main waterfall, and both have not yet finished deepening the part of the floor that they are striking. The narrowing of the shaft above the ledge proves that because of the angle of the two columns of water, the larger one does not generally hit the ledge (except perhaps in flood conditions). I was, in effect, able to stand on it and pull myself out of reach of the cascade. It is certainly the second waterfall which has contributed, above all by its dipping angle, to the widening of the middle section of the chamber, but there still remain about 15m of rock to be worn away before the ledge disappears entirely and the shaft becomes regularly conical right to the bottom of the great cavern.

As the plan shows, Gaping Ghyll ends in an enormous nave; 150m long, 25-30m wide and 25-35m high. It is the work of waters, stopped in their descent by an impermeable substratum of Silurian slates, which, through joints, has excavated this colossal reservoir of about 100,000m³ capacity. It could contain a cathedral with a spire extending up into the shaft. This is nothing else than the chimney of an enormous boiler whose roles are reversed - the chimney conducts cold water to the boiler instead of drawing off scalding vapour.

There is not a single stalagmite under the gigantic ceiling, and there cannot be any, as it must often be full of water; however, three things are striking, and which reminded me of my feelings in the depths of Rabanel and Jean-Nouveau.

First, the almost complete horizontal nature of the cavern and most of all the floor, this level beach of sand and pebbles of 3,000m² where popular imagination in the poetic times of the past would have located a Palace of Nieblung. There are certainly caverns of greater dimension, such as Adelsberg, Han-sur-Lesse, Dargilan, Gradisnica, and Mammoth Cave, but none of these, I think, shows such regularity; all have floors more or uneven, while that of Gaping Ghyll appears to be almost suitable for a Sunday waltz!

Secondly, the harmonious murmur, of the transparent sheet of the water falling from above, gracious as cascades in Switzerland, blown by the breeze on to rocks, like powdered diamonds. Here no draught interrupts it's vertical drop; the oval liquid column resembles a moving stalagmite too rapidly formed to set solid.

Thirdly, the feeble light of day, which, filtering through the water droplets like millions of prisms, does not seem like anything the human eye has gazed upon, and it provides me with something I have never seen before. It is one of the most extraordinary spectacles I have ever beheld.

About 20m away from the foot of the cascade it is not possible to see very well, and it was only by means of numerous candles placed around the cavern that I was able to make a very hurried survey - in only an hour and a quarter.

It is certain that, as much by corrosion as by erosion, the water has excavated the cave, and the fractures, joints, and beds of the strata have helped this work.

I do not, however, know whether this great cavern is simply an enlargement of the shaft above it, or whether it represents a greatly enlarged portion of an ancient river passing immediately below the shaft.

Each extremity the chamber is terminated by a steep boulder slope of tightly packed fallen rocks, composed of large angular fragments, not rolled over or rounded by water, which proves that they are relatively recent - pieces broken off the bedding planes of the roof, which I believed at the time would entirely block any passages making it necessary to dig through in order to find the continuation of the cave. We will be seen later how having descended quite alone and soaked to the skin, I could not dream of being able to make a lengthy examination of the crevices in order to find passages which have since been discovered. However, in climbing up the slope to the south-east, which is in the direction of Ingleborough Cave, I clearly heard through the stones, the noise of a stream. I confess that being without a companion, I refrained from a more complete investigation, as the least slip might have had disastrous consequences for me.

It is quite certain that the flood waters leave by the S.E. side, at the foot of whose slope I found a jam tin lid, which had fallen from above and was of sufficiently light to have been carried along by the water to the slope. No other objects were seen by me, - neither bones, dead wood, nor Mr. Hughes's pieces of wood; the gravel and pebbles of Fell Beck absorbed all.

According to the predictions of Mr. Hughes, the stream of water here should not follow a route that a man could travel along; it filters down through the sand and gravel in several places into the fissures below.

To the N.W. there is a little passage, fairly high, about 1m wide and 10m long, which may perhaps, lead to other passages or chambers if the sand which blocks it were cleared away.

What is the thickness of the alluvial deposit? What animal remains may it contain? At what depth is the original floor - now covered by gravel? These questions can only be answered by sinking a shaft.

I can only say that, on the 1st August 1895, the altitude of the gravel was 300m above sea level, so 48m higher than the resurgence at Beck Head; that the water from the cascade before filtering into the ground was of a temperature of about 12degC. and that the humidity of the air in the cavern was considerable.

The difference in level down to the stream which runs behind Giant's Hall is about 40m, and for 1220m as the crow flies, this means an average gradient of 3.28 in 100.

Where as the very active cave of Saint Marcel d'Ardeche (see 'Les Abimes', pages 70 and 79) only has a gradient of 4 to 100. Also I was of opinion that, between the bottom of Gaping Ghyll and Giant's Hall, there exists at least in some places

waterfalls and important chambers. It will be seen later that subsequent explorations have confirmed this theory.

After walking about the fantastic hall for an hour and a quarter I became convinced that there is no way out other than that by which I entered. My inspection was as complete as possible; to find anything else than what was seen by me it would be necessary for several persons to descend during more settled weather. Wet through from head to foot, I shivered with cold and my teeth chattered - in spite of my now nearly empty flask of rum. It was therefore necessary for me to climb out if I wish to avoid pneumonia. Reaching the telephone, which I had carefully hidden under a stone.

"Hello! hello! I am going to tie on to the rope and come up! Pull gently - Hello! hello! Do you understand?- Hello! hello! Is no one by the telephone up there? - Hello! What is the matter?"

The telephone remained silent. It is full of water and wont work anymore! The rope does not move and I wait, under the very cold shower! My position becomes dangerous: I yell fit to burst my lungs: "Pull, pull up!" At last I feel myself being lifted - and so quickly that I hardly have time to hold the rungs of the ladder. Then a sudden stop, 10m from the level of the floor: I guess that the knot of the second rope has stuck in the crevice: I hear nothing by telephone, and the water continues to freeze me. At first I have the distraction of seeing the remainder of my candles below me, whose reflection reveals the immensity of the cavern. But the stoppage is really past bearing, and I try to clamber up the rope ladder without support: my limbs, stiff from the effects of the water, will not take me more than four or five steps, but that has been sufficient to loosen the rope and to allow the knot to be dislodged from the crevice above. The knot is now out of the way, and they start once again to pull strongly. Finally I arrive at the ledge at 55m, and my cry of "Stop!" is heard. I am now within ear-shot - very fortunately, because, hardly had my ascent commenced than the telephone wire became entangled and broke. At 40m a further stop in the cascade in order to pass another knot; and at last, at 3.55 p.m., after an ascent of 28 minutes, I emerged from the opening of the hole.

The warmest cheers of welcome awaited me, but I could scarcely acknowledge them: warm clothing and hot grog were what I wanted most of all. It seems that I was very pale on arriving on surface, but I did full justice to the lunch awaiting me!

To my profound surprise, my wife informed me that she heard perfectly all my remarks and swearing at the telephone until the wire broke, and that she was surprised that I did not answer her questions. Thus it was only my receiver that did not function, being full of water.

Twenty minutes after my arrival on surface a storm burst forth and frightened off all the spectators. The same evening Fell Beck rose up again. Good fortune had indeed favoured me, and I was wise in not staying longer down below.

One last incident: the top rope on which the rope ladder was suspended was, under my weight, so thoroughly wedged in a crevice between two rocks at the edge of the shaft, that it

was absolutely impossible to pull up the rope ladder on that side. Another rope was therefore attached to the first, taken to the opposite side of the hole to where the stakes were located, and attached to the traces of two cart horses. With one vigorous pull the beasts released the rope ladders and, after a short trot on the peaty ground, they drew all the tackle used in my descent to the surface. Armand (Louis) himself would have applauded this elegant maneuver, during which only two rungs of the ladder were broken.

Without the falling water, which is always really unpleasant, the descent would have been a simple game down this straight and well lit shaft; and with my usual companions the operations would, of course, have been more rapid, and two or three of us could have got to the bottom.

But I must repeat that my success at Gaping Ghyll has been due principally to the perfect readiness to assist of all those who helped me, and above all to the exceptional foresight and courtesy of Mr. Farrer, who ordered, on his own initiative, the work of diversion of the Fell Beck, which took several labourers three days.

It is certainly the most generous and efficient assistance I have ever received during the course of my subterranean explorations, and I do not know how to thank my courteous host for all he did for me.

My expedition to Gaping Ghyll has not remained a vain adventure: twice already it has again been undertaken, and these new expeditions have, as I predicted, discovered important extensions to the cave. I have received directly from my successors the details that follow:-

Since September 1894, Mr. Edward Calvert, of Burley, near Leeds had had a project for renewing the attempt of Mr. Birkbeck. Not only was he delayed in the execution of this plan, but I regret now that I did not know of it and so could not join with him, as, with two of us, my descent on the 1st August 1895 might then have been more fruitful.

Be that as it may, Mr. Calvert, from whom I had unintentionally snatched the pleasure of the first descent, did not in any way halt his preparations. With him I have been engaged in the most courteous correspondence, and I have been happy to see him follow me successfully, down the route in which I had opened in his place.

The two first attempts were unsuccessful.

On the 15th September, 1895 Messrs Calvert, Barran, Cuttriss, Booth, Gray, Green, Bellhouse, Lund, Thompson and Ben Mason found the water of Fell Beck so high that the construction of a dam caused them to lose much time. Only at 3pm was Mr. Calvert alone, installed in a kind of bosun's chair fixed to two ropes and worked by a windlass, able to commence the descent. He was stopped about 65m down, due to the entanglement of the ropes and telephone cords, and above all by stones falling from the walls. Mr. Booth also descended 55m, but the lateness of the hour did not permit the descent to continue that day.

On the following 5th October, the stream was so swollen that any further attempt was impossible, but Mr. Calvert carefully

examined around the shaft and the lateral fissure entered by Mr. Hughes, where I had not been able to pass my rope ladder and he became convinced that with ropes and a system of pulleys, the descent would be easier.

By this fissure, which joins the main shaft about 30m down, the tackle was fixed so that, at 8pm of the 9th May, 1896, Mr. Calvert reached the bottom, which was thus visited a second time. There was, without doubt, less water than on the 1st August 1895, as the cascade consisted of two small columns, instead of one large single one. Mr. Calvert had the misfortune to land in a pool of water about 40cm deep, which I had been able to avoid, and this extinguished his lantern. With full daylight I had had perfect illumination during the whole of the descent, but because of the lateness of the hour, Mr. Calvert ascended almost immediately. The windlass greatly assisted this operation, which took only 4 to 5 minutes, instead of the 23 to 28 that I took on the rope ladder. This ladder was, nevertheless, indispensable for the first descent into the unknown, because of the independence and security it afforded to the explorer.

On the 10th of May Mr. Calvert descended with Messrs. Booth, Gray, Green and Cuttriss. Equipped with instruments and powerful naphthalene oil lamps, they were able at once to agree with the general accuracy of my sketch survey, and they split up into two teams.

Messrs Booth and Gray, for their part, went up the N.W. slope (about 11m high by 17m long), and found a passage 40cm high that they crawled along for about 50m into a narrow stalagmite decorated passage, and finally came out into a second immense cavern - although of smaller dimensions than the main chamber (about 50m long). They looked all around without finding a way on, but noticed a strong draught.

The other team, composed of Messrs. Calvert, Green and Cuttriss, found, after some trouble, a passage 40cm high at the top of the S.E. slope, the bank being 34m long by 21m high. In front of them was a long, tortuous passage, varying in height from 30cm to 9m, full of stalactites, that soon split in to three directions. Towards the west, the first passage, (34m wide and 21m high) was followed for more than 200m by Mr. Calvert on his own. To the south a descending slope led to a high sandy chamber, thence there was a short passage accessible only by crawling leading to a blockage of sand, which had to be removed in order to penetrate further. Finally a third fissure, parallel to that of 200m in length, led to another vast chamber at the end of 200 to 300m.

After spending six hours in their research, the explorers had to return to the surface, leaving for another time the follow-up to their exploration.

In the main chamber, where a sixth person, Mr. Moore, had descended in the meantime, and found no trace of debris, just as I had - only the carcass of one sheep and a cut plank found lying on a ledge at a great height above the floor. Thus proving as I had conjectured that the immense chamber was sometimes filled with water.

In a lecture on Gaping Ghyll, before the Yorkshire Ramblers Club at Leeds on the 19th of May, Mr. Calvert declared that

the exploration would be continued, "but the difficulties of the task were so great that to accomplish this task would require several weeks".

At Whitsuntide 1896 a fourth expedition took place at the hole, which had now been stripped of its frightening reputation. The preparations took the whole of Saturday 23rd of May. On the 24th a first descent was made by the lateral shaft, which was now recognized as the easier way down. Messrs Cuttriss and Green prepared a detailed survey of the main chamber, finding it to be 146m total length, 25m at the widest part and 290m above sea level - instead of 150, 20 to 35, and 300m respectively estimated by me. During this trip, Messrs Calvert, Booth, and Ellett again penetrated the passages to the south and discovered another large triangular cavern about 45m high. They reached it through an opening almost on a level of the roof, and had to descend a very slippery clay slope, at an angle of 60 degrees, and using ropes, a drop of 9m, to reach the floor, which was about the same level as the bottom of the main shaft.

There is one passage out of this new chamber, which leads to several other passages and in one of which, 500m from the main chamber, the explorers finally found, as I predicted, the water which runs from Gaping Ghyll to Ingleborough Cave. But this water disappeared 100m further on, in three impenetrable rocky fissures. Eleven hours was spent underground on that day.

Monday the 25th May, was devoted to the making of a proper topographical survey of the main chamber, and Mr. Cecil Slingsby, a celebrated alpinist, well known for his ascents in Norway, descended for the purpose of visiting the cavern.

A fourth day was necessary for bringing up all the instruments and tackle.

Such is the history of the exploration of Gaping Ghyll, but it is clear that its methodical examination is not yet complete. Mr. Calvert and his colleagues do not intend to give it up before detailed surveys have been made, which will help to better understand, better than any description, the actual layout of this labyrinth in the interior of Ingleborough.

The investigations already made have proved that Gaping Ghyll is a cave of the highest geological interest, and a sketch made by Mr. Gray which I can certify is exact, shows that the bottom of the shaft is surely one of the most extraordinary underground scenes that it is possible to contemplate.

Let us hope that one day it will be accessible for the curious to see it and without being soaked too much.

Presently in Gaping Ghyll there are about 954m of passage have been discovered, and running water is again seen at an altitude of about 283m which is only 24 to 31m above the source from Ingleborough Cave.