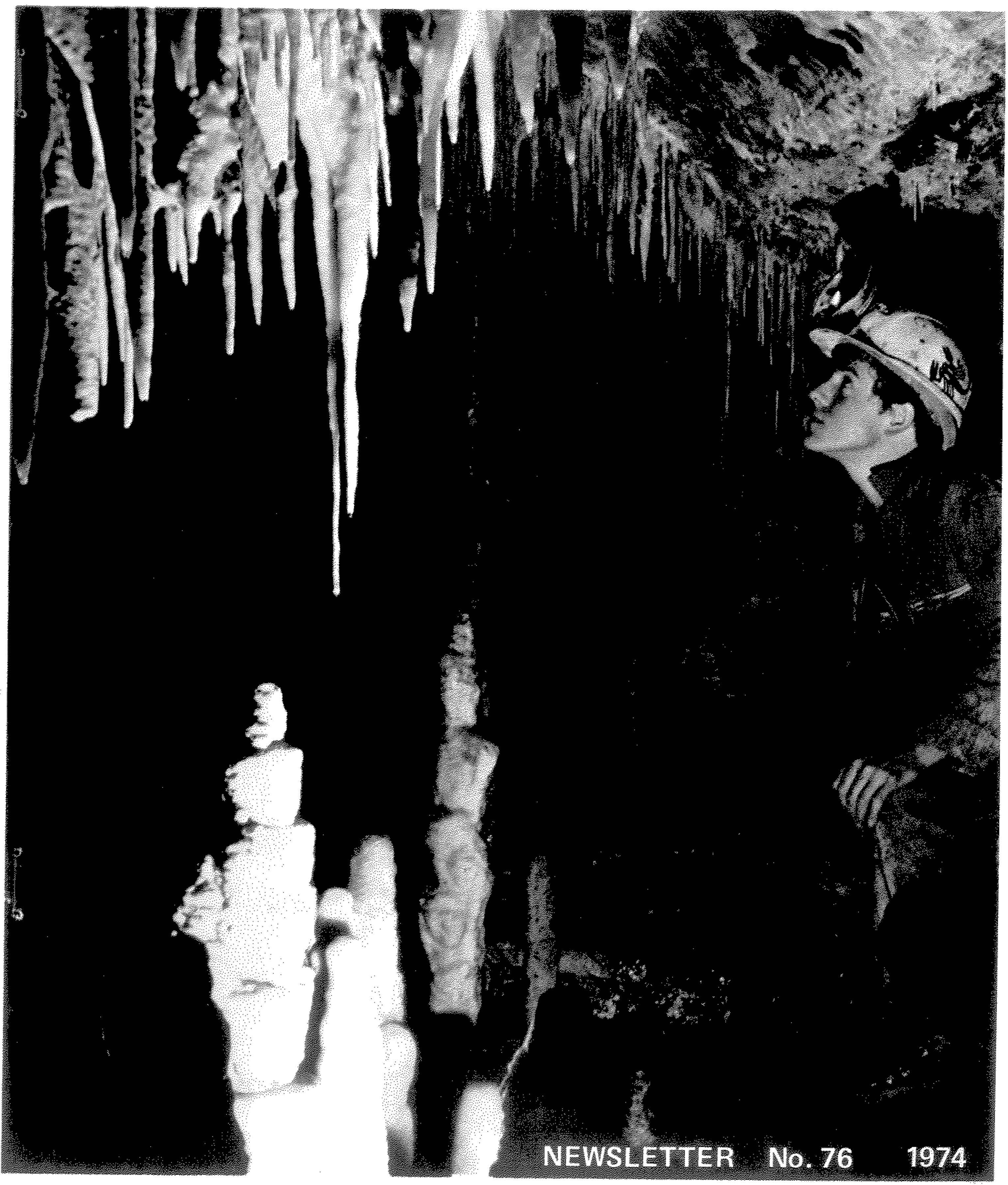
SOUTH WALES CAVING CLUB



NEWSLETTER No. 76 1974

S O U T H   W A L E S   C A V I N G   C L U B

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C O N T E N T S

COVER PHOTOGRAPH

Grotte de Pere Noel Hans sur Lesse Belgium

by Gary Jones

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A Lucky Start To '74

(Boreham Cave, Yorks.)

Despite above average rainfall for January diving was possible and extensions were made, namely in White Lady Cave and Bridge Cave. However the most promising sites like Ogof Cas, Llygad Llwchwr, Llethrid, Tooth and Dan-yr-Ogof were safe from attack. So, frustrated by the weather in the south, a visit to Yorks. was arranged for the 2nd and 3rd of February, largely determined by the imminent price rise, or the rationing, of petrol.

There were several places that we wanted to have a look at and the weather up north had appeared better. Thus, 10.00 p.m. on a miserable Friday night, 'Bomber' (R. F. Beaumont), Roger Solari and I arrived in Redditch to collect the fourth member, Dave Underhill. No one felt particularly enthusiastic about the long drive up and the prospect of having to crash out in the wet when we got there, so - off to the pub. Saturday dawned and Roger's car limped up the M6 under the incredible weight of four divers and their kit. Stopping in Skipton, a long pessimistic discussion led to the inevitable thought of a jar. Thus the day was progressing quite satisfactorily when we finally stumbled on Boreham Cave)Littondale), the only place in Yorks. that was not in flood. Across the valley Bown Scar and Scosca were in full spate so Boreham appeared rather enigmatic.

By the 'Wharfdale' book the cave appears pretty insignificant but it was known from Cave Diving Group reports that this resurgence had witnessed some fine diving exploits, largely by Geoff Yeadon and Oliver Statham. They had reportedly dived about 650 feet of sumped passage before running out of line. As their last report appeared in the C.D.G. Newsletter, dated 9th September 1973, it was obviously fair to assume that they had either pushed it to the limit or given up. In either case the question of whether we were 'pirating' it, or not, did not justifiably arise.

The entrance is obviously something of a fossil feature being just over 5 feet in diameter and emitting a very small stream. The stream shows no evidence of ever rising above a mere trickle.

Dave and 'Bomber' (deciding initially against a dive) helped us with the kit before indulging in a walk. We kitted up about 100 feet in from the entrance at the beginning of the canal which leads to the sump. Sumps one and two are really continuous, shallow, clear and about 130 feet long. A 100 feet beyond, the small stream that now occupies the cave was found to emerge from a tight (undiveable) yet diggable sump. A crawl off to the left led after less than 100 feet to a completely different streamway with far more water. Upstream closed down to a boulder choked sump and the 'way on', contrary to expectations, lay downstream.

Two lines enter the initially tight bedding sump. Roger dived first on one bottle while I followed after a few minutes with two cylinders and a 600 foot line reel. The sump was found to be uncomfortably small. At about 250 feet entry was made to a rift airbell and 60 feet later the sump was passed. It led to a chamber about 25 feet long and 6 to 7 feet wide where the water cascaded about 6 feet down over boulders into the next sump.

This led after 80 feet of shallow comfortable tube to a large airbell. Roger dived on but soon returned having reached the end of the diving line, with no great safety margin on air. I then dived reaching the previous limit to find G. Yeadon's reel in very poor visibility, after a 200 foot dive. Halfway I passed an 8 foot pot with very ominous large boulders, Roger having noted an airbell about 7 feet above. Tying on, 40 feet of line was reeled out, the passage gradually rising (but not much over 3 feet diameter), when peaty water was suddenly encountered. The water temperature was noticeably colder and diving upstream the sump was passed after a further 10 feet.

The extension looked impressive. A large stream cascaded through boulders in a lofty passage (over 30 feet high), into a froth ridden sump pool. Tying off, the kit was placed above the flood level and I set off to explore. The passage size increased steadily upstream and soon a chamber over 100 feet long, 50 feet wide and over 25 feet high was entered, where a tributary stream crashed to the floor via a 15 foot waterfall. In the vicinity lay some of the finest straws in the country and a superb curtain. Continuing along the main passage a canal was followed to a fork. The right hand branch closed down into a 2 foot square passage with fast flowing water, while the left led to deepening water and eventually a swim. Here a return was made, about 1500 feet of passage having been explored and a pair of wet suit socks testifying to rough usage.

The water in the sump pool had risen by 6 inches and the current in the sump was quite noticeable. However, visibility was good and no problems were encountered on the dive back. A cool Roger was found in the airbell on a rapidly receding piece of dry land and we made our way out, reaching the entrance and continuing rain at 6.00 p.m.

It was to be three weeks before we were in Yorks. again, obviously with the intention of further exploration. The Saturday was such a beautiful day that it would have been criminal to spend the whole day underground. Consequently, a short dive was made of Deepdale Rising and a brief splash was occasioned at Malham Cove.

Midday Sunday, we were assembled outside Boreham once more. This time 'Bomber' and Dave were to dive, though only sumps 1 and 2, so as to examine the upstream sumps and then survey out. Into the extension the order of diving was Roger first while I again followed, equipped with second bottle and line reels, for use in the main downstream sump. Once we had passed the 800 feet of sumps Roger dekitted and made himself comfortable while I dived. The sump was very large, yet shallow, and at 120 feet the line was belayed in a small airbell. Continuing, the line ran out after a further 200 feet, just beyond a large airbell. This sump must again be seen as very promising, showing every sign of surfacing and with a considerable distance to any place that might be considered as the resurgence.

Rejoining Roger, we both set off upstream into the extension, aiming to push on to the end and commence the survey. Passing the previous limit, the water level being two feet lower, we progressed through two sets of low canals before emerging at the final choke. Here a boulder marked with 'K.C.C.' faced us and obviously depressed our spirits a little. Even so, it seemed only fair considering that G. Yeadon had done all the initial groundwork. It was a great pity that he had run out of line when he did, but that's the luck of the draw!

Inspired by the sound of the stream beyond the choke, we dug for half an hour before giving up and surveying back downstream. Examining one side passage, Roger sustained a very bad cut above the knee, but would not give up. Only when my light was almost extinguished did we pack up and leave, both pretty fatigued. Needless to say we were very glad to exit at 8.00 p.m. with the prospect of the long drive south.

Thus Boreham Cave now has over 1000 feet of sumps and 3000 to 4000 feet (conservative estimate) of dry and beautiful passages beyond. Just what G. Yeadon has found remains to be seen but undoubtedly much more remains to be explored. We completely ignored two very promising inlets, due to shortage of time, and also a large, inviting high level passage near to the sump. An 'airy' 20 foot climb would soon give access to this. Hopefully a return will be made at Whitsun to complete the survey and anything else that needs to be done. In the meantime, it remains an intriguing and very promising cave.

M. FARR

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This paper was presented at the Sixth International Speleological Congress in Olomonc, Czechoslovakia in September 1973. Reprinted with the author's permission.

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Morphology and Hydrology Of The Ogof Ffynnon Ddu Karst Area

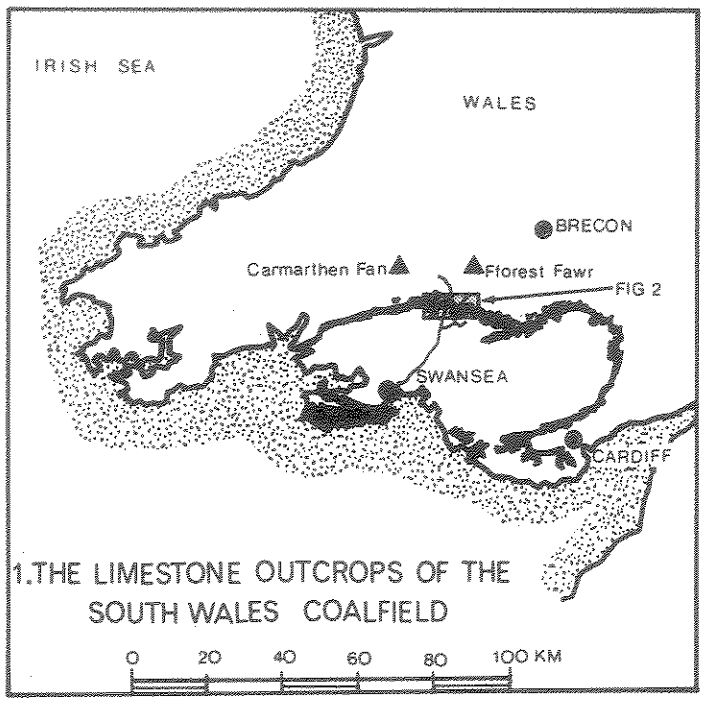
INTRODUCTION

The district described in this paper is located on the northern rim of the South Wales Coalfield, some 40 km. north-east of Swansea and a similar distance south-west of Brecon (Fig. 1). As a karst area it has attracted little attention but its importance has been established by the discovery in recent years of some 40 km. of cave passages. The aim of this paper is to describe the district and its relief features, to report on the work carried out there to date and to attempt to relate its development to that of the area as a whole.

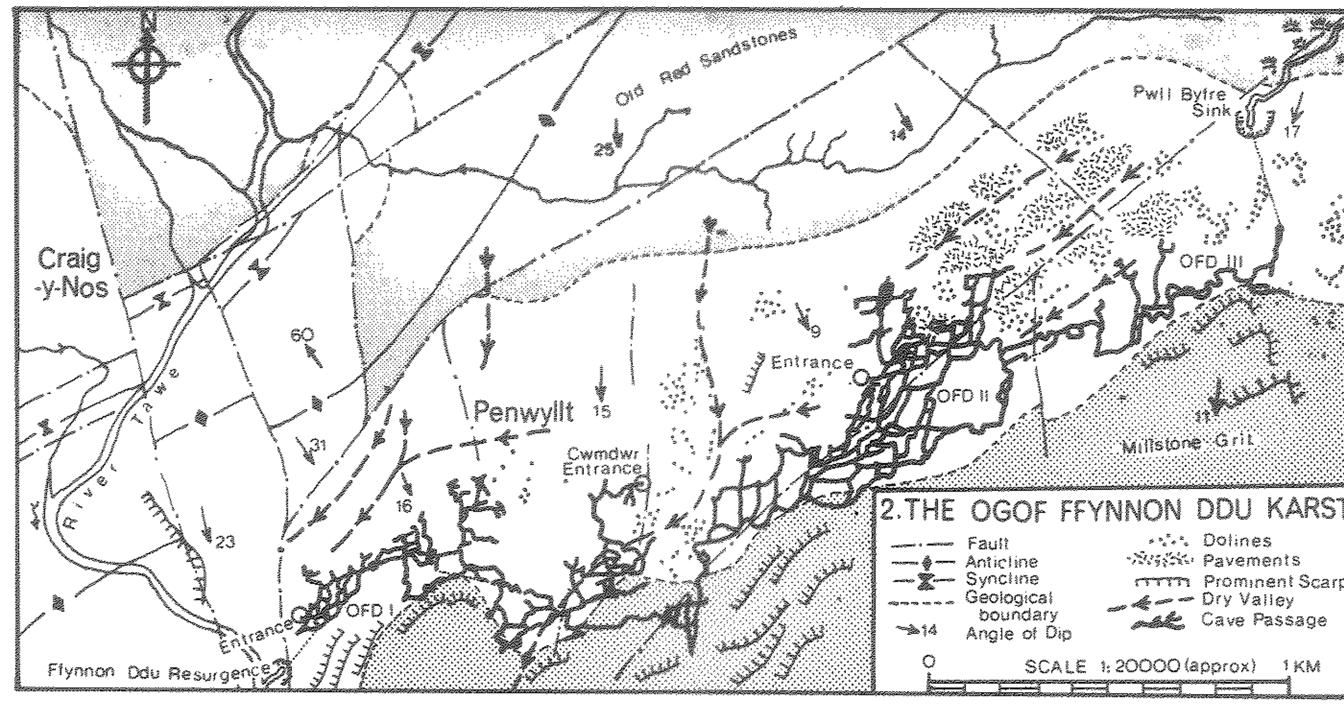
GENERAL GEOLOGICAL AND PHYSICAL BACKGROUND

The major structural features of the South Wales Coalfield were formed during Hercynian times. Basically it is a large synclinal structure with an east-west axis broken by noth/south and north-west/south-east en echelon faults and folds. There are, however, several structurally complex belts of Caledonoid (north-east/south-west) trend traversing the Coalfield. The Swansea Valley Disturbance is one of these and its main features in the district are gentle faults and folds. It is on the southerly-dipping, asymmetric limb of the Craig-y-Rhiwarth anticline that the karst area has developed (Fig. 2). Faulting has occurred in two directions, the major one being north-east/south-west following the trend of the disturbance, and the other north-west/south-east in which direction the faults mostly die out. The structure of the region is complex and has been described in detail by Weaver (1971).

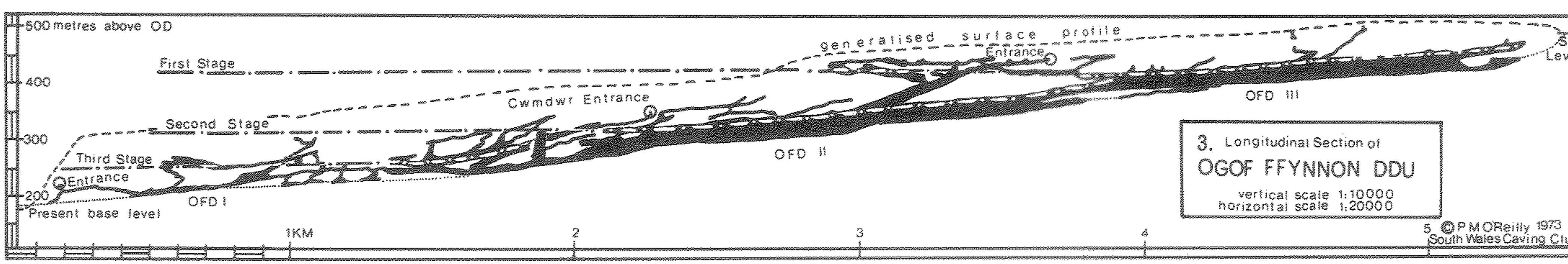
There is approximately 200 m. of Carboniferous Limestone, the lowest of the sequence being the Lower Limestone Shales which rest on the Devonian Old Red Sandstone. The main Seminula zone is 100 m. thick and consists of



1. THE LIMESTONE OUTCROPS OF THE SOUTH WALES COALFIELD



2. THE OGOF FFYNNON DDU KARST



3. Longitudinal Section of OGOF FFYNNON DDU

oolitic, pisolitic, fine grained, well-bedded, crystalline limestones often with thin shaley partings and dolomite lenses which merge upwards into the predominantly oolitic Dibunophyllum zone; this is succeeded by the cherty Upper Limestone Shales. The limestones are overlain unconformably by Namurian strata; the lowest unit of this is the Basal Grit, a hard quartzite conglomerate, which occasionally occurs as heavily eroded outliers of sandy detritus.

The general topography of the area is rugged (Plate 1); near Craig-y-Nos the Tawe Valley is at 200 metres O.D. but the valley sides rise steeply to about 350 m. O.D. and flatten out with a gradual rise to high points of 600 m. O.D. Scenically the area is dominated by the residual Old Red Sandstone mountains of Fforest Fawr (735m.) and the Carmarthen Fans (803m.) to the north. Long moorland dipslopes stretch southwards towards Penwyllt in a series of high rolling plateaux covered in a discontinuous layer of glacial till and post-glacial peat. The smoothness of these slopes is disturbed by the crags and ridges of the Carboniferous Limestone and the Millstone Grit especially in the neighbourhood of the Swansea Valley Disturbance. This forms a prominent ridge across the region and is breached at Craig-y-Nos by the allogenic river Tawe, which flowing southwards towards Swansea divides the area into two broad upland areas, the easterly one being the Penwyllt area (Fig. 2). The upland is largely open moorland or rough pasture, there being relatively little enclosed pasture, arable land or forest and although the Tawe Valley is heavily wooded up to about 250m. it is only in sheltered valleys and depressions that the trees survive higher. The area received about 2250mm. of rainfall per annum.

Where the surface of the limestone is not covered by glacial drift material it is characterised by low craggy escarpments and broken pavements displaying karren of several different types, kluftkarren being the predominant one. In comparison with the extent of drift cover, the pavements are of very restricted distribution. They are characterised by a close jointing pattern with the joints running roughly parallel to, and perpendicular to, the trend of the Disturbance. The pavements are encumbered by a good deal of flaggy rubble and frost action has played an important part in the fragmentation of the rock.

Numerous depressions have formed on the upland areas. Apart from dolines on the Grit, which tend to be large (up to 20 m. diameter and 15 m. deep) all those on the limestone have formed on the glacial drift and are rarely greater than 8 m. diameter and 4 m. deep. They occur predominantly on slopes of 3° - 8°. Concentrations of dolines occur in the broad shallow basins and dry valleys of the upland areas. Thomas (1954) shows that dolines on the Millstone Grit cannot be of surface solutional origin and so assumes them to be collapses into underlying caverns; a similar origin is invoked for the dolines on the limestone areas. However Williams (1963) provides ample evidence of the solutional origin of these features.

The district is well covered by glacial drift often 20 m. thick, even though some has been removed by later erosion. The bare, glacially striated dip slopes of the Millstone Grit, along with the trains of locally derived blocks of quartzite, quarz conglomerate and Old Red Sandstone erratics, bear witness to the southern passage of ice. Topographically glaciation caused little modification of the shape of the upland area and its effects are mainly depositional with some rounding off of the Tawe Valley which by the Pleistocene had assumed a similar aspect to today. There are well developed platforms in the region occurring at 300-330 m. both on the Old Red Sandstone and the Limestone, and erosion surfaces have been recognised at about 360-390 m. and 440-470 m. but whether they are true remnants of peneplains or not is uncertain (Williams 1960, Brown 1960).

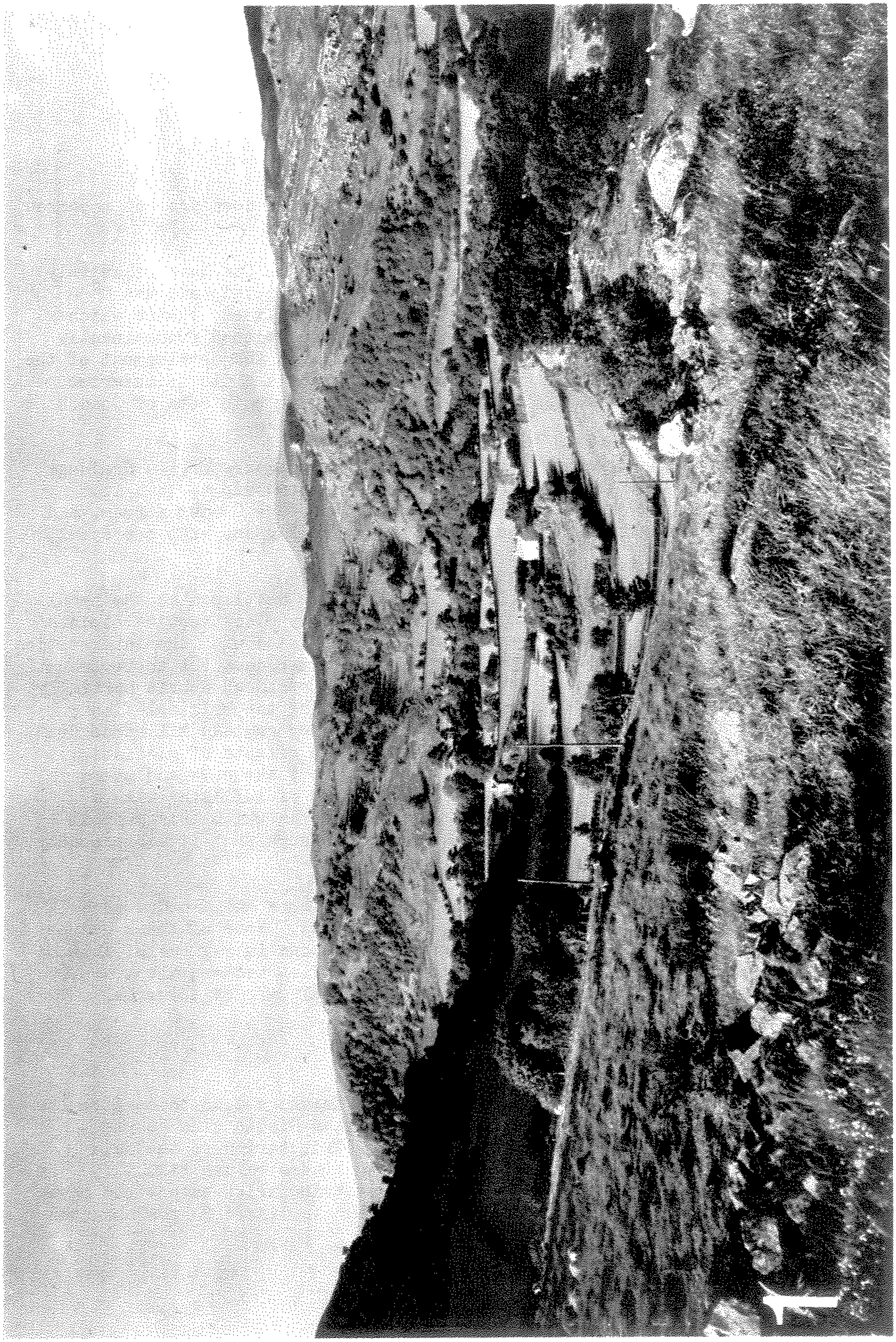
The Carboniferous Limestone outcrop is narrow, rarely exceeding 1 km. in width, and it is extremely cavernous; two major caves systems have developed beneath the upland areas around the Tawe - Dan yr Ogof (19 km.)on the west and Ogof Ffynnon Ddu (40 km.) on the east. The former is partially open as a show cave, but it is with the district above Ogof Ffynnon Ddu that this paper is concerned.

MORPHOLOGY OF THE OGOF FFYNNON DDU SYSTEM

Ogof Ffynnon Ddu has developed almost entirely in the Seminula Limestone and forms a complex sub-horizontal network of passages at several different levels (Fig. 3); it contains practically every type of passage from phreatic to vadose with passage enlargement by mechanical breakdown exhibited to a large extent. The length of the system so far discovered is 40 km. and the vertical range of the passage is over 300 metres making it the longest and deepest cave system in the British Isles.

Water draining from the Old Red Sandstone to the north of the district passes through a marshy area before crossing the Lower Limestone Shales and disappearing in a mass of boulders and gravel at Pwll Byfre. The subterranean river channel utilises 5 km. of the passages before resurging some 280 m. lower down at Ffynnon Ddu (the Black Spring), in the floor of the Tawe Valley. During drought the input at the sink may be as low as 0.005 cumesec and the corresponding output at the resurgence 0.01 cumesecs, but in flood periods these values may rise to 0.03 and 0.2 cumesecs respectively. The discrepancy in the balance is caused by percolation water and by the numerous minor points of engulfment occurring above the system in flood.

Passages have developed almost entirely along the predominant joints which run $0^{\circ} - 20^{\circ}$ and $70^{\circ} - 100^{\circ}$ (O'Reilly et al (1969)); minor north/south faulting provides an occasional exception in passage direction. In many places however, faults traverse the passage and exert very little influence on its direction. Most passages in the cave display evidence of a bedding-controlled initial phreatic stage. Capillary-size tubes run at random along the beds and enlarge by solution upwards - these then develop into an irregular mesh of half-tubes with little apparent joint control (Plate 2). As enlargement proceeds a smooth bedding-plane cavity develops, generally tubular in form, aligned along the jointing (Plate 3). There has been extensive vadose modification of the



phreatic tube so formed and vertical trenches up to 40 m. deep are not uncommon (Plate 4).

Two main cave patterns are apparent from the plan. One is a relatively simple network of passages closely related to the bedding, dip and the 0° - 20° jointing. This network is cut across by an essentially linear system which bears little relation to the dip and bedding but has developed predominantly along the 70° - 100° jointing. The most recent stage in the development of the cave is one of vadose modification with the main stream and its tributaries utilising the existing network of passage, and following both sets of joints about equally in doing so.

The subterranean stream is remarkable for the asymmetry of its drainage pattern, all of its tributaries, except one, flowing down dip to join it. There are some 16 minor tributaries and one major one, the Cwmdwr stream, and as there is only one swallet for the system all these streams must represent percolation water.

Virtually all the large caverns in the cave have developed as the result of passage enlargement by mechanical breakdown, usually along vertical joints close to the passage wall; enlargement is also associated with the intersection of passages. Some chambers have developed along fault planes but there is not development of large deep-seated phreatic caverns. Breakdown debris partially blocks many passages forming false floors and obscuring the original floor; terminal chokes often occur near the surface where they contain Millstone Grit or Sandstone erratics and may be partially due to the effects of glaciation. There are copious quantities of mud and sand throughout the cave and there is ample evidence that the cave has gone through a stage of infilling with a coarse, sandy gravel - the vertical range of passages in which this deposit occurs is very great and the nature of the gravel is such that it was probably introduced during an interglacial period.

There is a small flooded zone behind the resurgence and flooded zones separate the sections of the cave called I, II and III. None of these can be interpreted as a true phreatic zone however - they occur in regions of intense faulting and it is likely that this has altered the flow pattern along the bedding planes and joints, thus acting as a structural barrier to normal passage development.

HYDROLOGICAL PROCESSES IN OGOF FFYNNON DDU

Preliminary investigations of stream solute loadings tend to confirm the conclusion of Ede (1972), that there is little marked distinction between percolation water and swallet water in the area. Tributaries to the main stream (50 - 110 ppm $CaCO_3$) have relatively low hardness values (110 - 150 ppm) and respond rapidly to rainfall. Water for these tributaries enters the cave through a well-integrated network of solution channels linked to the numerous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surface depressions above; there is thus little time for any increase in the carbon dioxide content through contact with the soil and little time for the water to be in contact with the bedrock. This may go towards explaining the sparseness of calcite deposition throughout the cave compared to Mendip where calcite deposition occurs at shallow depth. The Cwmdwr stream water has a higher total hardness than any other water in the area (140 - 160 ppm) and indicates a less integrated flow path.

It has been found however, that the swallet water does differ from the percolation water in one important aspect; high quantities of organic material are picked up by the stream as it passes through the marshy area before sinking, and this appears to contribute to a large extent to limestone solution. Bray (1972) has found a direct relationship between aggressiveness and oxidisable organic content of the water and a series of tests carried out in extreme drought when the amount of percolation addition to the stream was very low found that the hardness gain per unit amount of organic matter lost was constant throughout the length of the streamway (Bray and O'Reilly (1974)). The implications of this are that the organic matter content of the swallet water, in being oxidised, imparts to the water additional solutional capability, so that limestone solution continues to occur to a greater extent than that indicated by the initial aggressiveness.

THE GENERAL RELATION BETWEEN CAVE AND SURFACE

Physiographically the Coalfield plateau is a southern extension of the High Plateau and Middle Peneplain of Central Wales (Brown (1960)). During Tertiary times the proto-Tawe flowed south-eastwards across the area and the remnants of the erosion surfaces and terraces already mentioned probably date to those times. Fluctuations of sea level associated with the Pleistocene caused a great deal of alteration to the drainage pattern of the area and as the Tawe cut back, its course gradually became adapted to the Swansea Valley Disturbance. The old plateaux became heavily dissected, and the caves which had been formed were progressively exposed.

The following detailed stages can be traced in the development of the Ogof Ffynnon Ddu system:

(a) The first major stage is the development of shallow phreatic tubes approximately 8 m. in diameter carrying water westwards towards the proto-Tawe. This cave was essentially linear in character although subsequent tributary tubes also developed draining the limestone updip of the main drainage channel. This cave appears to have been graded to about 400 m. (Fig. 3), possibly correlating it with the erosion surfaces found at that elevation in the region.

(b) There was subsequent lowering of the local base level causing progressive exposure of the existing cave and uniclinal migration down-dip of the main drainage channel. This was accompanied by extensive vadose


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modification of the older cave. The new one seems to have been graded to about 300 m. which relates it to the terraces at that level already mentioned (Fig. 3).

(c) During the period of rejuvenation associated with the structural adaptation of the Tawe, the cave became progressively more exposed and modified. There may have been a period of further stand-still at about 250 m. (Fig. 3), and there are river terraces at about this level on the Tawe downstream of the Resurgence.

(d) During interglacial and post-glacial times large quantities of clastic material were introduced into the cave and erosion of this is still in progress. Only relatively minor alterations have occurred since then. Throughout the latter three stages enlargement by breakdown has accompanied vadose modification producing the intricate three-dimensional network of passages and chambers known today.

SUMMARY AND CONCLUSION

The Ogof Ffynnon Ddu system has developed in gently dipping limestone on the fringe of a structurally complicated belt of faulting and folding traversing the South Wales coalfield.

The system is a complex of passages at different levels some of which possibly date back to mid-Tertiary times, and at least two major stages of rejuvenation have been recognised. Almost all passages show initial development as shallow phreatic bedding plane tubes which were later modified to canyons by vadose streams, the present day stream passage being the example par excellence. Further modification has occurred in the form of cavern breakdown; infilling has taken place possibly during glacial times.

A study of current solution processes in the area shows that there appears to be little difference in the flow patterns of percolation and swallet water, though the two may be quite dissimilar chemically.

ACKNOWLEDGEMENTS

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P. M. O'REILLY

PLATE 1 General view of the area showing the gently dipping strata, the platform at 300m., and the Tawe valley. The resurgence is located amongst the trees behind the house in the centre, the sink beyond the escarpment top right.

PLATE 2 Fallen block showing incipient capillary system formed along a bedding plane.

PLATE 3 Tubular passage aligned along east-west joint. The small vadose trench evident here is probably a good indication of the amount of modification that has occurred since post-glacial times.

PLATE 4 Canyon modification - the vadose trench here is some 40m. deep, the figure is traversing at mid-height.

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Ogof Fynnon Ddu IV, V, etc.

The lure of finding Ffynnon Ddu II was a motivating force in the club for almost twenty years. Since II and III are now discovered and a route is possible from the rising almost to the sink, the reason for digging seems to have disappeared. The only motivation is the hope of discovering a few more tributary systems. However, it may be that there is more than one route from sink to rising and that the other routes being more mature are bigger and better.

In the Swansea Valley the beds dip at about 15° in the direction taken by the valley, which is approximately north-south. Since we know that all of Ffynnon Ddu occurs only in certain beds of the valley limestone we can assume that it is unlikely that the stream will cut its way through these beds; it will tend to flow along the lowest of these beds. If the underground stream were the only active agent it would try to go straight down dip until the water table was reached and then move along the strike to the valley. (Route S_1. A. R_1. Fig. 1). This is the equilibrium route and once reached there would be no further cave development. However, due to easier alternatives presented by joints and faults the stream does not immediately take this route but follows the path of least resistance along S_1. R_1 and in time, by a series of diversions, heads towards the equilibrium route (Fig. 2). Whilst this is happening erosion in the valley is causing both sink and resurgence to move.

First consider the movement of the resurgence. Fig. 4 is a cross section of the valley along the length of the river Tawe. Three levels of river are shown in relation to the cave bearing beds. The third level is today's river and the second and first are older levels. From Fig. 4 it can be seen that as the valley is cut down the resurgence moves downstream. The cave development shown in Fig. 2 now becomes that shown in Fig. 3. If we now take a cross section at right angles to the river at various development stages of the valley, as in Fig. 5, and draw in the top outcrop of the cave bearing beds (A.B.) we can see how the sink moves away from the valley with time.

Fig. 3 can now be altered to incorporate the movement of the sink and we have a development as shown in Fig. 6. This is the situation of Ffynnon Ddu today. It is a simplified diagram and A represents the Waterfall series, B, Cwm Dwr and C, clay series and the top entrance. If this thinking is correct then these major dry series of Ffynnon Ddu are not tributary systems but ancient parts of the main stream and, what is more interesting, they could be interconnected.

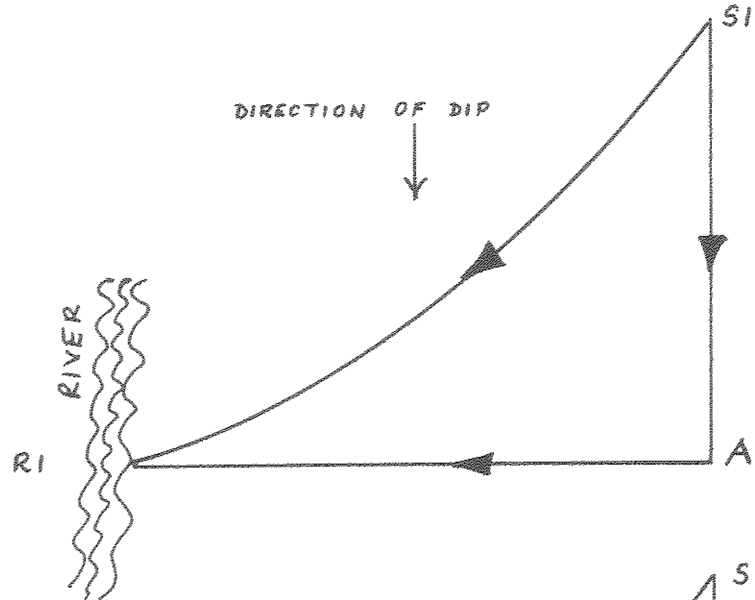

FIG 1
PLAN

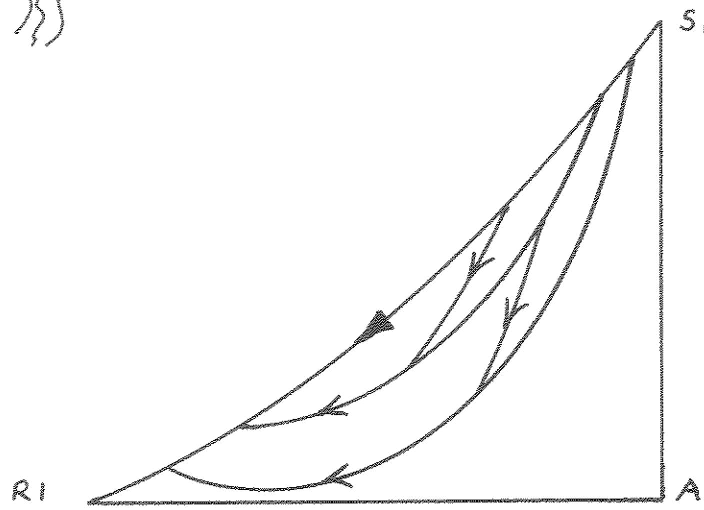

FIG 2
PLAN

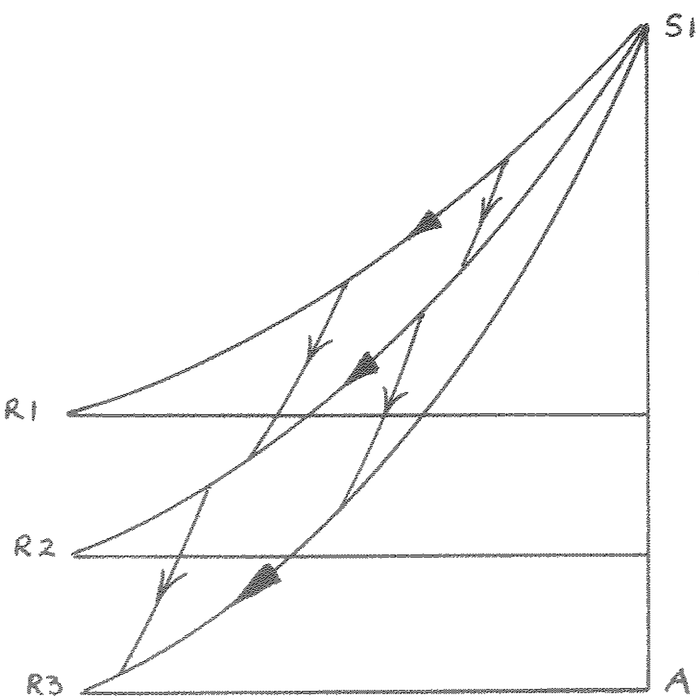

FIG 3
PLAN

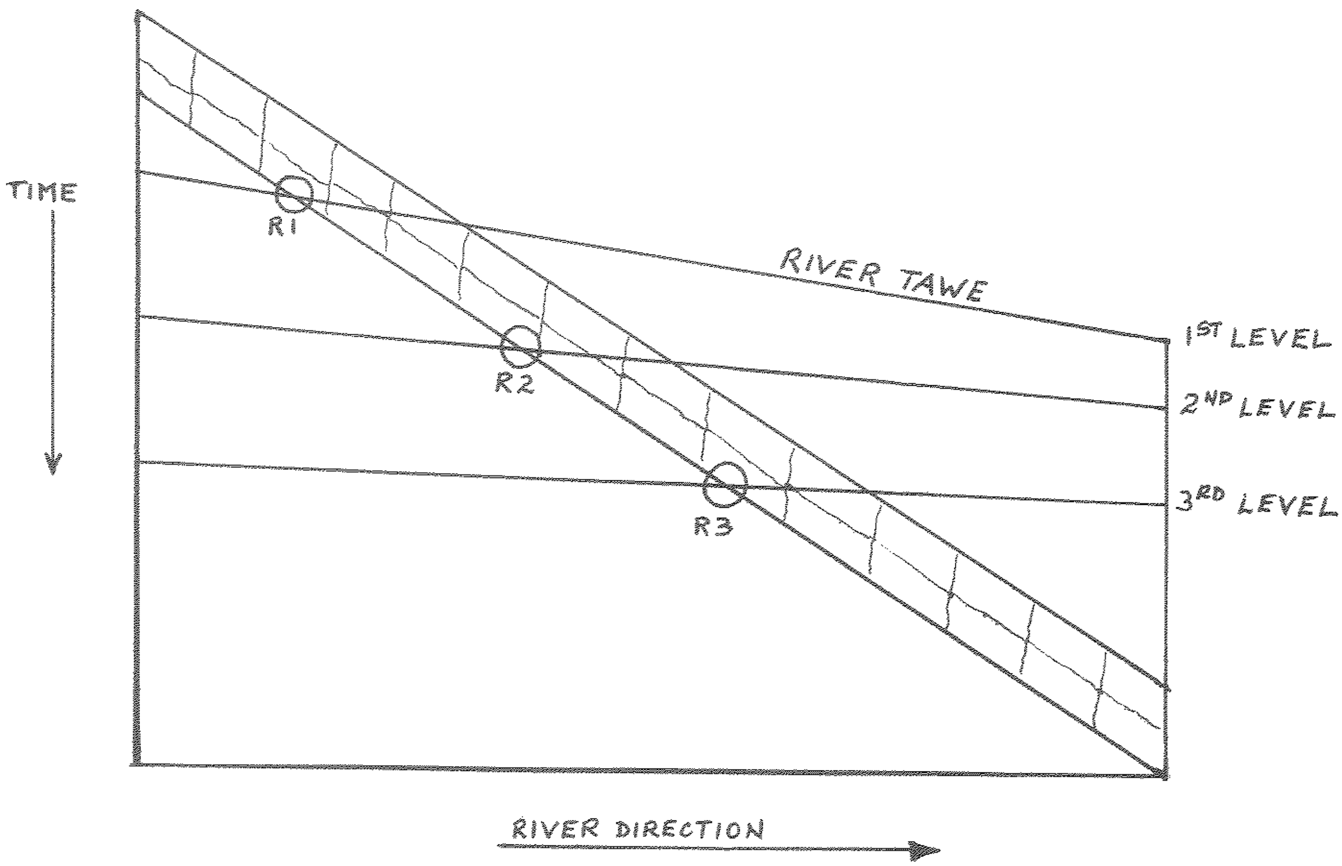

FIG 4 ELEVATION

The surface between sink and resurgence has also eroded, so with the passage of time the old sinks and resurgences are moved as shown by the dotted line in Fig. 6, which represents the extent of this erosion.

Where then do we dig to find cave under the quarry?

If the thinking about migrating sinks and risings is correct, then digging anywhere should eventually lead to the area concerned. That is, if there is cave in that area. The quarry has not hit any cave so what reason have we to believe that there is anything to find.

The present quarry floor is the top of the cave bearing beds so if there is any cave it is below this operation. So we must look for operations which have gone below these beds. There are three such operations and all have struck cave.

The first was the railway cutting. In the vicinity of the bridge the railway engineers came across cave during their excavations. The story goes

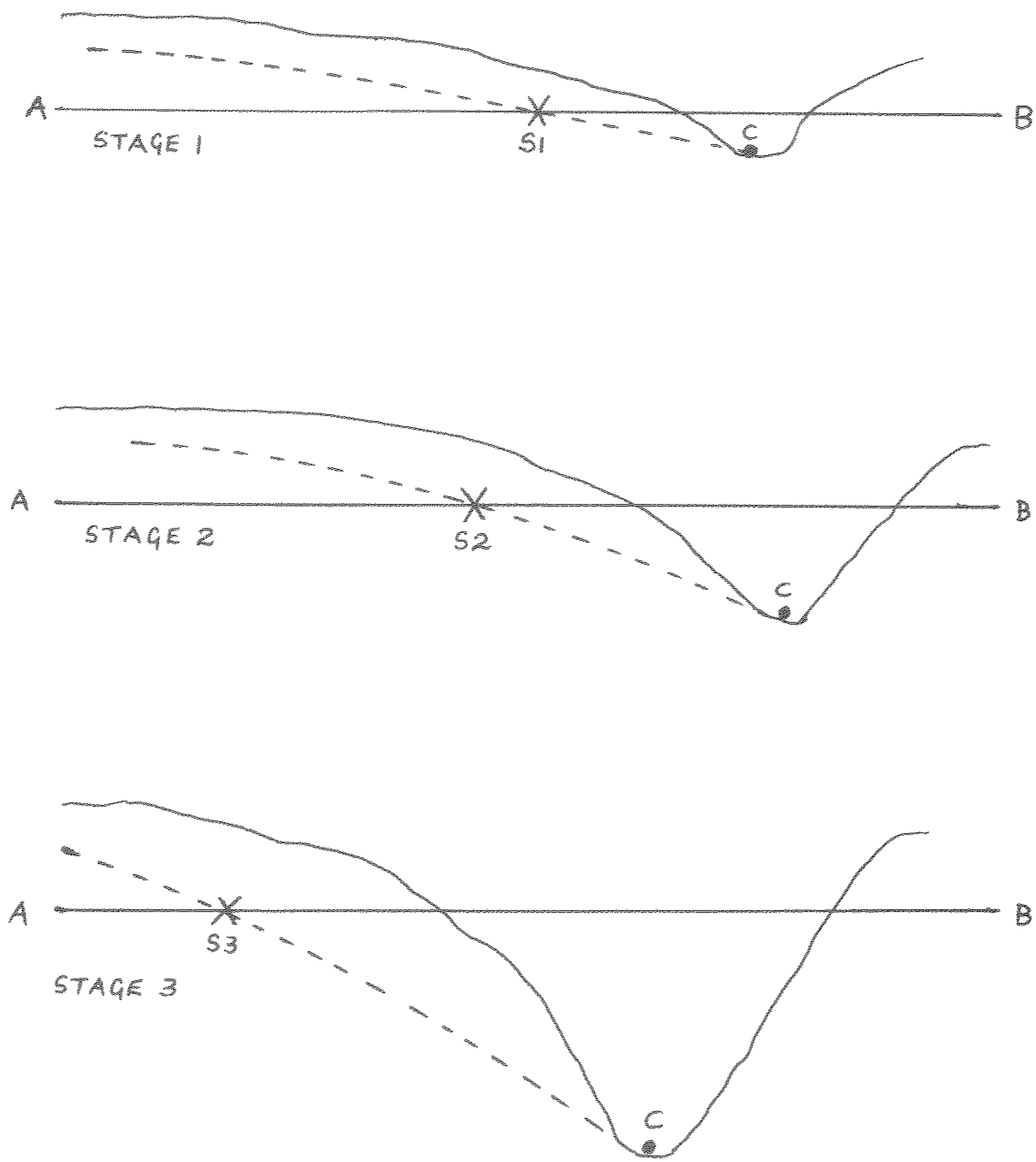

FIG. 5 ELEVATION ALONG LENGTH OF BYFRE STREAM.

A. B. OUTCROP OF CAVE BEARING BEDS.

C. RIVER TAWE.

X. SINK

- - - - BYFRE STREAM

that several truck loads of rock failed to fill the cavity and a concrete cap had to be made before the line was taken across. I have heard several second hand versions of the story and two first hand accounts, (these came from Pop Powell, Sylvia Barrows' father, and Mr. Morgan, Bill Burtons's father-in-law) and I am certain the story is true. The second operation was a near break-through and is fairly recent. When the garages and work-shops were being built the north-west corner of the foundation trench kept collapsing into a hole. It was never an open hole but similar to many we have tried digging in swallow holes. This was eventually made secure with boulders and used as a drain.

The third bit of evidence is a sink which once existed in a spot halfway between the present weighbridge and the entrance to Cwm Dwr. There was a branch line which ran to this spot and a club dig (called the horse-less carriage dig) was started after local stories of a large collapse in ages past.

This, to me, is sufficient evidence for the existence of big cave passage beneath the present quarry.

I have already said that digging anywhere in Ffynnon Ddu will eventually get us there. However, we need to proceed a little quicker than that if we are to get down to the pub on a Saturday.

The two underground series which could lead to the promised land are the Waterfall series and Cwm Dwr.

The Waterfall series is a place full of surprises and should not be underestimated. It has two potentially interesting digs, the first is on holy ground and should not be dug, the second is near the climb to the infamous Grand Piano. At the foot of the climb there are passages which end at a horizontal tube and it is this tube which should be pursued. It will mean blasting solid rock with all that that entails. There is little or no draught and some form of portable drill is essential. Since the dig is in a tube a hand rachet drill could be used and once a good face is established progress could be quite fast. The hand rachet drills, as were used by quarry men and miners, are good ways of drilling shot holes. We have always scorned them, prefering our own highpower approach. (Times have changed).

Cwm Dwr has always been the most unyielding of caves as far as digging is concerned. However, there are at least two worthwhile sites for this particular objective. When the original hole was dug by the club, it was purely fortuitous that we went in the direction we did. The bottom of the shaft fell in on the South side and we went through the hole. It is often overlooked that when you come down through the roof of a boulder choked passage, that there are two sides to the choke (Fig. 7). The original shaft is now gone but the boulder choke is to be found to the right at the bottom of the present entrance. The dig will be at least 20ft. through loose muddy

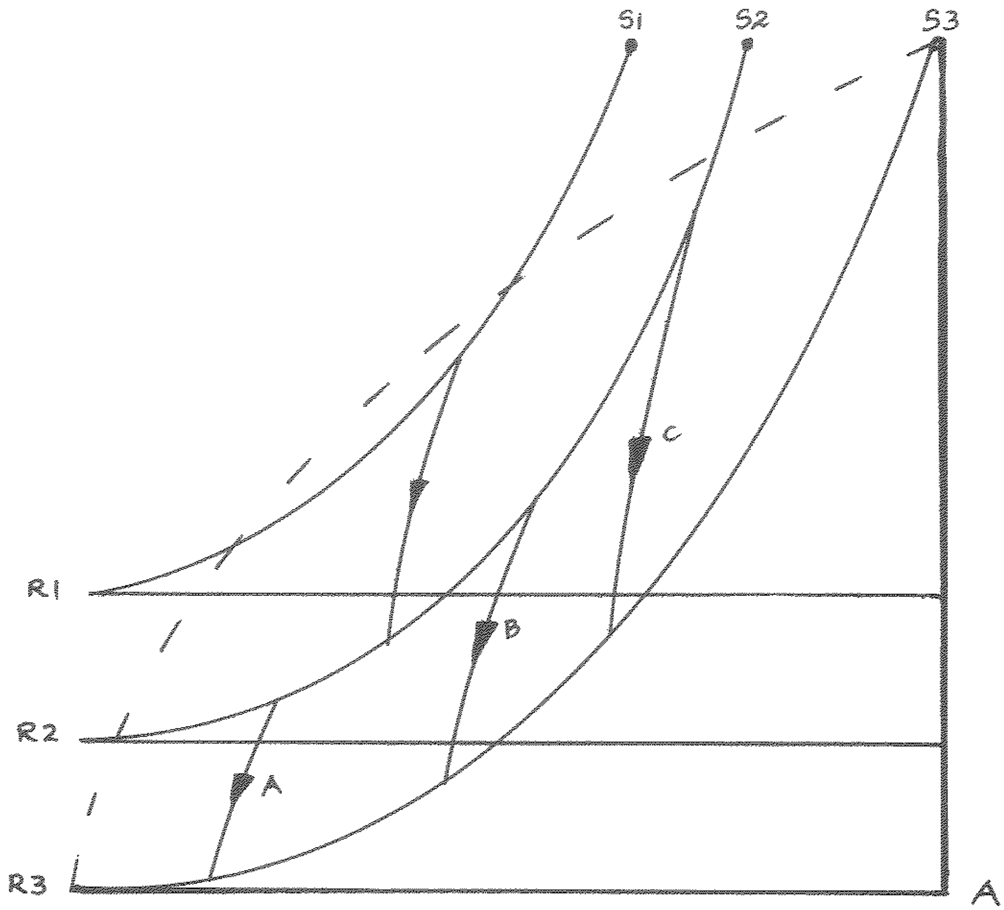

FIG 6 PLANVIEW

boulders. But it's close to the club and not far from the surface and can be dug in all weathers.

The second dig in Cwm Dwr is the best possibility of all the underground digs. It is the boulder choke through which the stream enters the Jama. This choke consists mainly of flat slabs of collapse roof with no evidence of surface run in. It is similar in construction to the first boulder choke at Pant Mawr but a lot more secure. If this choke is a result of bed separation of the roof then there should be spaces up and over (Fig. 8). If this fails the right hand side of the choke, where the water enters, looks very diggable. Large flat slabs, which should break easily with small charges, are to be found under the surface of calcited stones. This choke will lead to the upstream side of the main Jama choke and, quarry or no quarry, is the best underground dig in South Wales.

There is one other underground dig which is worth consideration. This is Ogof Ty-Mawr situated in a small cliff north-west of Ty-Mawr. It ends in a crawl blocked with mud and stones, but it could lead to the upper unknown parts of the Waterfall series and then on under the quarry. This cave is interesting because it is in a dry valley which could once have carried either the Byfre or

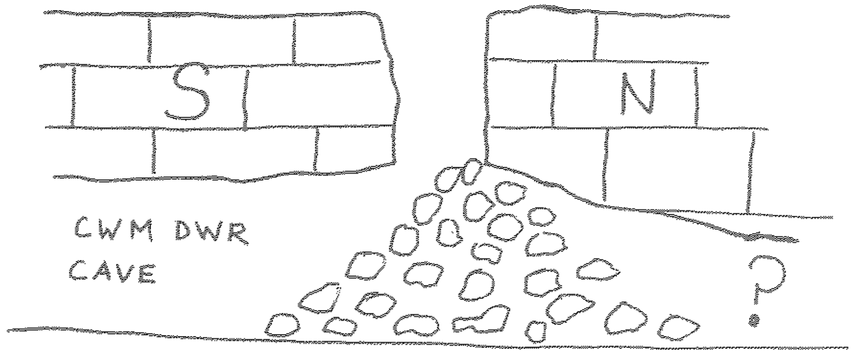

FIG. 7 ELEVATION

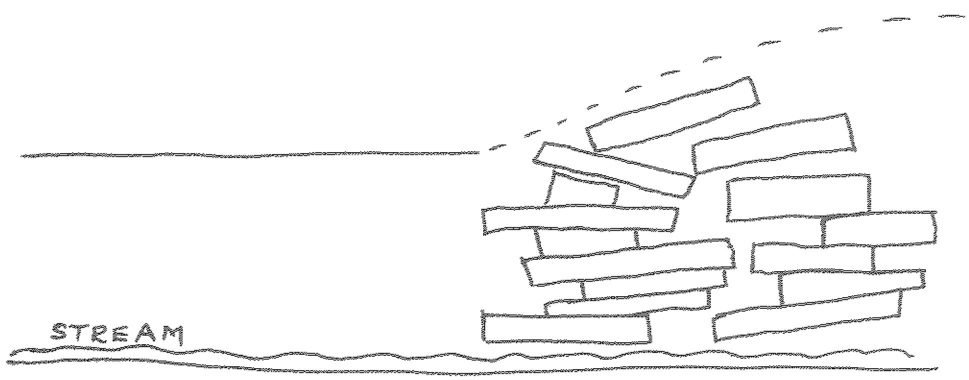

FIG. 8 ELEVATION

the main valley river. In which case this cave could be part of one of the old risings of the Ffynnon Ddu system and therefore the upstream block is worth more detailed examination.

Another possible site of an old resurgence is at the base of Craig-y-Rhiwarth. This is situated on the lane from the Grithig to the old club headquarters. The rising in the hospital grounds comes from the scree at the foot of Craig-y-Rhiwarth and in the past there were several attempts to dig into this scree. The problem is that the scree runs for some length along the cliff and some scientific ingenuity will be required to trace the stream under the scree before digging. Infra-red photography may reveal temperature differences along the length or some accurate listening device could be used. Once the path of the stream is known, digging would not be too difficult as gravity would be on the side of the digger for a change. It could be argued that this position is too low to be an old Ffynnon Ddu rising (Fig. 4) but there is an anticline which could account for this annomaly. As for other ancient risings, which should be in Penwyllt village or in the region close to and west of the old mineral track, the only one which could be a possibility is Weighbridge Cave. But there could be others which we have not seen as we tend to look for old sinks and not risings in that area.

The final possibility is Gents dig behind Cwm Dwr Quarry. This will require a winch and tripod but is close enough to the club to get a continuous band of spectators to turn the winch handle.

If the idea of migrating sinks and risings is correct it should be possible to determine the position of old resurgences from the survey. Phreatic passages will be formed when the stream hits the water table on its down dip journey. So if we locate the old phreatic passages in the cave and draw a line along the strike, where this line comes to the surface, there should be an old resurgence.

CLIVE JONES

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Club Notes

1. We welcome the following new members:

   Geoffrey Billington, 37 Gelligaer Street, Cathays, Cardiff

   Anthony Keeley, 23 Kelvin Road, Roath Park, Cardiff

   Marilyn Jackson, 21 Merridene, London, N21 1RD

   Stephen A. Moore, Havencourt, The Parks, Aldington, Evesham, Worcs.

   Stephen West, 15 Ael y Bryn, Radyr, Cardiff, CF4 8AZ

2. The following members have changed their addresses:

   Mr. & Mrs Glyn Genin, Roston, Station Road, Plumpton Green, Sussex

   Mr. & Mrs Brian Jopling, 44 Carhampton Road, Falcon Lodge, Sutton Coldfield

   Howard Kenney, Springfield, Tor Hole, Chewton Mendip, Bath, BA3 4LS

   Paul Tedd, 9 Greenside, Bourne End, Bucks.

CLUB NOTES (CONTD.)

Dave Wolfenden, Yew Tree House, Croggion, Ford, Shrewsbury

Mr. & Mrs Paul B. Dolphin, Avda de Les Escoles No. 16-3-3,
Les Escaldes, Principat d'Andorra

Glenda Pattenden, Flat 5, Leaside Mansions, Fortis Green, London N. 10.

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Recent Additions to the Records

The club library has recently acquired a number of regional caving guides for the use of members visiting those areas. If you do borrow one of these guides, could you please return it promptly after you have completed your visit. The guides are as follows:

Underground in Furness by E. G. Holland.

Very similar in format to 'Caves of Wales and the Marches'. It describes the mines, caves and potholes of the area between Morecambe Bay and the Lake District and North Lancashire and South Westmorland. It is a revised up-to-date edition with map references, length, depth, severity and type of tackle required for each system.

Northern Caves Volume One Wharfedale by D. Brook, R. G. Coe, G. M. Davies, M. H. Long

The first of three books written to supercede 'Pennine Underground' - the others are not published yet. Covering the area of Nidderdale, Upper Wharfedale, Littondale and Malham Dale and the hills between these valleys. A bigger book than the Furness guide, dealing with a more important area. Fourteen area maps and thirteen cave plans.

The Complete Caves of Mendip Barrington & Stanton. Fully Revised 1972

An attractive colour cover photograph leads on to a well laid out book. Similar to the other guides, the memorable parts are the abundance of cave photographs showing formations in Mendip caves when discovered and as they are now - destroyed.

A very sobering fact for the caving world to digest. There are also numerous notices reminding cavers to be safety and conservation conscious. These points add greatly to the book, making it more than just another guide.

The Caves of Devon A. D. Oldham, J.E.A. Oldham, J. Smart

Not such a glossy book as the others but with only one hundred copies printed it must become a collectors item soon. Listing over two hundred caves, some clear maps and a few photographs, a useful book when in Devon.

The Caves of North West Clare, Ireland By members of U.B.S.S. Ed. E.K.Tratman

At £6 this is obviously a different class of book to the other guides. P O'Reilly has already reviewed it in Newsletter 63, May 1969. Of obvious use to anyone going to County Clare, with many pull-out surveys and good area maps. Please leave in the car at the cave entrances, we can't afford another copy!

We have also purchased Current Titles in Speleology for 1969, 1970, 1971, 1972, 1973 Part I and II. These will make record searching easier as each book covers all the caving publications for one year (world wide) and indexes them. I would appreciate it if these volumes were not taken from the records but left there for consulting only.

We have also received the Yorkshire Ramblers Club Journal 1973, with accounts of the 1972 Ghar Parau expedition, climbing and other caving articles including an interesting one of the Golden Age of Yorkshire Potholing; 3 and 4 of Die Hohle (in Austrian) from Vienna; the B.C.R.A. Bulletin nos. 1, 2 and 3, which is an extension of the old C.R.G. Bulletin.

We have also just received Hereford Caving Club's 21st Anniversary Publication, with an account of their work so far in Pwll Swnd and a survey of it; A Review of the Speleogenesis of Agen Allwedd, and an account of Grotte Casteret. Unfortunately, the photographs have not been well printed.

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REVIEW

The British Caver Vol 61. Jan. 1974

105 pages with articles on 'The Caves of the Bishopston Valley', 'Caving in Peggau (Austria), Mendip, Ogof Dyn Byraf'. Two articles by Mel Davies : 'Caving in Spain', 'Turkey and its Caves'. An article by W. Settle, 'Caving in Czechoslovakia' and six book reviews. The first article on the Bishopston

Valley is probably the most interesting to South Wales cavers.

Completed by T. Oldham and members of Rodway School and Marlwood School, they have expanded on the work of Dick Baynton (Gower Hydrology Supplement, S.W.C.C. Newsletter No. 59, April 1968).

The work has been painstakingly done with surveys and descriptions of all the caves. Unfortunately the only large system, Ogof Bishopston (1500ft.) was not surveyed due to flooding. They mis-spelt Ogof Hentecil (Old Kettle). It should be Hen Tegell. The area they choose is not a very rewarding one however and hardly justifies their work and surveys, Baynton and others having adequately covered it before.

PETER FRANCIS

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