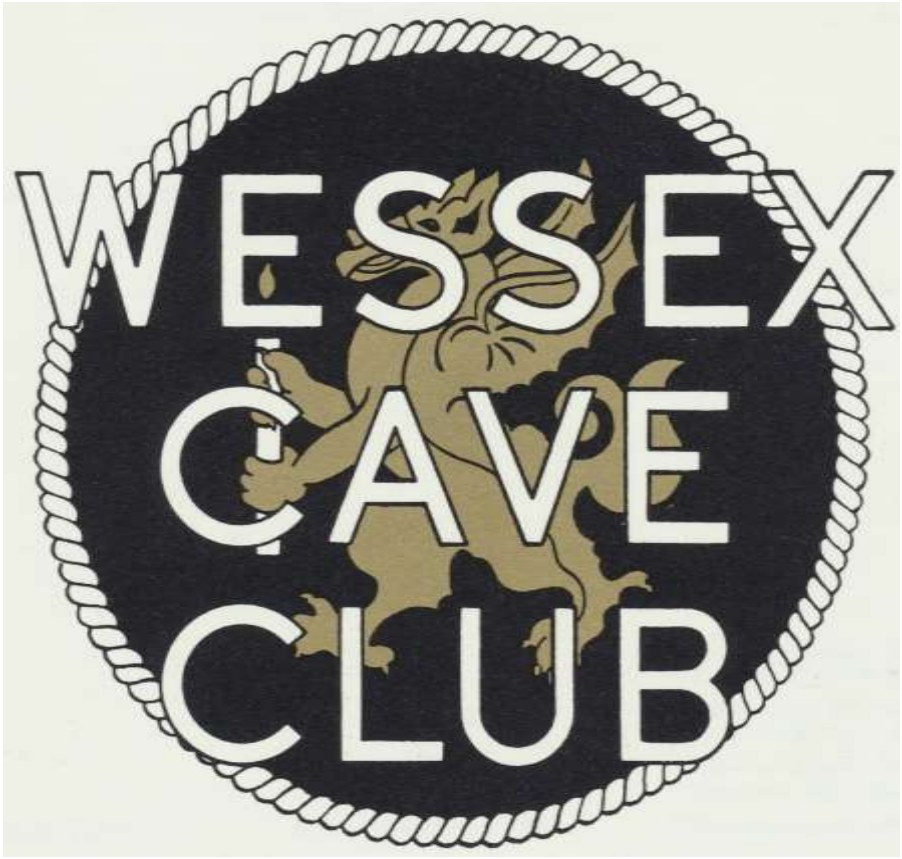
WESSEX
CAVE
CLUB

THE WESSEX CAVE CLUB JOURNAL

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Club Notes

An Apology

To **Bob Leaky,** reports of whose death are very much exaggerated!
Sorry Bob - blame it on the CSCC!

Congratulations:

Keith and Roz Fielder on the birth of a son, Liam who weighed in at 10 lb 6½ oz, on 7 May.

New Members:

Welcome to:

John Baker, 26 Frimley Green Road, Frimley, Camberley, Surrey, GU16 5AH
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Upper Pitts

A **hut working weekend** has been set for the **1st and 2nd of August.** Please contact Pete Hann if you think you will be able to help.

Although the new food and hygiene regulations do not apply to club hostels such as Upper Pitts, the **kitchen** at the hut is long overdue for a refit, and plans are currently being drawn up. Anyone who can help by providing materials (especially cookers and ovens) please contact Mark Helmore on 0761 416631.

Mike Dewdney-York has been drawing up plans for expanding the **library.** This will involve making the club's substantial collection of books and periodicals more accessible to members wishing to find information to help their caving. The expansion will take the form of a rack of shelves upon which periodicals can be displayed. Mike would appreciate help from any competent carpenters who can help build a suitable rack. Donations of box files or magazine boxes would also be appreciated.

News and Notes

Please could club members who are in possession of **club tackle** return it for checking and the annual audit.

The **1992 Wessex Challenge** was held on Saturday **20** June in Priddy. Teams from most of the major Mendip clubs took part in a treasure hunt which culminated in a boat race on the Minories. Winners were the UBSS, with a little help from the Moscow Caving Club. They will be hosting next year's event.
In the evening after the race, a very successful stomp was held in the Village Hall. In keeping with the spirit of the original Challenge, all proceeds from this event have been donated to the Mendip Rescue Organisation. Thanks are particularly due to Roger Dors for providing the bar and being so generous with the takings.

This year's **Annual Dinner** will be held at the Coxley Vineyard. Reasonably priced rooms will be available at the Vineyard. Details in the next Journal.

Caving Notes

People interested in a trip to **Ireland** next Easter should contact the caving secretary. Address at the front of the Journal.

The latest news from Mendip is of a big discovery by the **Axbridge Caving Group.** Details of location are sketchy: suffice to say it's in their part of the world. There is talk of eight hundred feet of large, well decorated passage with several; potential leads.

Paul Lambert has taken over as **MRO Coordinator** for the Club. He has updated the call-out list and circulated copies to those members included on it. Should any member feel that he/she should be included on the call-out list and is not please contact Paul on 0963 51436 or write to him at Co-Op Flat (rear), Fore Street, Castle Cary, stating: name, address, home phone number, work phone number, working hours, and why you should be on list

Club members travelling into Wales since Easter will doubtless by now be aware of the raised tolls on the **Severn Bridge.** The one way fee for the crossing is now £2.80 for a private motor vehicle, although there is no toll travelling back from Wales into the UK. The increasing number of club members with vans should be warned that light vans are being charged £5.60 for the return trip, whether they are privately registered or not. If you drive a diesel you will now find it cheaper to go via Gloucester, even if you want to go to Chepstow.

Recent news from the Dales indicates that divers have been continuing this year's exceptional record of finds. Geoff Crossley, diving in the **Keld Head** sump, has laid over 1000ft of line in an enormous passage which was discovered after a chance visit with some high power filming lights. The passage is heading towards Marble Steps, but has recently started to curve away from the direct line.

The CNCC have recently written to all their member clubs to remind them that there is still an access arrangement in operation on **Casterton Fell.** Permits are required for ALL trips: the northern caving secretary has more details. Please also note that the footpath arrangements for access to the fell have been changed. If you want to get to any of the upstream Easegill entrances (eg **Top Sink** or **County Pot)** it is no longer permissible to walk directly over the fell from Bull Pot Farm; the approved route is to go down towards **Lancaster Hole,** but carry on along the wall until you meet the Gill. Then walk up the side of the beck to the sinks. The change was agreed with the landowner following concern over the amount of damage done to the fell by people wandering haphazardly over the peat bog beyond the end of the Bull Pot track. Signs showing the correct route have been erected; please obey them.

Further abroad, word from **South Africa** is that most of the country's caves have been closed to sporting cavers following an agreement between the government and the country's scientific caving body which left the South African sporting caving organisation completely out in the cold. This, not surprisingly, has caused uproar. Could it happen here?

The rebolting programme has been gathering momentum. **Swinsto Hole** and **Yordas** are now completed. All that is needed to complete trips in this cave are maillions: normal 8mm hangars are now redundant.

News from Derbyshire is that access the **Holme Bank Chert Mine** has been withdrawn pending a new arrangement being drawn up with Chatsworth estate. Elsewhere, **Yoga Cave** has some unstable boulders in the Latrine area, and pollution in **Lathkill Head Cave** is causing concern. The Derbyshire bolting programme has now completed **Giants Hole, P8, Carlswark, Lathkill Head Cave, Layby Pot and Oxlow Caverns.**

There was another fatality in **Port-Yr-Ogof** recently. Apparently a young army cadet suffered cold shock upon leaping into the river. This is not the first such fatality at this site and further reinforces the need for proper clothing even in 'novice' caves.

The arrangements relating to the closure of the **Dinas Silica Mines** have been clarified somewhat. Apparently the Brecon National Park wants to turn the surrounding area into a visitor centre, thus necessitating the gating of the mines to keep the general public out. Continued access to the mines for cave divers seems to be under no threat.

Cavers looking for drinking water in **Daren Cilau** should be aware that there have been several cases of upset stomachs in the cave amongst people who have been careless over the water they chose. Recommended sites to obtain drinking water are the first inlet in the entrance series, the Misfit, the Kitchen in Apocalypse Way, the left hand inlet in White Passage choke, Crystal Inlet, and 7th hour sump, but not from St David's Streamway or Terminal Sump.

From Devon comes news of an extension in **Pridhamsleigh.** Paul Craggs found an extension of 46m of Prid II at -34m. meanwhile, **Radford Cave** remains closed by a collapse, although efforts are being made to manufacture an alternative entrance. **Penrecca Mine** is closed due to an access agreement problem, and negotiations are underway to try to maintain access to a number of **mines in Cornwall** which are threatened with permanent capping.

Club Diary 1992

2 August	Committee meeting	10.00am Upper Pitts
23 August to 30 August	RESCON 92 International Cave Rescue Conference	South Wales Cave Club, Penwyllt
12 September 13 September	BCRA Conference	University of Bradford
19 September 20September	Yorkshire booking	Birks Fell Pot Gavel Pot
20 September	Committee meeting	10.00am Upper Pitts
10 October 11 October	Yorkshire booking	Gingling hole Magnetometer Pot
17 October	AGM and Annual dinner	
7 November 8 November	Yorkshire booking	Lancaster Hole/Link Pot Long Kin East/Rift pot
5 December	Yorkshire booking	Juniper Gulf
30 December 31 December	Yorkshire booking	Notts Pott Lost Johns Cavern

Please contact Keith Sanderson (address at the front of the Journal) if you wish to attend any of the Yorkshire bookings.

Novice instruction is available on all Club trips: please contact Andy Summerskill (address at the front of the Journal) for details.

Notes for contributors

If you have any article, letter, comment, news, photograph, or anything else which you would like to see published in the Journal, please do not hesitate to send it in. Preferably, text should be typed on one side of the paper only, with wide margins and double spaces between the lines, but I'd rather have it scrawled on the back of a cigarette packet than not get it at all.

The main requirement for photographs is that they should not have too much contrast as otherwise they are unrecognizable when printed. Prints in black and white or colour are acceptable, but bear in mind that they will come out as black and white prints when they appear, so if the colour is an important feature the effect may be lost in printing. Please make sure that your prints or transparencies are clearly labelled, and send the appropriate captions for each figure on a separate sheet.

For those who have access to a word-processor, I may be able to accept contributions on floppy disc. Please give me a ring so that we can discuss whether or not your software is compatible with mine - at present I can handle contributions in Apple Macintosh format and all formats of MS- DOS IBM disc.

Line drawings, sketch maps and diagrams are all welcome. They should be supplied in the size at which they are to be printed. Make sure that lettering is large and bold.

If you copy drawings or photo's, or quote, from another publication, please make sure you inform me before publication so that I can make arrangements regarding copyright

Authors may obtain a laser-printed copy of their article for the production of further offprints by contacting me, although I may have to make a small charge for this service.

NJW

Rescue Practice

The 1992 Wessex Cave Club Practice Rescue will be held on
Saturday 19th September 1992
from Drunkards Hole, Burrington Combe.

Meet at Upper Pitts at 10am.

It is hoped that those on the call-out list and committee members will attend as well as anyone else who is interested. As an incentive, it is Paul's 30th Birthday that day and he will be putting on a barrel!

Wessex Cave Club

Annual Dinner

to be held at

Coxley Vinyard

on

Saturday 17 October 1992.

7.30 for 8.00 pm

Menu, price and details in the next Journal.

AGM 2.30pm, Hunter's Lodge Inn.

The Golden Oldies Video Project

A progress report

Maurice Hewins

Before the recent advent of video recording, most amateur movies were shot on narrow gauge cine film. Pre-war, 9.5mm was in vogue but by the 1960's, (standard) 8mm had become general. This was later largely superseded by super 8.

At their best, when filmed with a good camera such as a Bolex B8 and shown on a top of the range projector, the results can be superb. However, it always takes time to set up a showing, so a lot of good films tend to end up unedited and forgotten at the back of a cupboard.

The success of last years film show at The Hunter's proved that there is much interest in those caving films of the 60's that remain, the event also caused some unexpected material to surface. Tony Dingle produced a short but unique sequence of the Wessex dig at Thrupe Swallet. Another major find was Dennis Warburton's epic of the trials and tribulations of Alan Surrall's digging team at Cow Hole. The latter could make a fascinating comparison with the video made last year at Hymac Hole by Tuska's group.

The Farnham Group filming at the 40' in Swildons in 1964. (Tony Dingle)

It seemed to me, that it was desirable to get as much of the film transferred to VHS video tape as possible. This would enable greater access as well as facilitate further copying and editing. The only worry is that the archival durability of video tape may prove to be poor. Experience has shown that 8mm film shot in 1959 remains strong and flexible, with its colours apparently unaltered. Some pre-war film can deteriorate badly, and ignite spontaneously, or even explode.

To date, the best of my own films have been commercially copied. In addition the rest of anything considered likely to be of any interest has been put onto tape using a borrowed video camera. The latter copies are acceptable in the short term and enable me to assess what we've got.

If any reader has any old movies of possible interest to the club, that they could add to the collection please let me know. The best of Dennis Warburton's underground sequences have still not been located and may still exist. The next step will be to get all the material identified and catalogued. Then a copy can be left on Mendip for general use. If a really top grade copy is needed later of any particular footage, we can refer back to the original film if we know where it is. Help with making duplicate copies and with editing will be appreciated when I reach that stage.

June 1992

Charterhouse Cave and T'owd Man

Nigel Graham

Last year, visitors to Charterhouse Cave spotted two boulders containing sections of drilled holes on the mud and boulder slope dominating Splatter Chamber, some 40 feet high.

The mud slope becomes vertical below tantalising openings at roof level. This infill is being eroded by the main stream and by a small shower from a rift in the roof. The bank has apparently slumped relatively recently, and a huge mass of mud and boulders still clings desperately, thanks to some stal, to the hanging wall lower down the chamber.

This March, our digging team spotted a stemple in a small roof pocket. On April 4th, we returned with scaling gear. Being gentlemen, we offered lead-digger Pete Hann the lead. Overcoming minor incidentals like showers of loose muck and the butt of the maypole sinking into the mud as fast as he climbed the ladder, he reached the top of the bank. Summoning up his years of wide-ranging caving experience, Pete assessed his situation: "It's f****** 'orrible up here!"

Moving very cautiously on 45° mud, he examined two inlets, one being the source of the shower, the other dry. Both are hopelessly choked with boulders, whether mining waste or natural collapse we cannot say but this appeared the only way in the miners could have used. The stemple proved indeed to be just that, and a stemple socket was found in the wall nearby. Perhaps they had anchored a handline on what had been a far more extensive mud slope. No other signs of T'owd Man have been seen in the cave, so how far he had ventured in his search for galena (or other ores) is unknown. The cave lies below an extensive gruffy area.

The stemple is visible from the foot of the slope, the shot-holed boulders are a few feet up the bank, below the shower inlet. We suggest that the rest of the bank be untouched, as its mud forms have suffered enough.

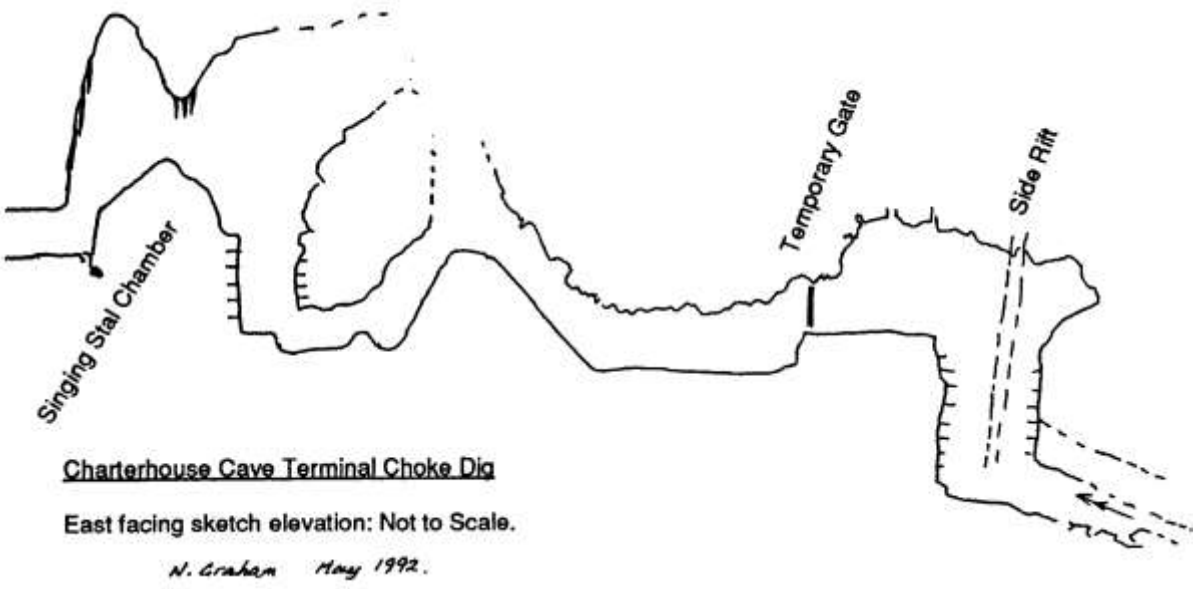
Before we left, removing all gear, Pete carefully inspected the lower corner of the chamber. Removing his muddy outer clothes, he crawled in among boulders and fine formations for some way behind the infill, until stopped by more stals. One can peer into this area, to admire it without entry.

So yes, our old friends the miners had been in Charterhouse Cave, though their entrance remains uncertain.

The team were Pete Hann, Eddy Waters. Wayne Brown, Dominic Sealy and Nigel Graham. This bends the rules a little, but it was a "working-trip needing an extra pair of hands and all present know and care for the cave. We do not exceed the leader+3 limit on ordinary tourist trips.

Footnote:

On 24th May, Pete assessed his progress in the present terminal boulder choke. The solid left-hand wall develops a useful overhang a few feet beyond the safe limit, a small shaft between concreted boulders and the entrance to a small, choked, decorated side-rift. The wall is stal-coated to the overhang, which shows the steep dip here (about 40°). A hole giving an enticing view some 15ft on emitted a strong, cold draught. Unfortunately the surrounding boulders are very unstable. Worse, mud obscures their key points, and will need very cautious raking away to reveal the "structure" (if that's applicable to a rubble heap). The sketch section, drawn facing the solid East wall, is not to scale but is somewhere near estimated proportions!



How to loose the guarantee on your Bosch

and related horror stories

Nick Williams

Introduction

Battery powered hammer drills have revolutionised the way in which cavers use both explosives and rock anchors in this country. With the aid of one of these drills it is possible to make long shotholes to greatly increase the efficiency with which explosives can be used and they make it possible to place anchors at a much greater rate than with self-drilling types thus reducing the time taken to place bolt routes up avens or on pitches.

There are several manufacturers making drills suitable for caving purposes. Of these, the most superior is certainly the Hilti TE10A which is a fully industrialised drill with a price tag to match. Other manufacturers include Black and Decker and Hitachi, but the drills chosen by most cavers are the GBH24VR and GBH 24VRE manufactured by Bosch and it is these I shall concentrate on in this article (fig. 1).

Officially designated 'rotary fixing hammers' by Bosch, the drills are hardly designed for the cave environment, and while the bolting applications are not far removed from the original purpose intended by the designers, the manufacture of long shotholes requires some particular modifications. The VR and VRE drills are identical in every respect except that the latter has an electronic speed control built into the trigger. This can make starting holes which are not perpendicular to the surface in which they are being drilled easier. Unfortunately, Bosch fit the trigger with a little knob arrangement which controls the maximum speed by preventing the trigger from being pulled in completely, and while this is fine in theory, the practice in caves seems to be that grit gets into the knob and can jam the trigger completely.

Fig 1: The Bosch GBH 24VR Rotary Fixing Hammer

Both drills have switches above the trigger which reverse the direction of rotation. This should not be operated while under load as the current may damage the contacts. Also, it is worth making sure you know which way the switch should be for the drill to turn in the correct direction since drilling holes is substantially slower in the wrong direction, and in some applications underground it is difficult to tell which way the drill is turning!

Operation of the drill

The basic power unit is a permanent magnet DC motor running off 24V worth of 1.2Ah nickel cadmium batteries. At full power the drill provides over 250W, equating to a current of over 10A in the batteries and the connections between them and the motor. This, and the low voltage supplied, means that it is important for the connections to be in good condition if significant power is not to be lost. Any abnormal resistance in the connections will waste power, cause undesirable heating and may even prevent the drill from operating at all (the battery contacts should be the first thing to check if the drill fails to turn).

The motor in the drill drives a reduction gearbox which incorporates a genuine pneumatic hammer action. This consists of a dash-pot which moves a weight back and forth striking the end of the drill. This gives substantially more force than is obtainable from a normal hammer drill, hence the use of a special type of chuck and drill bit. The rate of strike is about 600/min at full speed. Because of the way the hammer operates, the force with which it strikes the end of the drill is substantially reduced if it is not operating at full speed.

Drill bits

Drill bits (‘steels’) for masonry applications work in very different way to those for other materials, since essentially the rock is broken by the compressive hammer action of the tip. In order that they should not wear out too fast, the drill bits have a special tungsten carbide tip piece brazed on the end. This material is very hard (hard enough even to scratch glass) and can only be sharpened with a 'green grit' (silicon carbide) wheel. These are available for most grinders, a useful source being K.R. Whiston (New Mills, Stockport SK12 4PT), and while the drill bits do not have to be razor sharp all the time it is worth re-grinding them whenever they are obviously blunt. It is also worth keeping them clean and rust free, since particularly in the case of long drill bits (over 300mm) substantial amounts of power can be wasted by friction between the steel and the hole and by getting the rock dust caught in the flutes. Cleaning with a steel wire brush, followed by a wipe with an oily rag and a spray with WD40, should prevent any

build-up of corrosion provided the drill bits are not stored under damp conditions.

Each different manufacturer of drill steels uses a different design of flute profile, and it seems possible that some of these are more efficient than others. Experiments to confirm this are still taking place. With any design of flute, however, it is possible to reduce the friction of the drill steel in the hole by fitting a special tip. A standard steel which has had the next size (1mm larger) carbide tip fitted to the end will cut considerably more efficiently. The trade off is that the resulting holes are less accurate in diameter and shape so this is not a suitable option for making holes for anchors.

When removing or re-fitting tips it is important not to overheat them as this may cause fractures or even complete shattering. The bronze used in carbide tip brazing is specially formulated to melt at a lower temperature than normal. Additionally, that the tip must be replaced close enough to central not to cause unwanted vibrations when drilling.

The SDS type drill bits used by the GBH and many other pneumatic hammer drills are not normally available from DIY type outfits save for perhaps a few limited sizes. However, professional power tool dealers and hire shops not only often have a range in stock but will usually get special drills quickly if asked. The SDS bits are available in up to 26mm diameter, but the largest practical size which can be used with the 24V battery drills is 16mm. Fortunately this seems to be the size in which most manufacturers produce their longest bits and holes up to 800mm in depth can be made, although it is good practice to build up to this length using shorter drill steels for the first parts of the hole.

Adapters to allow a standard key-type chuck for straight shank steels to be used with the drills can be purchased for about £7.00. These are not recommended for use with the hammer action switched on. Since long, small diameter drill bits in SDS fitting are more difficult to come by I have brazed a standard straight shank drill onto a chuck adapter (without the chuck) and this seems to work well, particularly if the shank of the steel is turned down to fit inside the chuck adapter. This makes 8mm holes up to 600mm in length available and is extremely useful for some boulder reduction exercises.

Wet Conditions

In many applications, the drill may have to be carried to the drilling site through a sump or wet passages. In this case it is necessary simply to provide a waterproof container to carry the drill in. For non-diving applications a modified ammunition can (two six inch boxes welded one on top of the other) can be used. Much lighter and less awkward to carry, however, is a 'Schermully' box. This is a grey rectangular bottle with a red screw top lid, standing about 14” high. They originate in the Forces where they are used as waterproof containers for flares and are available in some caving shops. A piece of rope tied to the body of the box is used to carry it (avoid the old

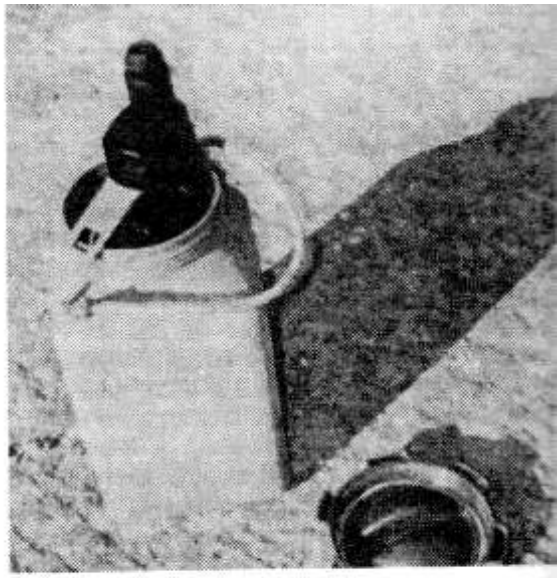


Fig 2: The GBH drills will just fit inside a 'Schermully' flare box.

type box with the rope tied through the lid). To get the drill itself into the box it is necessary to saw off the lower part of the aluminium battery bracket: this part of the bracket does not seem to serve a useful purpose and removing it does not prevent the battery from being attached to the drill but it is still best to ensure that the owner is properly sedated before this operation is attempted on someone else's drill! Once this modification has been made, the drill can be wriggled into the box (handle first), along with the battery pack, wire and assorted other items (fig 2).

Carrying the drill at depth underwater is no more complicated, although suitable receptacles tend to be more expensive. Some people use waterproof dry bags (a compressed neoprene bag with a drysuit zip) while others use rigid ‘Pelican’ cases. In the former case it is important to wrap the drill in some sort of towelling or carpet to prevent the sharp protuberances on the drill damaging the bag under pressure.

Using the drill underwater, while not actually dangerous, is probably not wise since the effect of water in the hammer action is unlikely to be beneficial. It is possible to immerse the drill entirely for the purposes of cleaning and I have even pressure washed one when it got completely covered in mud. However, it is important to dry the drill as soon as possible after it has got wet to avoid corrosion. If the drill cannot be placed somewhere warm to allow the water to evaporate from within, it should be dismantled (at least as far as separating the gearbox from the motor) to allow it to dry faster. Particular attention should be paid to cleaning dirt and grit out of the chuck, but being relatively simple to dismantle this should cause few problems if cleaned and greased regularly.

The drill steels themselves can be used underwater, and this does not seem to effect the rate at which they cut unduly. However, dust which can normally be removed from a hole with a blow tube

becomes a sticky sludge when it gets wet, so the only practical way to shift it is with a water jet.

Efficient Drilling

As previously mentioned, the drill operates by hammering at the rock and the rotation of the drill is only required to remove the shattered rock from the hole. If the drill is pushed hard into the rock the cutting speed is actually drastically reduced since the drill tip cannot move away from the bottom of the hole and gather momentum for the next strike. The correct drilling pressure results in a very distinctive ringing noise from the drill steel: it is worth getting to recognise this sound before using the drill in anger. As a rough guide, the weight of the drill when fitted with a battery is about right for efficient cutting when the steel is vertical and the weight of the drill is resting on it.

The other thing which greatly reduces the drilling rate is a slow drill speed, such as when the batteries start to go flat. Quite apart from being very bad for the battery, the cutting rate drops off very quickly once the motor speed starts to fall, so it is often quicker to use part of the charge in two full batteries than to completely flatten one.

External Batteries

For a good many caving applications the fitted battery packs are not sufficient, particularly when drilling shotholes. The time for which the drill can be used can be greatly extended by connecting an alternative battery pack to the drill by a lead or extension wire. This has the added advantage of almost halving the weight of the drill and so can make using it overhead in bolting applications much less tiresome even if it does mean carrying the battery in a backpack or tacklesac (fig 3).

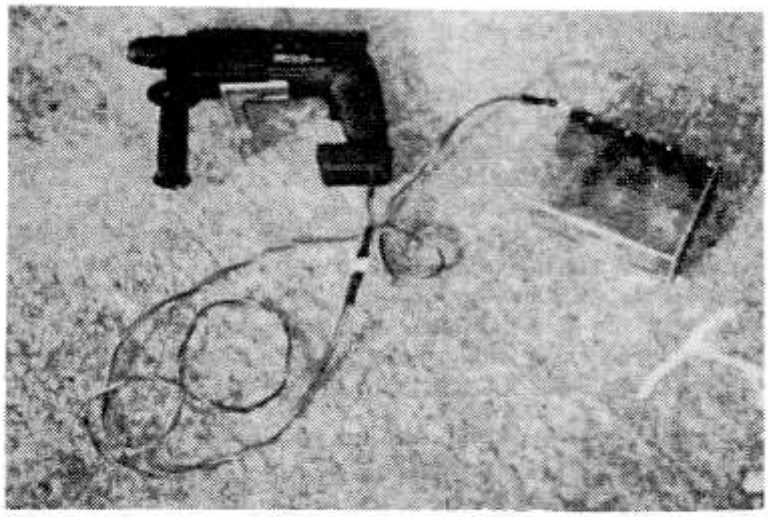


Fig 3: External battery packs connected by a flying lead make the drill much lighter to carry and give extended drilling times.

Various external battery packs have been tried with the Bosch drills. Of these the nickel cadmium battery packs are by far the most successful: although sealed lead acid batteries have been used they are not designed for either the electrical or the mechanical abuse which they get in this application, and they tend not to last anything like as long before they no longer hold a usable charge. Nothing can be done to resurrect batteries in this state, the only thing to do is buy some new ones.

Nickel cadmium batteries, by contrast, thrive on this sort of treatment. Good and useful battery packs may be built from 4 or 7Ah cells and will give many tens of centimetres of 16mm hole before needing to be recharged. Using smaller capacity batteries is also possible, but the discharge rate is higher than recommended for anything much under 4Ah, which is why the battery packs which are supplied with the drill can have a disappointing life. Some users have had success using second hand cells, while others believe that paying the extra for new ones pays off in the long term.

As noted above, the performance of the drill is greatly reduced as the battery voltage drops, and some users have put an extra cell or two into their batteries to ensure that the maximum energy is squeezed from the pack at or near 24 volts. The only risk from this practice is overheating, of which more below.

Connections

The quality of the connection between the drill and the battery pack is vital. At the currents at which the drill operates even small resistances in the wires and connections can result in large power losses. I use 2.5mm^2 wire to connect my external battery pack, and would not recommend using smaller than 1.5mm^2.

There are also a number of schools of thought on the connections to the drill. ¼" female tags (as used in most car wiring systems) clip neatly onto the battery terminals on the drill, although I have found that they can get pulled off easily (equally easily cured with a pair of pliers). This is not recommended on drills fitted with the variable speed control (GBH24VRE) since connecting the drill up backwards will damage the speed control. For drills without the speed control, all that results is that the drill goes round the wrong way.

Other users have made a wooden block arrangement with brass or printed circuit board connections which push onto the drill's own terminals. These, while effective, are bulky and can be subject to the same dirty connection problems as found with the proper Bosch battery packs. At these currents there is really no substitute for properly crimped or screwed connections.

My own favoured solution is to connect a flying lead to the battery terminals inside the drill and

put a standard electronic type connector on the end of this. The battery connecting strips are held in place by two self tapping screws just inside the housing, and there is space (with a bit of wangling) to get 2BA ring tags under these in addition to the terminal strips themselves. Short (=200mm) lengths of wire then lead from each terminal through the bottom of the drill handle (where they will tuck neatly behind the battery pack) and into the outside world. On the end of these wires I use Molex connectors of the type often seen on computer power supplies and radio controlled cars, but any two pole connector with sufficient current carrying capability (say 10A) would be suitable. Additional mechanical support for the wire insulation can be provided by using self adhesive heat-shrink sleeving: this sets into a fairly tough tube after shrinking, and can be moulded around the wires with a pair of pliers while still warm.

This arrangement virtually guarantees a good connection to the drill. If polarised connectors are used this can prevent damage to the speed control of VRE drills. There is the added advantage of them being quicker to connect than the other arrangements. A potential disadvantage is that both the external and the Bosch battery pack could be connected at the same time (not recommended) but I suppose nothing's idiot proof!

One thing to be very careful of is to ensure that there is never any danger of short circuiting the battery since the currents available from any type of rechargeable battery are enormous by normal standards, and quite capable of incinerating the wires and parts of the drill, not to mention causing a potential explosion risk from the battery!

Extra Cooling

The design of battery powered drills is always a compromise between available battery life, size, cost and weight, and available power. Even cursory comparison with mains versions will show that the battery drills have much lower power ratings than their mains equivalents. The designers of the drills therefore go to some lengths to minimise the amount of power wasted by the drill, and in the case of the Bosch units this means that they have not been fitted with a cooling fan. The logic of this is that the battery pack provided will not run the drill long enough at full power for it to overheat, but this situation obviously changes when an external battery pack is fitted.

The most vulnerable parts of the drill are the brush mountings, and in extreme cases of overheating they can melt, rendering the drill irreparably useless. This can be avoided by only drilling for short periods and letting the drill cool - a ten minutes on/ten minutes off duty cycle seems about right. The best way to tell if the drill is getting too hot is to use it only with bare hands and stop drilling when the case starts to get uncomfortably hot to hold around the rear of the motor housing.

To solve this problem it is necessary to fit the drill with some additional cooling. The only realistic way of doing this is to fit a fan to the armature: this is not actually as complicated as it might at first appear since the mouldings used in the battery powered drills are for the most part the same as those used for the mains versions and so all the necessary vents and clearances are provided for fitting a fan. Having said this, the instructions which follow do require some fairly severe treatment of the drill, and are not for the faint hearted! They will, of course, probably completely invalidate any guarantee you might have on the drill, and I accept no liability for those people who attempt them only to find they are not as competent as they thought they were! I will only add further that I have performed this operation on three separate drills (including my own) with no disastrous consequences.

Dismantling the drill

All the screws which hold the drill together are of the plastic forming ‘self tapping’ type, and are screwed directly into the nylon of the case. There are no metal inserts, and this means that care must be taken not to over tighten the screws when replacing them.

Dismantling the chuck, as referred to above, is a simple operation and can be done frequently with no long term effect (so long as care is taken not to loose the bits! The gearbox, however, is a slightly different kettle of fish, and it is probably wise only to pull it apart when absolutely necessary. Apart from anything else, there’s a lot more bits to loose!

The magnets used in the drill are of the ceramic rare earth type, and extremely strong. Since they will attract any ferrous material in the near vicinity, it is wise to ensure that the working area is clean and free from swarf or filings as these will greatly increase the rate of wear of the drill if allowed to get into the works. The magnets are probably very permanent but even so it is not a good idea to leave the drill unassembled for any length of time without inserting some form of ‘keeper’ to complete the magnetic circuit.

Fitting a fan

The first operation is to find a fan suitable to fit the drill. The best source of these is an old mains electric power tool which is beyond economic repair. I found that the local tool hire shop was a good source of dead drill armatures.

The preferred type of fans are those with straight radial fins on one side and a flat surface on the other. The fins should be about 5mm deep (giving an overall fan depth under 10mm). Spiral or especially deep fins tend to be more efficient, but this simply means that the drill wastes more power moving air, and while it will run cooler this is an unnecessary waste of battery time. The armature shaft of the GBH 24V drills is between 10.0 and 10.5mm diameter, so choose a fan which has a small enough central hole to be filed or reamed out to the correct size.

All suitable fans are push fits on their armatures although some have splines on the armature shaft. In any case, the fan can usually be forced off the armature shaft with a vice or hammer although it may sometimes be necessary to saw the end off the old armature to ensure the fan can be push evenly when being removed.

Once you have removed the fan from the old armature, put it on one side until needed - no attempt should be made to change the size of the hole in the centre until the battery drill armature is available to compare it against.

Before dismantling the battery drill, first run it to familiarise yourself with the normal noise of its operation, both in the hammer-on and the hammer-off modes. This is a valuable procedure, and can save a considerable amount of heartache later on. When you are satisfied that you will recognise whether the reassembled drill is behaving oddly and making extra noises, take off the battery pack and remove the three screws which hold on the rear of the handle. Remove the cover and the two screws which hold the battery contacts in place and the four smaller screws holding the two brush covers in place.

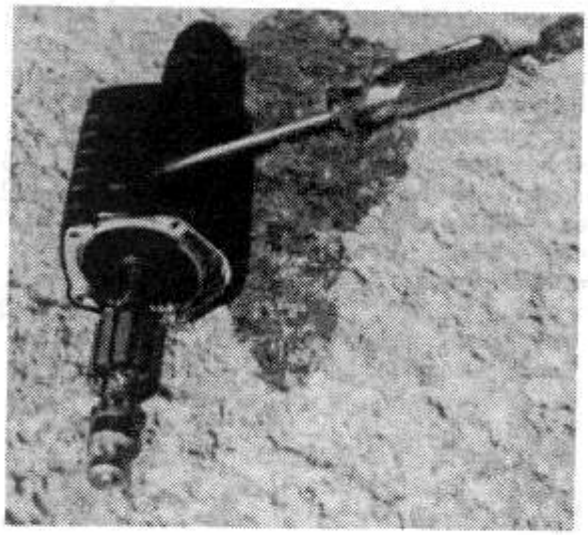


Fig 4: Using a flat bladed screwdriver to remove the hammer control knob

Next, remove the brushes. The switch unit/ speed control can then be lifted out. If the drill you are working on is the 24VRE with an electronic speed control take care to mark the wires to ensure that you will be able to reconnect the input wires the correct way round.

Remove the rubber seal off the chuck. The plastic cover for the chuck will now come off to reveal the circlip underneath. Remove this, and taking care not to loose the ball bearing , remove the spring plate, spring and spacer.

Using a flat bladed screwdriver, lever the hammer control knob out of the gearbox housing (fig 4). This can require a lot of force, but the knob, which is held in place by a spring loaded clip, will come out under the influence of a steady pull. Take care not to loose the metal insert.

Having removed the control knob, undo and extract the four screws holding the blue motor body to black gearbox case. It will then be possible to pull the armature out of the body, but take care that the armature does not smack into the magnets under the force of the magnetic field as this could crack or chip them. Retrieve the red rubber washer from the brush-end bearing. The gearbox cover can also be removed at this stage: it is wise to do this over a tray to catch any stray bits. The cover will probably come away with several of the gearbox parts intact. Leave these in the case, and remove the other loose gearbox parts from the box chassis, taking note of where they go.

The next step is to remove the armature from the gearbox chassis. To do this it is first necessary to remove the gearbox end bearing from the chassis. It is held in by a rubber 'O' ring. If you can get this out, all well and good, but I have never succeeded in doing this and although pushing the bearing out of the chassis without removing the 'O' ring will shave a small amount off the ring, this does less damage than fruitless attempts to remove it with a sharp point or knife edge.

Removal of this bearing is probably the most delicate operation of all. Support the chassis as close as possible to the bearing outer race (leaving space for the bearing to come out of the aluminium chassis) and gently hammer the armature and its bearing out of the chassis. To do this it is essential to use a brass drift – otherwise there is the risk of damaging the gear teeth on the end of the armature shaft. Also, take care to ensure that your support system does not damage the armature: it is, for instance, very easy to support the chassis in a vice adequately, but then bash the windings against the vice jaws while concentrating on not damaging the bearing!

Now the armature is free of the gearbox chassis the bearing can be removed from the shaft. This is also done by gently hammering the shaft through the bearing - again take care to use a soft faced hammer which will not damage the shaft millings, and support the bearing to avoid bending the races.

The drill is now almost completely dismantled and ready to have the fan fitted to the armature shaft. Expand the hole in the centre of the fan with a file or taper reamer, taking care to keep the hole fairly round and central. The fan should be a hard hand push fit, or require gentle persuasion with a hammer. Fitted with the blades towards the armature windings it is in the correct position when about 5mm past the shoulder against which the gearbox end bearing fits. Once the fan is in place the bearing can be refitted to the shaft (it may need hammering) and the whole assembly back into the chassis under hand pressure. The metal side of the bearing goes towards the gears in the box. Check that the fan appears roughly in the centre of the aperture in the side of the chassis and does not foul on any of the metalwork.

Next, re-assemble the gearbox and cover. This is spring loaded by the hammer action and may require assistance from an extra pair of hands in order to get the control knob into place. Before replacing the motor body, replace the red rubber rear bearing mounting a job most easily done with a piece of copper pipe or wooden dowel as these are unaffected by the field of the magnets.

Continued on page 145

There I was, surveying this hole...

Willie Stanton

Pockmarking the plateau of the Mendip Hills in Somerset are thousands of grassy hollows, sometimes called sinkholes or dolines but known in the Mendips as swallet holes. Each one conceals the entrance to a cave in the limestone beneath. Too steep-sided to plow, they form wildlife oases in the green deserts of intensively farmed fields.

In the late 1950s I set myself the task of surveying them all, and I soon arrived at a curious swallet hole where four gullies meet in the shape of a cross. It was centrally placed in a square field, surrounded by rising slopes and cliffs on all sides. The field itself was flat, and the little stream that entered a cave at the lowest point had cut down through deposits of silty clay that had been laid down in horizontal layers no thicker than a sheet of card.

Clearly the field had been the bed of a lake. But how could a lake have existed on the top of the Mendips, which, as all the locals know, are as full of holes as a Gruyere cheese?

My survey identified 14 more former lakes in a line stretching from above Wookey Hole cave to beyond Cheddar Gorge. Each one is a huge dent in the limestone plateau like a valley with no exit. Mendip farmers long ago gave them mysterious names like Cabin Bottom, Bag Pit, Vurley and Gargill. The biggest is 18 metres deep and covers 100 hectares.

Only one explanation was likely. The lakes probably formed in the Ice Age when the caves beneath them were blocked with permanently frozen mud. During each brief summer the Mendip snow cap melted and the waters flowed away down what have since become dry valleys (cutting the gorges at Cheddar and Ebbor) or into the lakes. When the Ice Age ended, 10,000 years ago, the ground thawed and the lakes drained through swallet holes in their beds.

This was good academic stuff, and it helped to attract field parties of earth science students to the Mendips. Two sites were particularly suited to short educational visits. A road traverses the Brimble Pit lake bed, providing a useful parking space for the obligatory minibus. The Cross Swallet lake, with its perfect circular erosion terrace marking the old water level, is then within walking distance.

My survey advanced only slowly because I was employed overseas. But driving past Brimble Pit during leave in 1964 I noticed that one of the nine deep swallet holes in the lake bed was half full of builders' rubble. It was rumoured that the farmer planned to fill all of them. At about the same time a nearby quarry changed ownership and began to expand, much faster than previously, towards Cross Swallet.

In those days the planning laws gave no protection to landscape features unless they were officially "special". Concerned for my discovery, I proposed to the then Nature Conservancy Council that the Brimble Pit and Cross Swallet lakes ("closed basins" in the science jargon) deserved special treatment because of their accessibility and because, taken together, they exhibit all the distinctive features of the Mendip Ice Age lakes. The NCC assessors inspected the sites and agreed with me. In 1968 they designated the two basins as a site of special scientific interest (SSSI).

In 1970 I gave up geologising abroad and moved into a house only a mile away from Brimble Pit. Commuting to work, I crossed the SSSI twice daily. Every now and then, a few loads of builders' rubble or other rubbish appeared in the swallet holes. The NCC had no powers, apparently, to stop it.

But this was a small matter compared with the widespread destruction of limestone scenery that was going on elsewhere in the Mendips. Farmers were increasing the productivity of their fields by levelling the bumpy bits: the swallet holes, limestone crags, old stone pits and mine workings were being filled or covered with rubbish.

In 1988 I completed my survey of the limestone plateau. I had found 2245 swallet holes. 287 of which were more then three metres deep. Of these deep ones, 34 had been completely filled and levelled and 64 were in various stages of filling. No doubt there had been others that were lost before my survey reached them.

I learnt the hard way that the practicalities of farming - the economics of survival - outweighed environmental scruples when a lorry driver called on a farmer with a plan to dump refuse on his land. My protestations that farmers were supposed to be the guardians of our country side were, literally, rubbished.

"Put your money where your mouth is", one farmer said, and after a while the idea took root. I approached several landowners who were actively dumping, and persuaded one to sell me a field with swallet holes. Weeks later she had second thoughts and cancelled the sale. Another farmer agreed, then backed out. A year passed with no success. Then, almost casually, I learnt that a field was available in my own parish. It just happened to be the field with nine swallet holes in Brimble Pit lake bed.

Three months later I was happily arranging to return my swallet holes to their natural state as landscape features and refuges for wildlife. One contained about 150 tonnes of soil and rocks, another 10 times that amount of builders' rubble scrapped cars and household "durables". The other seven were empty apart from a few cookers and old tyres. Because the field was an SSSI, the NCC (now English Nature) was willing to meet most of the clearance costs from its site restoration fund IT exchange for a management agreement.

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A trip on string the Mendip way

Dominic Sealy

The caves of the Mendip hills are not renowned for their verticalness. Determined to build up our limited experience of S.R.T. two friends and myself decided we would take a hint from Andy Sparrows Book and try out some of the suggested S.R.T. pitches on Mendip. Having had to abandon a pre-arranged trip to the Dales at very short notice we were all feeling rather depressed; the opportunity to do some vertical caving rarely avails itself so not to be outdone we formed Mendip's "Ladder Loathing Trio"!

S.R.T. kits were packed, ropes uncoiled and bolts threaded. First to be attempted was the mighty chasm of Hunters Hole. A gentle walk down from the Wessex soon saw us stood by the entrance (having suppressed our urge to enter the Hunters). After a short period of faffing about at the pitch head we soon reached the first re-belay. Before long I was rigging the final traverse out over the free hang to the base of the pitch. The traverse is a might bit technical but worth it for the excellent hang. Soon we were all at the base of the pitch, a quick look down to the choke and we were on our way out.

The following day, our enthusiasm running high we set off for Eastwater to do Twin Verticals route once again using S.R.T. Before long we were at the head of the first vertical. Not the most inspiring of pitches I grant you, however still worth doing. The second vertical makes up for what the first lacks. Rather than swing across to the half way ledge we decided to carry on to the base of the shaft using an in situ deviation. This makes a reasonably spectacular descent of 70' in what (if you squint) could be a Yorkshire shaft!!

A squeeze at the base of the pitch leads into the rest of the old cave. We made a little round trip up Thirteen Pots, then made our exit. A good trip by anyones expectations.

Our next vertical adventure saw us down Rhino Rift - perhaps rather more accepted as a string trip. It's an interesting cave bearing much more resemblance to a Yorkshire pot. We followed the traditional route but looked out to a distant deviation on the third pitch. Routes for all standards of technical competence we decided!!

We still have many possible S.R.T. routes on Mendip to complete (new route Rhino, Atlas Pot and the Thrupe Lane Space Walk, to mention some of the more obvious ones. Whilst I confess that many of Mendips' pitches are far more suited to ladder and line, there are good S.R.T. pitches on Mendip. Next time you're wondering what to do and perhaps you feel like brushing up on your S.R.T., go out and try some of the string routes before you knock them. They certainly gave us a few hours of fun.

Bosch drill - continued from page 143

Re-insert the armature into the motor body. It is usually necessary to screw the body to the gearbox with at least two screws to obtain sufficient alignment to allow the drill to be rotated by hand, but the screws should not be fully tightened until it is certain that none of the moving parts are fouling the housing.

Two favourite causes of fouling are the fan not being far enough along the armature shaft, and casting flash on the aluminium battery bracket. The former is cured by moving the fan slightly, while the latter problem required appropriate adjustment of the bracket with a file. Other fouling problems are likely to be caused by incorrect assembly or misalignments. If the cause of the noise is not immediately obvious try to determine the frequency with which it occurs: if it is once per revolution of the motor, it is probably caused by something sticking out of the armature. Twelve strikes per revolution indicate something protruding from the housing and hitting the armature metalwork or rubbing on the commutator. Noises many more times the speed of revolution are probably the fan blades fouling the housing, particularly if they only occur for part of a revolution.

When all noises are accounted for, replace and tighten the four gearbox to body screws, and check the armature rotation again. Finally, replace the brushes and switch unit, the battery contacts and rear part of the handle. The battery can now be fitted, and the drill should run with an identical noise to that which it made before being dismantled.

There I was, Surveying this hole - continued from page 144

The 150 tonnes were scooped out by a tracked digger in one morning and piled in two heaps on the field. I spent many months sorting out the rocks for wall repairs and putting the soil to various good uses. Removing the 150 tonnes occupied a digger and two lorries for a fortnight. I had to be sure that the exhumed rubbish went to a legal dump, not to another Mendip swallet hole.

To recompense English Nature, I agreed that the field would be farmed in an environmentally friendly way for at least 21 years. It will remain as pasture or a hay meadow, with the swallet holes preserved and agrochemicals banned. To diversify the already good flora and fauna there will be no grazing from 1 November to the end of April; if hay is taken it will not be cut before August. Access for educational or research purposes approved by English Nature will not be refused.

So a chain of coincidences, beginning with a geologist's recognition of an ancient lake bed, has after 34 years led to that same geologist being able to win back, safeguard and perhaps even enhance a small part of a vanishing environment. Funny, the way things turn out.

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