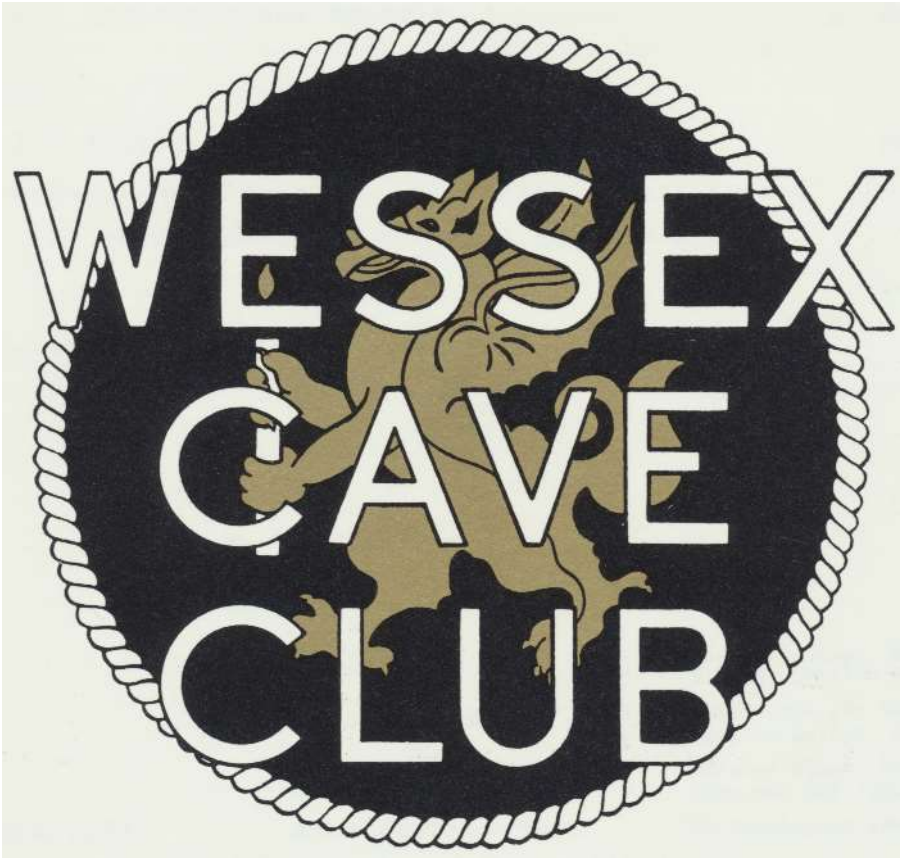
WESSEX
CAVE
CLUB

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CLUB NEWS

Parental Consent Forms

Since the original forms are still valid, clubs wishing to affiliate and cavers between the ages of 16 and 18, will now be allowed where appropriate, to join the Wessex. A new indemnity form will eventually be agreed on.

Caving Insurance

Many clubs, the Wessex included, are experiencing difficulty in renewing their caving insurance policies. This is being dealt with, and it appears that slightly reduced cover will be negotiable for slightly increased premiums. Members may find it advantageous to take out an additional personal policy. More details will be given later.

Caving Tackle

The Committee has received two letters complaining, justifiably, of the ladder shortage at Upper Pitts. Measures have been taken to resolve the problem and a Tackle Sub-Committee, consisting of the Gear Curator (Brian Hansford), Ian Jepson, Jeff Price and Aubrey Newport, has been formed to collate information on methods of manufacture and to supervise the actual construction. A ladder making jig has been made and a start is expected at any time. It is to be hoped that those who have complained of the lack of tackle will be willing to help with its manufacture.

1976 AGM and Dinner

The dual event will take place this year on Saturday October 16th. The AGM will be held in Priddy Village Hall and the Dinner will, as in previous years, be in the Bishop's Barn, Wells. An application form for tickets for the Dinner and for seats on the coach from Priddy is inserted in this Journal. Why not come along and air your views at the AGM and then relax in convivial surroundings at the Dinner? (Cash with orders please).

Nominations and Proposals

At last year’s AGM, fears were expressed that the committee nominations were falling to the same people. A nomination form is included in this Journal. If you would like to see some new faces on the Committee, now is the time to do something about it. Why not get yourself nominated?

Similarly, a proposal form is enclosed, in case you wish to raise any matters of policy at the AGM. The proposals and nominations should be sent to the Hon. Sec. by September 25th.

Rhino Rift

This cave has now been gated, and the usual Charterhouse Caving Committee rules apply. A key is kept at Upper Pitts and with the other CCC member clubs.

Theft

A length of Bluewater was stolen recently from Upper Pitts. Members are warned that the Club cannot accept responsibility for personal effects and baggage at Upper Pitts, and that they should be kept safe in locker or car.

A Pictorial History of Swildon's Hole

If you still have not bought your copy, or if you know of a potential outlet for a copy or two, Phil Davies would be pleased to hear from you.

Binding Journals

Members wishing to have complete volumes of the Wessex Journal bound should contact Phil Davies by mid-August. The cost will be about £2 each.

Shatter Cave

Cerberus Speleological Society has renewed the permits for our three guest leaders: John Ham, Aubrey Newport and Peter Palfree.

Sales

A limited number of caving boots (in matching pairs) is on sale at Upper Pitts.

New Members

We welcome the following new members to the Club:

Elected 23rd May

Steven J. Averill, 66 St. Denis Road, Selly Oak, Birmingham 29.
Suzanna M. Eaton, 49 Heathfield Road, Audlem, Nr. Crewe, Cheshire.
Christopher Gay, 10 Cosbycote Avenue, London SE 24.
Stephen J. Graham, 66 Shortheath Road, Farnham, Surrey.
Susan Horton, The White House, Frome Old Road, Radstock, Avon.
Keith I. Jacobs, 7 The Grove, Abingdon, Oxfordshire.
Christopher Norton, 43A Belvedere Road, London SE19 2HJ.
David A. Walker, 151 Newbridge Hill, Bath, Avon.
Juliet K. Walsh, 56 Howard Road, Woodside Green, London SE25 5BY.

Elected June 27th

Clare P. Baker, 14 Whitehall Road, Harrow, Middlesex.
Q.C. Cooper, 19 Grangedliffe Gardens, London SE25 6SY.
P.J. Hart, 42. Gravel Hill, Addington, Croydon, Surrey CR0 5BD.
A.J. Philpot, 50 Claremont Road, Bristol BS7 8DH.

MEETS

Friday Night Meets

All meets except Wales at 7.30pm. Further details from Richard Kenney: "Yennek", St. Mary's Road, Meare, Glastonbury, Somerset. BA6 9SS. Tel. Meare Heath 296.

August 20th	August Hole	November 12th	Cuthberts
September 3rd	Burrington	November 27th	Wales (Saturday)
September 17th	G.B.	December 10th	August Hole
October 1st	Shatter cave	January 7th	Swildon's
October 15th	Lamb Leer	January 21st	Manor Farm
October 29th	Eastwater	February 4th	G.B.

MENDIP NOTES

by

Wimblestone

Tying Up Loose Ends

As quarrying operations come to a close at Fairy Cave Quarry, so too will the long list of cave discoveries revealed, and sometimes promptly destroyed, by blasting. In recognition of this fact, the Cerberus have embarked on a definitive report and survey of the dozen or more fragments making up this system, which they hope to publish in an illustrated form later on this year. Recent digging in Hillwithy Cave and the upstream Series of Hillier's Cave has produced the hoped for link-up, lending further weight to the theory that all the passage found in the quarry has been part of a single system. Hillwithy itself comprises 900' of rather uninspiring and extremely muddy passage, which makes it marginally more attractive than the upstream end of Hillier's, which can boast only a vast quantity of diesel impregnated quarry sludge! Clearly there are more ways of killing a cave than by knocking its walls down.

Over the Bridge

It has to be admitted that a few decorated caves have at one time or another escaped from Mendip and settled on the other side of the Severn. One such system is Otter Hole near Chepstow. Not content with providing a unique tidal sump and a massive stream way, it now offers cavers a stal. encrusted gallery of European magnificence. Vast flows and curtains drape the walls and on a crystal floor, which has been likened to Barne's Loop in its heyday, stand a score or more huge stalagmites, many of them higher than a man. The discovery of this high level series, together with extensions beyond the sumps, have brought the length of the cave to over 8000'. Nobody has yet told me whether the cave is heading back towards the proper side of the river.

Ochre Not Calamine

My report in the last Journal of the re-discovery of a mine at Compton Martin, brief though it was, was inaccurate in one important respect. It was an ochre working, not a calamine mine. Shepton cavers have now surveyed several thousand feet of roomy galleries in the side of Compton Combe and have found traces of other entrances. Some of the older inhabitants of the village below can remember the mine being worked in the 1920's, when red ochre was raised for use in the paint industry. The site is almost certainly that described as Cliff Quarry in the Geological Survey's Memoirs. Shepton surveyors are also active at the other end of Mendip, where Thrupe Lane Swallet is receiving their attentions. The depth of the cave is in the order of 380' and the passage length is over 2000'.

Tyning's Barrows Revisited

Until this year, the cave at Tyning's Barrows, to the west of GB, had been seen by only a handful of persons, all of whom waxed lyrical about its digging potential and mourned the fact that it had been blocked off by an angry farmer within hours of being opened by the Great Flood of 1968. Hardened diggers made a mental note to check the position every ten years or so and settled down to wait. Imagine their surprise, therefore, on learning that the same farmer, a Scot no less, had been talked into giving permission for the cave to be reopened, capped and pushed. Who had achieved this miracle - a fellow Scot, of course, in the person of caver-cartoonist "Snab" McNab.

Wasting no time, an all-party digging team set to work, re-excavating the ten foot entrance shaft, installing concrete pipes and chemically stabilising loose boulders. Digging is now about to commence in the draughting choke at the end of 500' of already impressive rift passage, and hopes are high that another big Blackdown system lies just around the corner.

A New Testament

Rumour has it that a revised version of the Mendip Bible is to appear in the autumn - "The Completer Caves of Mendip". No doubt the authors, who need no introduction, would welcome donations of new or little used swallets, untried springs and overlooked holes. Anyone finding lost caves or loosing found caves should also get in touch.

YES IT IS

Barry Gay

The question was posed in the April Journal "Is it worth it" with respect to Subs, and Hut Fees. To which I would answer a very positive yes, as if we look in detail at what we get in return for our money, I don't think you could say its not good value in these days of inflation.

Lets start with the building which should be called the Club House not Hut. This is a really good structure, dry and .windproof, well heated, which even from cold will be comfortable in about two hours. This at the push of a button from the first person to come into the Hut. No solid fuel to hump, or fires to light. Hot water in plenty for kitchen, and washing is provided. A good big kitchen, with mains water, and all utensils necessary for cooking and eating. The lounge, library and dorm's are of adequate size and with reasonable facilities.

The building invariably by a Friday evening has been cleaned by some dedicated persons called Hut Wardens, and is pleasant to come into after a long journey. For a lot of members it becomes our home for a couple of days, and I personally find it very comfortable, and judging from the number of people who stay so do a lot of others.

Many other facilities are also available to us in the form of library books and surveys, cave keys, items of caving equipment from sales, tools and workshop.

Outside we have a good car park and a decent grassed area to use in the summer, pleasant if you happen to live in central London.

If we assume a member stays at the Club for twelve weekends in a year this works out at about 70p. a time, which is very good for two days. Try finding the equivalent in a hotel, not forgetting to tell them you will be returning in caving gear a couple of times during the weekend! Yes to my mind we get very good value for our money.

THE EIGHT YEAR ITCH

Closing the Surface Traverses

P.R. Cousins

Those of you with a liking for figures will have been appalled at the surface closures published in part I of this article. These were not misprints and the author has been trying to forget the horrible truth since 1970 when the surface work was completed. However, when starting to write up the underground work in Agen Allwedd early in 1976, it was found that not only was the surface problem still there, but also that the surface traverses would have to be used to relate the cave survey to other caves nearby, and to surface features such as shakeholes.

Stated briefly the problem was as follows, a surface traverse of 27,000ft between two Ordnance Survey Trig, Pillars failed to close by 210ft in plan and 20ft in altitude. A subsidiary loop (the second loop), failed to close by 115ft. The first loop was much better and had been closed by Dennis Warburton some years before. The sketch map with this article should set the scene.

Looking for Errors

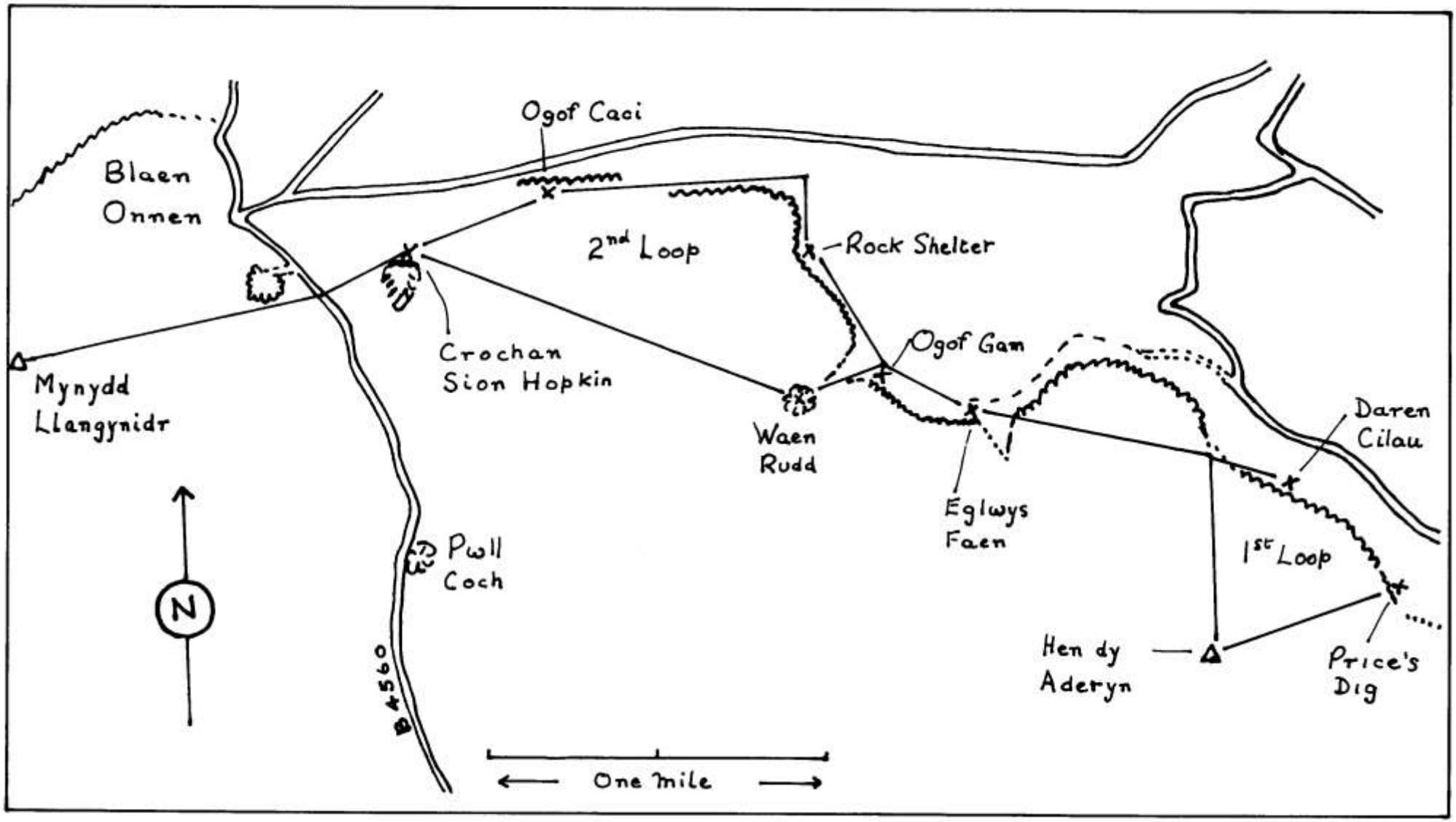
The first task was to check all the calibration reference bearings and the corrections which had been derived from them. An optimum was reached where not only were the true mean calibrations for each trip being used, but also these were sensibly consistent from month to month. This required minor changes of 0.2° to 0.8° in certain traverse sections, which in turn affected the overall closures. The possibility of booking errors, or gross magnetic anomalies was largely eliminated by the mode of survey - often nominal 100ft legs in a direct line from one feature to the next. Inaccurate calibration of the clinometer was also ruled out by the leap-frog method of survey used. To illustrate this, one section with considerable vertical range was recalculated with a 2.0° error introduced into the clinometer readings and the final altitude was found to be essentially unchanged!

In spite of the corrections, a misclosure of 190ft in the main traverse remained, and the second loop misclosure was now 160ft. The main traverse misclosure can be restated as an error of 0.8° overall, with a residual of 50ft, and the problem regarded as primarily magnetic; but the second loop misclosure would remain unchanged. Two other sources of error should be mentioned, both are due to the projection used for Ordnance Survey maps:-

a) The Scale Factor: This arises from the fact that the earth is not flat and the factor varies with longitude from 0.99960 to 1.00050. In the Llangattock area the value is 0.99969. Distances on the ground must be multiplied by this factor to obtain the National Grid distance. The correction between Hen dy Aderyn and Mynydd Llangynidr was 1.73m. east, 45m. north.

b) The Altitude Corrections This arises because map distances are computed on a hypothetical spheroid at approximate sea level. Thus all distances between hill tops are greater on the ground than on a map. The correction at 1700ft OD is approximately 0.42ft per mile. For Hen dy Aderyn to Mynydd Llangynidr, this becomes 0.45m. east, 0.12m. north.

In view of their magnitude, both of these corrections were ignored for the purposes of this survey.



LLANGATTOCK AREA – SKETCH OF SURFACE TRAVERSES

Closing the Traverses

Two alternatives had to be considered for closing the traverses:-

a) To treat the misclosure as being primarily caused by errors in calibration and swing the entire traverse through 0.8° anticlockwise. The residual error and the large second loop error would then be treated in a conventional manner.

b) To treat all errors as if they were random and close both the main traverse and the second loop simultaneously to a mean at Crochan Sion Hopkin.

The first alternative was finally rejected because there was no evidence of magnetic calibration error - on the contrary, the readings were very consistent and to introduce a 0.8° change would have implied that the underground survey was also in error by this amount.

The chosen course was to derive a three point mean at Crochan Sion Hopkin, weighting each section of the traverse in proportion to the number of legs - which in practice was directly equivalent to the traverse lengths. The same procedure was followed for the altitude data, where the misclosures were not abnormal.

The general formula for a weighted mean was used, viz:

$$\frac{\overline{X}}{n'} = \frac{x_1}{n_1} + \frac{x_2}{n_2} + \frac{x_3}{n_3} + \cdots\cdots$$

where

$$\frac{1}{n'} = \frac{1}{n_1} + \frac{1}{n_2} + \frac{1}{n_3} + \cdots\cdots\cdots$$

$\overline{X}$ is the mean Easting (Northing), when X_1, X_2, X_3, etc. are the Eastings (Northings) of a point by three or more different routes and n_1, n_2, n_3, etc. are the respective weightings of these routes - i.e. the traverse lengths or the number of legs.

In this particular case it was necessary to close the second loop first, since this is not independent of the rest of the traverse. The process was then repeated on the Main Traverse, using an imaginary section of n' legs, in place of both sides of the second loop. This procedure was intended to avoid over weighting any section in the final mean, and the method is believed to be generally applicable to traverse closures. Having thus established the nodes at each end of the second loop, the errors could be distributed equally to each leg along the various traverse sections.

The result was a new mean position for Crochan Sion Hopkin, and corrected positions for all caves tied into the circuit. For example, the change at Ogof Gam was about 110ft in plan and 11ft in altitude. The revised data for both surface and cave follow this article.

The Accuracy of the Ordnance Survey

The procedure adopted for closing our traverse leads to considerable disagreement with the Ordnance Survey - particularly over the position of the cliff line near Agen Allwedd, where the error is approximately 30m. In view of the simplicity of our survey from here to the Llangynidr Trig. Pillar, the author considered the possibility that the published Ordnance Survey maps were in error. The largest scale at which mountain and upland areas of the UK have been, and will be mapped is 1:10.000 (formerly 1:10560), or approximately 6 inches to one mile. This is the situation for the Llangattock and Llangynidr plateaus. When the area has been re-mapped by air-photo techniques, the accuracy is intended to be 10m. R.M.S. for general features.

The original survey of the area was made 100 years ago. This, so far as the author can deduce, was entirely a chain survey from a dense triangulation network - many of the rock cairns from which survive today. The County Series maps based on this survey were drawn on a Cassini type projection, using a prime meridian through Llangeinor in Glamorganshire. The current maps are still based on this County Series of 6" maps in many areas; the National Grid has been superimposed, and the projection altered to the Transverse Mercator now used by the OS. The Trig. Pillar on Hen dy Aderyn is common to both the original survey and the re-triangulation carried out in the 1950's. All other stations of the original survey were ignored in this re-triangulation, a new site on Llangynidr being chosen some way from the earlier rock cairns.

In view of the difficulties of Chain Survey in mountainous areas - particularly with convex hill slopes, and the changes in projection and control points, the accuracy of current (circa 1965) plans could well be less than that intended for the new 1:10,000 series. Thus an error of 30m would not be impossible in this area. This would in turn alter some of our calibration bearings and reduce our traverse misclosures. There is, however, no proof that any such error exists.

Relation of Cave to Surface

The majority of the Agen Allwedd cave system is over 500ft below a featureless plateau, with a variety of strata intervening; there is, therefore, little to comment on. The well-known sink holes at Waen Rudd and Pwll Coch have been known for many years and do not appear to be directly related to the present cave system. The sink at Crochan Sion Hopkin is much more interesting as it provides the northermost known feeder to the system and is at a lower altitude than most other shake holes in the area.

The survey of Remembrance Series by Roger Solarii has been added to our location for Terminal Chamber on the published plan. This shows the location of the terminal aven of Remembrance Series to be very close to the Crochan Sion Hopkin sink - probably within 100ft. There is a fault running through the aven on Roger's plan, and a parallel fault has been mapped by the Geological Survey, passing beside the sinkhole, which strongly suggests that the aven and the sink are, in fact, coincident. An estimate of the altitude of Remembrance Series can be made by comparison with the known altitude of the limestone at the Limekilns of Craig y Castell 500m to the east. The cave here, Ogof Caci, is at 1330ft OD. The strike along this extreme northern rim of the plateau is approximately E - W and this places the northern end of Remembrance Series at a similar altitude. The base of Crochan Sion Hopkin sinkhole is at 1520ft OD. Allowing for the aven penetrating upwards above the usual strata there is still a gap of at least 100ft. Digging prospects for a direct link are very poor.

There is another sinkhole - seepage would be a better term - 900ft east of Crochan Sion Hopkin, and also over the cave, but this is 100ft higher up the scarp of Llangattock. Perhaps a good search of the area will reveal fossil inlets at the right altitude. The authors own suggestion (Cousins, 1972), that the Clasifer valley was the source area is now difficult to reconcile with the known, surveyed, cave.

Ogof Caci, (or Lime Kiln Dig) the cave dig at the limekilns, which looks so promising, is over 1000ft from Remembrance Series and much further from Summertime Series. Looking at the general passage trends, the direct connection has a less than even chance, although there could be a primitive drainage route direct to the fault in this area.

The far end of Maytime Series, mapped by John Parker, has been added to the survey at Main Sump. The furthest sump, NGR 203130, is over 4,000ft from Devil's Bridge Risings with an altitude difference of about 150ft.

Further Reading

ANON, 1950 Constants, Formulae and Methods used in the Transverse Marcator Projection H.M.S.O.

COUSINS, P.R. 1972 The Geomorphology of Agen Allwedd
J. Wessex Cave Club 12, (l47), 282-288

COUSINS, P.R. 1976 The Eight Year Itch - Survey work in Agen Allwedd: 1968-1975
J. Wessex Cave Club 14, (164), 41-44

ELLIS, B.M. 1976 Surveying Caves
B.C.R.A.

HARLEY, J.B. 1975 Ordnance Survey Maps and Plans, a Descriptive Manual
Ordnance Survey, Southampton

Surveying in Turkey Passage – Agen Allwedd *Photograph* I.G.Penney

PERMANENT REFERENCE MARKS

Surface Features

LOCATION	EAST (m)	NORTH (m)	ALTITUDE (ft.)	MARK	DESCRIPTION
Hen dy Aderyn	20281	14491	1735.7	-	Ordnance Survey Trig Pillar.
Mynydd Llangynidr	14703	15931	1774.5	-	Ordnance Survey Trig Pillar.
Blaen Onnen Quarry Pot	15840	16260	1631.2	-	Quarry floor levelled from Crochan Sion Hopkin.
Crochan Sion Hopkin	16508	16282	1539.2	D	On low bluff at north side of sinkhole, 18ft above floor.
Ogof Caci	17050	16680	1328.2	D	On right hand side of entrance, 8ft above floor.
Rock Shelter	18376	16321	1268.7	U	Floor near centre of arch.
Ogof Ffu	18518	16175	1276.3	?	On rock face 2½ft above entrance.
Waen Rudd	18346	15648	1557.6	D	On rock slab, near entrance of sinkhole floor, approx. 1½ft high.
Ogof Gam	18738	15842	1194.2		Bolthole in gateframe, lowest on LH side.
Eglwys Faen	19260	15667	1164.2	D	On cliff beside tramroad, 2ft above track.
Ogof Daren Cilau	20512	15295	1315.0	D	On cliff, 9ft above entrance.
Ogof Pen Eryr	20741	15201	1342.7	D	On cliff, 8ft above entrance.
Price's Dig	21059	14919	1351.7	D	On cliff, 4½ft above entrance, to the right of arch.

Underground

Note: All directions underground are INTO the cave via North West Junction.

Queer Street	18522	15753	1169.1	?	On RH wall of Queer St. at junction, 9ft above floor.
Main Stream Passage	18465	15575	1134.1	D	On LH wall of Main Pass., opposite Main Stream Pass., 2½ft above floor.
Erse Passage (end)	18383	15539	1232.1	D	On lone boulder in floor of final chamber, 4ft from RH wall.
Southern Stream Passage	18799	15315	1139.6	U	Tip of prominent boulder projecting from bank on LH side of Main Pass, opposite Southern Stream Pass.
Aven Series	19173	15296	1173.6	D	On LH wall of North Wing, beneath aven, 3½ft above floor.
Bastard Passage	18324	15418	1093.9	?	On LH wall by junction with main stream, 5½ft above floor.
Second Boulder Choke	18265	15342	1090.2	D	Near centre of large boulder at start of choke.
Midnight Passage	18240	15323	1103.6	D	On LH side of Mud Rose Chamber, 3ft from floor 8ft from Portal of Midnight Passage.
Keyhole Passage	18171	15313	1090.8	D	Beneath rawlbolt furthest into cave.
North West Junction	17921	15157	1017.7	D	On RH wall of passage, 5ft above floor, directly opposite entry of Main Stream Passage.
Chocolate Passage	18205	14903	998.0	D	On RH wall of main stream, at bend opposite Chocolate Passage 4½ft above floor.
The Narrows	18392	14534	974.1	B	On LH wall after traverse, but before third choke, by sandbank, 3ft above low water.
Fourth Boulder Choke	18475	14439	974.5	D	On RH wall of main stream 8ft below boulders of choke, 1½ft below local roof, 5ft above low water level.
Bat Passage	18513	14460	1028.4	D	On RH wall of Biza Passage after junction 5ft above floor.
Sump Passage	18688	14319	989.4	D	On RH wall of Biza Passage, opposite Sump Passage, 3ft above floor.
Biza Junction	18674	14277	953.1	D	In Main Stream Passage, on RH wall 20ft upstream of climb into Biza Passage, 11ft above stream.
Quarry Corner	18829	14269	931.4	D	On boulder on LH side of main stream, at bend where passage leaves fault, 6½ft above stream.
Higher Traverse Passage	19048	13983	888.6	D	On boulder in main stream on LH wall, directly below high level inlet, but 150ft downstream of Higher Traverse Passage 6ft above stream.
Main Sump	19195	13806	862.6	D	On LH wall of main stream, on rock spur to L of entrance to Southern Stream, 5½ft above low water.
Turkey-Sump I	17124	16073	1211.0	Smoke Triangle	On RH wall, 4½ft from water, approx. midway between sump and final rift, opposite ledge.
Terminal Chamber	17161	16062	1192.5	B	On RH wall of Turkey Passage, used as base of running wire for pitch, 3½ft above stream.
Double Oxbow	17416	16003	1176.5	D	On RH wall of Turkey Passage, 6ft above stream, 5ft beneath entrance to oxbow.
Hawkins Horror	17611	15877	1151.9	D	About 6ft above stream on RH wall of Turkey Passage, left of entrance to Hawkins Horror and Summertime.
Turkey Chamber	17621	15734	1128.4	D	On LH wall of chamber, beside climb to chamber continuation, 5ft above slab.
Shattered Passage	17838	15575	1093.7	D	On large boulder in Turkey Passage at junction, on RH side 6ft above stream.
Coal Cellar Passage	17954	15406	1069.6	D	On LH wall of Turkey Passage, opposite Coal Cellar Passage, 6ft above floor.
Helictite Chamber	17845	15251	1027.0	D	On LH wall of Turkey Passage, 2ft above low shelf, climb to chamber is approx. 10ft downstream.

Underground - Eglwys Faen

Second Chamber	19300	15545	1190.5	D	On boulder in chamber, near to aven, 4ft above floor.

D = Drillmark
U = Unmarked
B = Rawlbolt
? = Non-standard mark

It is hoped that most of the non-standard marks - often chisel marks - will be converted to drillmarks in the near future.

CHARTERHOUSE WARREN FARM SWALLET IN THE BRONZE AGE: A TENTATIVE RECONSTRUCTION

R.A. Chappell

Charterhouse Warren Farm Swallet lies on the central Mendip plateau, in a shallow tributary valley entering Velvet Bottom from the east. Digging commenced in 1972 at the north-western end of a rectangular depression and continued until a depth of some twenty feet had been attained, when part of the unshored dig collapsed. It had by then become clear that the site was a vertically descending rift of unknown length and depth, but at least six feet wide at the top and trending parallel to the valley in the general direction north west-south east. It was decided to move the dig to a more central position in the depression and sink a well shored shaft directly over the rift. The first 16ft of shaft was shored with rectangular box sections of railway sleepers on all sides and was supported on two reinforced concrete beams which spanned the rift and were keyed into the rock walls. Below this the rift was dug from wall to wall, emptying out the entire contents of the south eastern end and proceeding downwards with one shored face only. At the time of writing, a depth of 67ft has been attained at the base of the shored face and the rift still appears to continue vertically downward with a width of 4-5ft at the shoring, closing down gradually to a few inches wide some 15ft horizontally from the shoring. The results of the early trial dig a few yards to the north west of the present site might lead one to believe that the length of undug rift behind the shoring is at least as great as the part which has been dug.

The system of shoring and the well-behaved geometry of the rift walls has greatly facilitated systematic removal of fill from the rift. This systematic operation has, in turn, greatly facilitated the systematic treatment of archaeological material which has been uncovered with the fill in increasing quantity. Stratified bone abounds and some of the layers have proved dateable by means of associated flint and pottery finds. Dating the bone itself by radiological methods would complete the chronology but as a result of finds already made, it is possible to say that the site was continuously used by man from at least early Bronze-Age times through to the Romano-British period.

It is not the purpose of this article to provide a full account of the archaeology of the site, or even an interim report, but rather to demonstrate that by careful attention to archaeological detail, people who regard themselves as cave diggers rather than archaeologists can still derive valuable information to assist them in their work and that the intellectual challenge of recovery, identification and interpretation of archaeological remains, when they exist at a site is at least as great as the more athletic challenge of spoil removal by the ton.

Prehistoric man evidently used the swallet as a midden, and bones of his domesticated animals occur in great: quantity. Bones of cow, pig, dog, red deer, roe deer, sheep/goat and man himself are represented in all levels except the lowest. Horse was also found in an upper post-Roman level of uncertain date. The richest and best characterised of all the levels at the dig occurs at a depth of 52+-1ft and extended along the entire excavated part of the rift. It could be dated accurately to the Early Bronze Age by the finding of a plano-convex flint knife (slug knife) and over eighty decorated Beaker shards, belonging to the same pot, found along the line of the shoring. At least twenty human individuals of all ages occurred in this level, belonging to a local Bronze Age community with some distinctly individualistic traits. All human bones were apparently disarticulated and indiscriminately mixed. The presence of weathering and rodent gnawing marks on some bones suggests that decomposition was complete before they were placed in the rift. The presence of sharp cut marks near some of the joints could mean that dismemberment was also practiced. However, it is also possible that bone was an important economic material and that the rift was the local source, hence disturbance could be secondary.

This Bronze Age community also herded cattle and red deer. The two species are represented in almost equal numbers in the deposit and that husbandry of both was practised is shown by an unusually high proportion of yearling animals still possessing diciduous dentition. Again, the majority of bones were separated, with some showing signs of weathering or rodent attack, but occasionally part articulation was detected and the presence of one complete individual of red deer points to the possibility that the site could have been a dangerous pitfall in Bronze Age times.

It is the presence of a wide spectrum of locally indigenous vertebrate and invertibrate remains that demonstrates the effectiveness of the rift as a natural pitfall and sediment trap in Bronze Age and later times. Rodent, frog, toad, and mollusc remains occur at all levels, but once again it is the 52ft Early Bronze. Age stratum that has been best characterised. The table shows the smaller species that have been identified from this level, together with an estimate of their frequency of occurrence. Not all of the small individuals that were in the layer have been recovered, as this would have necessitated putting perhaps 50 tons of fill through a submillimetre sieve. Also, the deposit was so rich that much of the recovered material is still awaiting classification. Thus the information in the table is based on the examination of only a portion of the total excavated material, but the rough guide to relative occurrences should still be reliable.

A wide range of species have been identified, either in the course of the underground excavation, or else from later surface washing and sieving of spoil or large bone from known provenance. Identification was mainly from dentition and in the case of species that were not already known, standard works were consulted (see literature summary at end). The bird identifications were, however, beyond our scope and were made by G.S. Cowles, Sub-Department of Ornithology, British Museum (Natural History) on the basis of finds of mandible, humerus, clavicula, synsacrum and scapula.

It will be seen from the table that frog, toad, and field vole were all very common and together comprised about 90% of the total small vertebrate remains. Common shrew, wood mouse and pygmy shrew came next, but finds of other species were much less frequent. Notable amongst the infrequent species was water vole, represented by seven separate finds of skull, mandible or individual teeth. Its occurrence in the beaker-slug knife stratum may point to the possibility that the swallet was still active as little as 3,500 years ago, since water vole is aquatic. Today, the species is usually rather closely associated with slow flowing rivers, canals, ditches and lake margins or anywhere where slow moving fresh water is in contact with a well vegetated bank, so that it is entirely possible that such conditions could have prevailed at the site in Bronze Age times. The preponderance of frog and toad also point to the possibility of a similar environment.

The amphibian remains, however, provide a second clue that Warren Farm took a small stream in the Bronze Age. Measurements of mandible size as well as lengths of femur, humerus, tibia/fibula and radius/ulna have suggested that individuals less than a year old are present, as well as breeding adults. Today, large frogs occasionally turn up at the site and on one occasion, a fully grown toad was found under a stone several hundred yards from the dig. These rare occurrences of fully mature frogs and toad today when the site is dry tend to show that if the swallet had been dry in the Bronze Age, only bones of fully mature individuals would have been found and the finds would have been relatively infrequent. As it is, the remains of immature individuals once again point to the fact that Warren Farm sustained a body of water and that the swallet was a breeding site. Some individuals were scarcely out of the tadpole stage and one can hardly imagine such immature creatures migrating for any considerable distance.

Further work needs to be done on ageing the available amphibian material before a meaningful age distribution can be drawn up. A major problem is the lack of growth date on modern individuals for comparison. How long is the femur of a two year old female Mendip toad? Hopefully we will soon be able to supply an answer to this and other important questions as work continues!

The other vertebrate species are unfortunately less useful as indicators of environment, since they are all wide ranging and with catholic habits. Amongst the reptiles, however, the low frequency of lizard and the

higher frequency of slow-worm may be significant as the latter is more tolerant of shaded or wooded habitats. Identification of slow-worm was relatively easy but estimating the numbers involved was less so. Three split mid-caudal vertebrae were found, but they occurred in one bag of finds from a small area, hence they may all belong to one individual. Several dozen dermal plates of slow-worm were also recovered, usually there were some in every bag, but since one individual possesses several hundred of these, estimation of frequency is again difficult., If bird remains had been frequent, any deductions about environment might have been more certain. As it is, bullfinch suggests a wooded environment, while the presence of skylarks and swallow suggest more open country and one is unable to make a definite choice.

The mollusc remains were plentiful and viewed as a whole provide the best indicator of environment that we have, in the absence of pollen analysis. All of the species that have been identified so far are terrestrial molluscs and all can be classified as a damp woodland fauna. Most may be found under leaf litter, rotting wood or other damp sites in woods or hedges. The finds of Balea perversa and Marpessa laminata are particularly significant in that both normally occur in association with logs and tree trunks. Balea perversa in particular is geophobic, according to Evans, and lives an arboreal existence, to be found in crevices in bark.

On the basis of all the foregoing evidence, one is able to reconstruct a tentative site model for Bronze Age times. One envisages a slow moving stream moving between vegetated banks and sinking at the swallet down a 50ft entrance rift. Immediately surrounding the swallet is wooded country, but more open land cannot be too far away, since the nearby settlement needed to sustain its pastoral activities. Indeed the height of the site (ca. 800ft) is such that it must have been close to the natural tree line in any case. Direct evidence that trees were present close to the swallet does in fact exist. At approximately 40ft down, the kernel of a hazel nut was discovered by chance when a lump of dried silt was broken open during digging. Opportunities for further identifications still exist since charcoal has been discovered which may be amenable to microscopic examination.

The belief that the swallet was active until quite recently spurs the diggers on to continue their descent and concomitant archaeological activities. Below the rich bone layer finds suddenly became much less frequent and mud fraction in the fill diminished so that at a depth of 65ft one is now working in essentially clean limestone cobbles. This well washed deposit once again points to the existence of previous stream activity here and one speculates that the gradual accumulation of man's and nature's debris in the rift in the Bronze Age and Iron Age went hand in hand with a gradual drying up of the stream.

Are Neolithic finds likely at the site? The presence of Neolithic flint in the surrounding fields makes this a real possibility. Even so, the presence of at least 50ft of undisturbed and evenly laid beds spanning the Romano British period down to the Early Bronze Age constitutes an important deposit. The proximity of the site to Velvet Bottom leads one to suspect that some of the later members of the Warren Farm community may have been involved in lead mining. However, the fact that a settlement existed here continuously for such a long time must surely lead one to ask when any such involvement could have started. Perhaps the answer to that question may be found in the undisturbed fill behind the shoring, or else in the settlements that exist up the valley sides only a few hundred feet from the dig.

EARLY BRONZE AGE FAUNA AT CHARTERHOUSE WARREN FARM SWALLET

MAMMALIA	Badger	Meles meles	R
	Fox	Vulpes vulpes	O
	Weasel	Mustela nivalis	R
	Polecat	Mustela putorius	R
	Common Shrew	Sorex araneus	C
	Pygmy Shrew	Sorex minutus	O
	Mole	Talpa europaea	O
	Water Vole	Arvicola terrestris	O
	Bank Vole	Clethrionomts glareolus	O
	Field Vole	Microtus agrestis	VC
	Wood Mouse	Apodemus sylvaticus	C
REPTILIA	Slow-worm	Anguis fragilis	O
	Lizard	Lacerta sp.	R
AMPHIBIA	Frog	Rana temporaria	VC
	Toad	Bufo sp.	VC
AVES	Bullfinch	Pyrrhula pyrrhula	R
	Skylark	Alauda arvensis	R
	Swallow	Hirundo rustica	R
	+ small passerine bird		R
	Bechstein's Bat	Myotis Bechsteini	R
MOLLUSCA		Cepaea nemoralis	C
		Discus rotundatus	C
		Carychium minimum	C
		Vitrea crystallina	C
		Puneturn pygmaeum	C
		Balea perversa	O
		Marpessa laminata	R
		Columella edentula	R
		Oxychilus sp.	O
— .		Retinella sp.	O

Note: the mammal list is restricted to the small mammal finds

R = rare (1-4 finds) O= occurs (5-9 finds) C = common (10-19 finds) VC = very common (>19 finds)

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CLOSE YOUR EYES AND YOU ARE ALMOST THERE

Simon Mead-King

In the middle of March 1974, the Thrupe team were digging in the down-dip end of the rift leading off the base of the 25ft timbered shaft. The rift was between 2 and 3ft wide, but was heavily choked with large boulders and stream fill. The only indication of a possible open passage beyond was the faint draught that seemed to be coming from somewhere ahead. About 10ft into the rift, an unexpected choice faced us. A phreatic tube was exposed in the right wall and a definite draught could be felt emerging from it. However, the digging continued along the rift and the open rift leading into the cave was discovered.

The exploration of the system was followed by the blasting out of the new permanent entrance involving a sloping adit and a 20ft shaft. This, using a Kango hammer and single shot holes was a lengthy undertaking and it was not until a year after the initial discovery of the cave that we were able to turn our attention elsewhere.

The phreatic tube, with its movement of air, seemed to be an interesting challenge. The tube led off the rift 3ft from the floor and appeared to run in a straight line for about 10ft. Its diameter was only about 12ins. Clearly, if we wanted to follow it, a considerable amount of chemical persuasion would have to be used to make it body sized at the very least. So, with every inch of the way having to be blasted or chiselled, we progressed gradually along the tube. The draught carried the fumes away rapidly but all the rubble removed had to be winched up the new shaft, to be dumped on the surface. The first 10ft of passage were phreatic and oval in shape but it seemed that the nature of the way on had changed. A few feet ahead we could see a blank wall and what looked like an enterable stream passage descending left to right across our path. Breakthrough was imminent we thought but when we got to it the passage turned out to be a rift only inches wide. This is a typical example of how the eye can be deceived when its field of vision is restricted. Undeterred, the work continued, the rift starting to descend at a steeper angle. There was plenty of evidence that it had carried a stream, for sandstone cobbles and blackened chert were plentiful but it remained tortuously narrow. Always looking ahead, we thought we were nearly in. By the end of July our labours had taken us to a point where the rift turned a second right angle to the left. At this point a series of parallel rifts entered from the right, probably taking flood drainage from the main surface collapse.

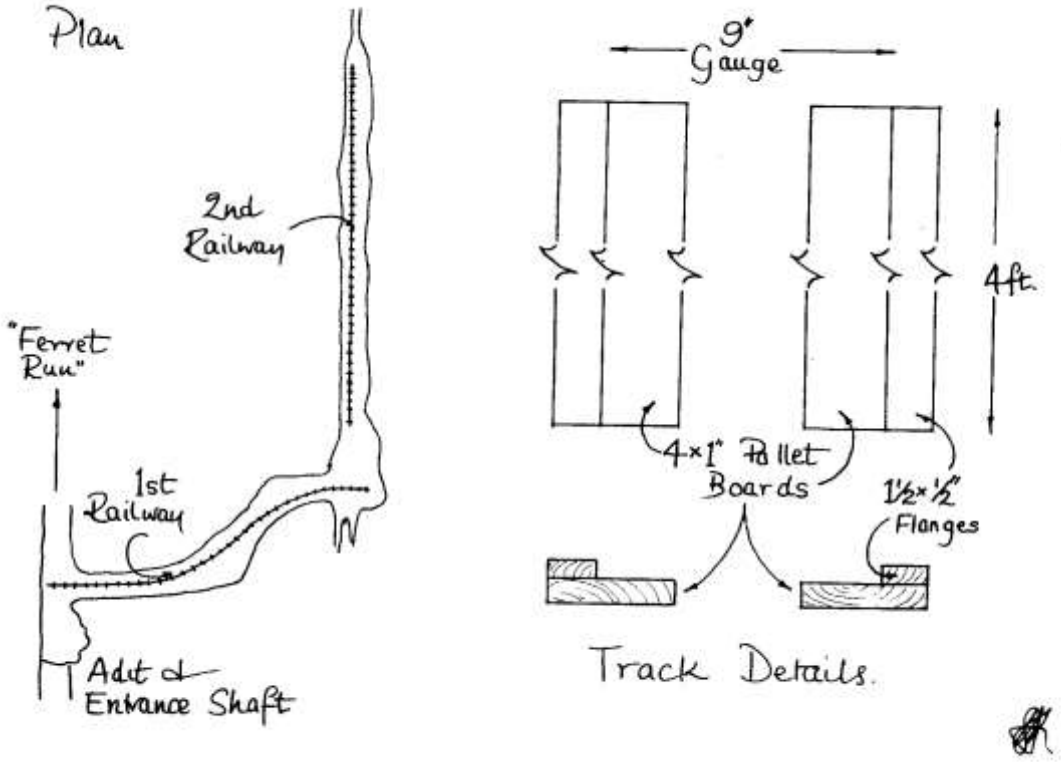
We were now some 40ft distant from the original rift and spoil removal along the low passage was becoming very difficult. It was clearly time for railed transport to take over. During August, with the skilled help of Les Oxborough, lengths of track were manufactured from pallet timber. Each section was nearly 4ft in length and consisted of 2 parallel boards a couple of inches apart held together by cross pieces. When in position underground, the gauge was measured and narrow batons nailed onto the boards to act as flanges. This design was based on the successful railway used at Rhino Rift and it was from Rhino Rift that we obtained the truck. This is basically a wooden box mounted on plastic wheels, one set fixed, the other swivelling, to make cornering easier. Proper iron tramway track has been used in Mendip digging e.g. Cooper’s Hole, Browne's Hole and Hillgrove but wood has many advantages. It is more easily obtainable, lighter and most important, much easier to work with, especially on corners.

The passage had to be slightly enlarged to fit the track, which was then nailed together and ballasted. At the shaft end of the railway the track was carried out over the main Thrupe rift to make unloading simpler. The means of locomotion was rope haulage. With the railway working smoothly, despite the occasional derailment, digging speeded up and before long things began to look promising, large hand sized cobbles and black spaces beyond. Then part of the roof collapsed and we were into our first bit of man sized passage. It was a narrow water worn rift heading away down-dip into which Richard insinuated himself, hammering off offending chert nodules en route. He disappeared down a six foot drop and announced that he had reached a slight enlargement followed by a constriction which he could not squeeze past. This was banged the following weekend and another 10ft of rift entered, ending in a more final narrowing down. In all, we had got about 30ft of new passage; not much of a reward for the effort

put in but considerably better than nothing and a timely psychological boost. Yet again, in order to attack the final constriction effectively, the passage had to be chemically enlarged, a long tedious job. This was further complicated by a huge piece of bedrock dropping neatly into the passage at one point.

A second railway was installed, with a spoil dump between the top of it and the first railway. Oh for somewhere underground to dispose of spoil! Removing the spoil takes 99% of the total digging time!

All the time we were speculating as to where in the known cave our tunnelling would emerge. Possibly Butts Chamber, with its lofty avens, but this became increasingly unlikely the longer the dig progressed. Possibly into an aven of unknown height in the roof of Atlas Pot giving us a 200ft plus free hanging pitch and Mendip's biggest vertical. Possibly into avens above the Avalanche rift sump. However, when a line survey was drawn out by the Shepton Mallet Caving Club, none of these seemed likely. We were heading nearly due south, well away from Atlas and at the furthest point already over the final passage in Avalanche rift. Our depth was a mere 55ft below ground with the Avalanche choke over 200ft below us and our passage showed no signs of going vertical. This is the question mark surrounding our present activities. With the lower railway now over 50ft in length and the rift stretching away from us down-dip, at the present gradient, we should have reached Wells by the year 2000. Hopefully the next instalment will have a more definite conclusion.



A REPORT ON THE ROPE USED IN THE CUEVA DE HORDES, SPAIN

Editor's note: This report is based on two letters written by G.R. Borwick of the National Engineering Laboratory (Strength of Components and Fatigue Division). The first letter (1) was written after a preliminary examination of the rope and the second (2) after more detailed testing had been carried out.

I. My first impression is that the point of failure shows the classic signs of cutting or abrasion of fibres for a large part of the cross-section and of tensile failure for the rest. This would fit the theory that the rope suffered mechanical damage by contact with a rock ledge until it became weak enough to fail under the weight of the caver.

There are a number of hard zones at irregular intervals along the lengths and these obviously result from the ascendeurs used by the cavers. I would like to do some tests to establish the residual strength at and away from such zones.

In view of the importance being placed by cavers on the fact that the pitch was very wet, it is worth pointing out that polyester (terylene), like the other man-made fibres, except nylon, does not loose strength when wet.

II. We have tested two pieces of the rope with the hard sections between the ends. The frequency of the hard sections is such that there were several in each specimen. The specimens were held by loops formed at each end using figure of eight knots and were tested at quasi-static rates on one of our tensile test machines. The specimen length was nominally 20ft between pin centres.

The breaking loads were 1.1 and 1.2 tonf, each measured to the nearest 0.1 tonf. In both cases failure occurred at one of the knots.

Two points emerge. Since the knot was the weak point, and since a figure of eight knot has the effect of reducing rope strength by about one fifth, it is not unfair to consider rope strength as approaching some 11/4 tonf. The rope was quite capable of supporting the weight of a man with a good deal to spare. The second point is that despite the presence of the hard zones, the rope failed at the knot. I am quite certain that these zones will have an adverse effect on rope strength but that effect is less than that of the knot in the specimens we tested.

I have further examined the failure zones and see no reason to change my earlier views concerning mechanical damage.

My conclusion, therefore, is that there will have been some inevitable fall-off in rope strength through normal wear and tear but that the residual strength away from the failure zone is sufficient to allow continued use.

In the absence of a detailed knowledge of the exact circumstances of the accident and its site, it is not possible to be absolutely precise but in my opinion it is quite fair to accept that failure was caused by mechanical damage through abrasion and/or cutting over a rock-ledge or similar formation until a sufficiently high proportion of the fibres was cut to allow the anchored rope to fail under the man’s weight.

There is, of course, no remedy except to publicise the necessity of protecting ropes (and slings or other fibre-based items) from contact with those surfaces likely to have a cutting or abrading effect.

(Editor's italics)

POLYESTER ROPES FOR SRT

The following articles on Polyester ropes were circulated at the recent Buxton symposium on vertical caving techniques and are printed with the kind permission of Marlow Ropes Ltd.

While the figures for energy absorption given in the second article are undoubtedly accurate, it must be remembered that they were obtained under laboratory testing conditions and hence they do not take into account any abrasion damage which might occur to a rope during a fall in a cave. As such, it would perhaps be advisable to treat the figures as being the maximum that would be available under ideal conditions and not to use them as an absolute guideline.

16 Plait Matt Terylene/Polyester Ropes for SRT

Preamble

Marlow Ropes Limited is a member of the Hawkins & Tipson Group, a Public Company quoted on the stock market since 1973. Marlow Ropes was formed in 1961 by Hawkins & Tipson, to concentrate on synthetic fibre ropes which were then virtually in their infancy (although Nylon ropes had been manufactured since the war).

Our particular involvement was with Terylene/Polyester which seemed at the time to have characteristics which were in many cases more valuable and versatile than Nylon, especially its low controlled stretch characteristics.

The first major market was yachting as at this time prices were so high that all products met with considerable sales resistance elsewhere. Since then, although yachting is Marlow's prime concern as a single market, we are active in the general industrial field which in some cases shows the confidence users feel in Terylene as a fibre - for example, Fire Brigades, Coastguards.

History of 16 Plait

We are for caving particularly concerned with 16 plait because of its special qualities, but we should point out that this is only one of a range of several types of Terylene/Polyester ropes and ropes of other fibres which we currently manufacture and stock. It is clearly the most suitable for this purpose. It was originally designed for yacht winching operations and this is still its biggest use.

The first type of 16 plait (circa 1959) had parallel filament cores with a single 16 plait outer in continuous filament yarn (shiny). Yachtsmen's complaints about the slippery surface and the stiffness of the rope first made us change the outside fibres to matt finish yarns. The next improvement was again in response to yachtsmen's requests, to make the rope softer. This was achieved by covering the parallel core with a loose plait so that you now had a parallel core and two plaited covers. This is the rope currently in operation, although there have been marginal improvements in strength over the years due to improved Polyester yarns. Four years ago we introduced colours - red, blue and gold and although these were much appreciated they are rather harder and in some cases weaken the overall strength of the rope.

We are currently working on two developments:-

1. Type 3 White (*) see footnote)

This is already on sale in 16mm dia. upwards and we are actively considering it for 10-14mm as well. It consists of a long laid 3 strand continuous filament core covered with a single 16 plait matt cover. The advantage of this rope is the considerable increase in strength, especially in bigger sizes, although there is some improvement in 10-14mm as well (see chart below).

2. Type 3 Coloured (*) see footnote)

We shall in due course be bringing out new shades of red, blue and gold which is in fact a new type of yarn, being stronger and softer. The colours are also better, especially the red which is redder rather than orange. The chart below shows the differences and improvements and it is as well to note that the core strength of current manufacture is 80% and the new manufacture 100%.

	White	Coloured
Current 16 plait matt 10mm	2000kg	1600kg
New Colours	-	2000kg
Type 3 16 plait matt	2250kg	?
Current 16 plait marr 12mm	3000kg	3000kg
New colours	-	3000kg
Type 3 16 plait matt	3000kg?	?

16 plait matt for S.R.T.

Advantages

1. Matt finish - for better grip, friction, adhesion between inner and outer plaits.

2. The 16 plait construction makes the rope virtually un-kinkable and more important non-twist under load (we have an instance of a 500' length of rope on a block and tackle on a gantry having no twist at all under load).

3. Protected strength (80% core 20% cover). Most other plaited or braided products are 50/50.

4. Non-rucking. 16 plait will not concertina over ledges etc. and will suffer less damage as a result.

5. The round shape of 16 plait will be kept through working. This prevents flattening around sharp bends which could cause damage due to excessive friction.

Disadvantages

1. Loss of strength after relatively few uses. The reason for this cannot yet be proved but we do suspect it is due to grit particles washing in and out of the rope core and abrading the internal fibres. Microscopic examinations have failed to show any grit or damage but we are not particularly happy with the tests.

2. Lack of energy absorption in cases of free fall dropping on extensive heavy shock loading (see accompanying document "The Energy Absorption Potential of Marlow 16 plait Polyester Ropes").

Work Progress

We would like to produce as a supplementary to our retail price list a "guide to cavers" which could give guidance to cavers on care and protection of ropes, a list of do's and don'ts and most important of all if possible establish length of life recommendations. This will have to be established with the recommendation of B.C.R.A. on work carried out by Brian Smith of the Bradford Pothole Club.

Experimental Work Currently in Progress and Activities Considered

1. Current type 16 plait and new type is with a climbing expedition to be used as a fixed rope.

2. Current type 16 plait and new type with Brian Smith to compare one with the other.

3. Once we have established the answer to (2) a sample length of the chosen type in new colours on the outer plait to be sent to Brian Smith for evaluation.

   Note (*) See footnote)

   If Type 3 proves unsuitable (but we may decide to go ahead anyway with Type 3 for yachting) we will carry a range of the present 16 plait for cavers. In this situation we may or may not decide to stock all colours in 10mm and 12mm but would like to seek guidance at this stage to which colours would be preferred.

4. Proofing of external fibres to close the pores (see sample). The work so far done experimentally on proofing has been encouraging but not wholly successful.

Reasons for above work

1. (Climbers) - To widen the market.

2. (Type 3) - Greater initial strength to counteract strength loss due to grit. (Better resistance to grit "flow" due to solid strand core?).

3. (Colours) - Identification.

4. (Proofing) - To protect the core from strength loss due to grit, by closing the pores.

We welcome questions and criticism.

E.G. Hawkins
Sales Director Marlow Ropes Ltd.

(*) Since the original publication of this article, Marlow Ropes have decided that Type 3 16 plait is, in fact, not suitable for caving use and it will not be put on the market for this purpose.

THE ENERGY ABSORPTION POTENTIAL OF MARLOW 16 PLAIT POLYESTER ROPES

Marlow 16 plait polyester rope in 10mm dia. size has been proved highly successful in caving operations.

When this success first became evident, we immediately began extensive research work, as the result of which we think it desirable that all cavers should be made aware of certain facts about the ropes when they are subjected to shock loads in an emergency.

This is not in any way to introduce an alarmist element but purely to explain, for the benefit of all, the facts as they exist.

Nobody, not even a mountaineer, falls on a rope deliberately, but it must be pointed out that if in emergency a rope is called upon to satisfactorily arrest a falling body the rope must be technically capable of absorbing that load.

It is, we think, correct to say that in caving, the chances of a fall are not anywhere near so great as in mountaineering and in the rare event of a fall, the distance is considerably less.

The energy absorption of 16 plait polyester rope is of the order of 6,000 ft. lbs. per pound weight of rope.

Calculated as figures applying to 10mm and 12mm. 16 plait ropes, this means an energy absorption rate of 325 foot pounds per foot of rope for 10mm rope and 466 foot pounds per foot for 12mm rope.

If, for the purposes of illustration, we assume lengths of 10, 15, 20 and 25 feet of rope, we have energy absorption capacity of 3,250, 4,878, 6,500 and 8,130 foot pounds respectively for 10mm rope and 4,665, 7,000, 9,300 and 11,650 for 12mm. rope.

We now look at the effect of a man falling these distances., The figures that follow presume that a man is falling an equal distance to the length of the rope - that is, for a 10 foot length of rope the man falls 10 feet; for 20 ft. of rope a fall of 20 feet and so on. This is the way that the shock-absorbency of ropes is determined in laboratory testing and represents the worst possible conditions that could exist. In fact, they are worse conditions than are likely to happen in most actual usages of the rope, excepting possibly industrial and yachting safety harnesses.

Firstly then, let us assume that a fully dressed and equipped man weighs 200 lb.

The energy produced by a falling body is the multiple of the static weight of the body and the length of fall so that at a free fall of 10 feet he will have developed 2,000 foot pounds of energy and at 15, 20 and 25 feet the figures will be 3,000, 4,000 and 5,000 respectively.

When we compare these energy figures to the energy absorption potential of the rope we see that there is a margin of about 1½ : 1. For 12mm rope the margin is around 2¼ : 1.

These figures are for new rope and are highly satisfactory but account must be taken of the reduction in strength of ropes through use.

It is known that after a reasonable period of use, the strength of ropes used in potholing applications depreciates by up to 50% - even though ropes are invariably washed after use. Extensive research in our laboratory has not so far been able to account for the cause of this but, although examination of used ropes has never defined to any great extent the presence of silt that has penetrated into the rope, this seems the most likely cause. The abrasive nature of silt will, of course, produce some permanent rupture of the fibres from which the rope is made. We know that the reduction in strength is not caused by any tendency to acidic conditions either in cave water or the environs. Neither do the clamps used in descending or prussiking appear to be the cause of damage.

To return to the energy absorption capacity of the ropes, it is essential then, that we look as what is available in them when they have reduced in strength by 50%. Obviously, their absorption capacity is also reduced by 50% - from 6,000 ft. pound per pound weight of rope to 3,000.

If we now look again at the figures given for new rope, where we see that for 10mm rope a factor of approx. 1½ : 1 exists between the rope absorption capacity and the energy developed by the falling man, this will reduce to ¾ : 1 for a rope of 50% strength reduction. This means of course that the rope will break.

I repeat that this is, however, when tested under deliberately hazardous laboratory testing conditions and hasten to add that actual conditions encountered in caving operations are not likely to be anywhere near so stringent.

If the figures for 12mm rope are examined, a rope of 50% reduction will have an energy absorption factor of approximately 1 1/8 : 1 - not a very great margin of safety, but at least the rope should not break.

We have set out our figures in this way to highlight the worst conditions that could occur, but since it is not likely that a potholer will fall without some (possibly quite considerable) length of rope above him the actual shock load transmitted to a rope will be very considerably less than in laboratory testing. The

longer the length of rope already out above a cave, the greater is the ability of the rope to absorb the load.

To illustrate this, let us say that there is 40 feet of rope above the potholer and that he slips off a ledge. The capacity to absorb energy of a used 10mm. rope of 50% strength is 6,500 foot pounds. There will therefore be ample margin to arrest the falling man safely because, since he is in contact with the rope he cannot fall very far; - even if the rope is lying slack at the start of the fall.

In conclusion, let us repeat that whilst conditions in caving are unlikely to be so serious as to cause a rope to fail, even allowing for a 50% drop in strength due to circumstances of usage, it is always as well to be acquainted with performance under extreme conditions.

Under the terms of the Health & Safety Act it is the duty of a supplier to acquaint the user with all information relating to his product to ensure safe usage. I feel that we are conforming with the requirements of this Act in providing the information given in this paper.

A.E. Wills
Technical Director, Marlow Ropes Ltd.
February 1976

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Axbridge Caving Group

As a result of the current caving insurance problems the members of the Axbridge Caving Group and Archaeological Society have recently split up into two new groups.

The cavers retain the name 'The Axbridge Caving Group' whilst the archaeologists have formed themselves into a local history society. The reason for the split was the increase in insurance premiums which would have meant the archaeologists paying an extra £4-5 each per year on their subscriptions along with the cavers. The caving group are currently insured for all eventualities except the dreaded 'member to member' claim, pending the results of the Southern Council investigation into caving insurance.

The new revamped A.C.G., which among its interests controls Banwell Bone and Stalactite Caves and Coral Cave, has a new more central meeting place for its members at the Ship & Castle, Congresbury. The Hon. Secretary of the Group is Ray Gorrigan of 19, Brandon House, Jacobs Wells Road, Bristol, BS8 1DT.

LETTER TO THE EDITOR

Dear Sir,

I would like to have the opportunity to reveal some of the events which lead up to the publishing of the article "Accident in the Cueva de la Vega de Liordes".

1. The committee decided that a report on the accident should be prepared and that Phil Davies should write it. This decision was not communicated to all the Club members involved in the accident.

2. Phil restricted his discussions and correspondence to Brian Woodward and members of the Wessex Establishment. At no time did he either tell me he was writing the article or ask if I might wish to contribute.

3. As it was felt that it would be politic to publish the article before a report appeared in Descent, Phil did not bother to wait for any comments that Brian had to make on the draft article

And so, Phil, who admits that he is not competent to write about prussiking or rope handling (the cause of Chris's death), had to pad the article with irrelevances and concluded with some completely misguided criticisms.

Just as the article was totally useless in helping to prevent similar accidents occurring in this country or abroad so it is in no-ones interest to delve either into the reason for all the innuendo of the article's second paragraph or to read a detailed reply by me to the thoughtless criticisms of the conclusion. The way in which Phil's article was prepared, however, illustrates the rift which has developed between the Establishment (not necessarily committee members) and the plebian caver. These Club members when not completely unhelpful or patronising are often just downright rude to any caver they meet from outside their select circle. For the good of the Club, they should come down from the heights to which they have elected themselves and try communicating with other cavers.

Yours faithfully,

PETE MOODY.

I regret, particularly in view of the tragedy involved, that it has been found necessary to publish the accompanying letter from Peter Moody, the Committee however, understand that they have a duty to the membership of the Club. It was this same sense of responsibility that prompted them to commission the accident report and conclusions which was prepared by myself without prejudice and with sympathy for the difficult situation that developed in Spain.

The very fact that the Club is able to publish a critical letter of this kind seems to counter the very arguments that Peter Moody presents.

Having now had time to ascertain the cause of the rope failure, perhaps a more constructive letter could have included helpful advice concerning the use, application and technique of S.R.T. I hope information of this kind will appear in this Journal in due course, preferably written by the younger, more active members of the Club.

Philip Davies 10.6.76.

REVIEW

Access to Caves (1975) NCA Conservation and Access Group

The declared aim of this concise report is to 'state the quantitative position regarding access', and it has done so by collating the information on questionnaires sent to cavers in each region who are considered to be well acquainted with local access agreements. The report concerns itself with any cave where some kind of access procedure must be complied with, exclusive of those where it is merely common courtesy to ask the farmer's permission. The findings are documented in a 39-page booklet; all data being presented in tabular form, though their meaning is not always made clear by the titles - nor is there any explanation for those percentages which exceed 100!

The initial picture is of a multitude of access agreements, close seasons, booking and leader systems, each bearing little resemblance to any of the others. Yet some common factors can be plainly seen, the major surprise being perhaps that each region has roughly the same proportion of controlled caves. It is also apparent that very often, it has been the farmer or landowner, rather than cavers, who has initiated an access agreement; would-be pirates might like to bear in mind that without such agreements, many caves would perhaps be permanently closed - and the actions of an irresponsible few can have repercussions on the caving world at large.

In their conclusions, the authors seem fairly confident about future trends. Farmers, quarrymen, cavers and other sportsmen can all pursue their occupations and pastimes in harmony, but only at the loss of some individual freedom. To the caver, this will continue to mean the access agreement. It is also an unpleasant fact that insurance is becoming more and more a reason for gating caves, as by this means the person or organisation responsible for the site can better safeguard its liabilities.

The authors do not, however, foresee a rash of access agreements in the near future, and it is likely that each cave will, as in the past, be considered on its own merits. What is a cheering prospect, is that we are likely to see a rationalisation of existing agreements so that they become easier to operate and fairer to all.

We should not, however become complacent, and this booklet should be read by all cavers with any interest in access whatsoever.

P.G.H.

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