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Forum

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Book Review

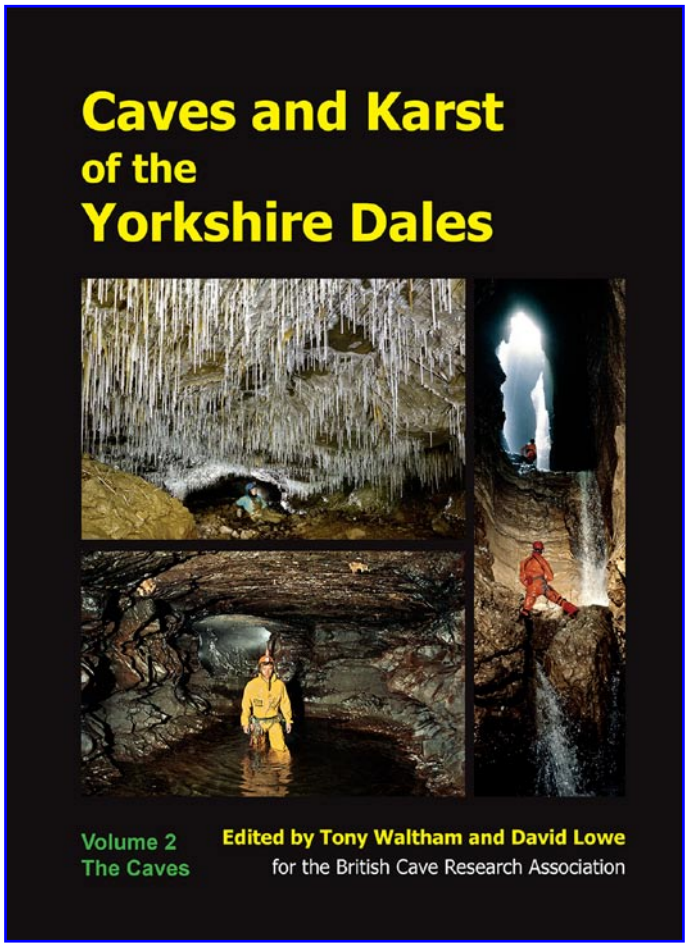
Caves and Karst of the Yorkshire Dales Volume 2

Edited by Tony Waltham and David Lowe, 2017.

328 pages (A4), all in colour, with 141 maps and graphics, and 627 photographs. [Buxton: BCRA.]
Softback (ISBN 978-0-900265-48-8). RRP £30
Hardback (ISBN 978-0-900265-51-8). RRP £70
20% discount to BCRA members.

Review by **Chas Yonge**, Canmore, Alberta, Canada.

Volume 2 (chapters 17–33) of *Caves and Karst of the Yorkshire Dales* follows on from Volume 1 (chapters 1–16) by describing the Yorkshire Dales (and adjacent karsts) area by area. It contains chapters that describe the major caves and a regional overview for each of 17 areas within and around the Yorkshire Dales karst and is very well supported by an increased number of excellent photographs. It occurred to me that some chapters should have been combined because they have considerable overlap (e.g. 3 chapters concern the Three Counties System), but as I went through I thought the editors had done a good job balancing the content so that no chapter was too long. It reads well.



On picking up the book, my immediate thought was: who is this aimed at? After all, this is not a caver's guidebook, as excellent, detailed guides exist; indeed, such guides are referenced in the Preface. So as I read through the chapters, I was impressed by the detail of the cave descriptions, especially accompanied by the many fine photographs – these highly distinguished authors with long experience really do take you through the caves. But this is not all. One of the strengths of this volume lies in its standardized area maps, which, unlike those in the cave guides, add essential geology (Grit, Yoredale, Great Scar, and Basement), geomorphology, hydrology and cave skeleton plots (the latter indicating passage size). I particularly liked the cross-section diagrams, which give a further perspective of how this all comes together. The systematic format to the chapters, as in: Introduction, Geology, Geomorphology, Hydrology, Cave descriptions, Cave evolution (speleogenesis I suppose) and summary remarks, provides consistency throughout the book. Presented in this way, the reader gets a good feel for the karst and speleogenesis of each area described, and what questions still need to be answered. The use of side boxes, pink for exploration history, yellow and blue for more detailed scientific explanation, is a good way to provide supplementary information without interfering with the flow of the main text. When even further illumination is required reference is also made to Volume 1, but I found the references to be rather few, which led to my second thought: Can Volume 2 be read as a stand-alone book? I think the answer is that it can, but the generalized background on specific topics – e.g. glaciation and Quaternary evolution, speleothems and palaeoclimates, cave palaeontology - which you get from Volume 1 is essential background reading. Perhaps the more descriptive nature of Volume 2 would appeal to the less technical reader? But there again, there is a lot of thought-provoking discussion of a technical nature. I'm happy to own both volumes.

I was somewhat concerned by the lack of female participation – two chapters in Volume 1 involved women authors but none in Volume 2. There are photos of women cavers and taken by women photographers in both volumes. For Volume 2, I think the lack of female participation might be historical in that many of the authors' peak caving experiences were at a time when relatively few women were caving. This situation has changed somewhat – at least it has in my club in Canada, where female membership is almost 50% and our newsletter and national magazine receive in-depth articles from cavers of both sexes; trends among other clubs throughout the caving world are the same.

In summary, having caved extensively in the Dales during my university days, I have a reasonable knowledge of the areas described, except in the northern areas. So I very much enjoyed reading through the chapters as a vicarious caver! But I learned so much more and it's left me with a much deeper understanding of the cave areas of my youth. When I reviewed Volume 1, I wrote that the book was a "*must have*" and this most definitely extends to this second volume. The Dales karst region is absolutely world-class, and this 2-volume opus is an extraordinary piece of work to support that. It sets the standard for such books to come, from anywhere in the world.

[I made notes as I went through the chapters, so below is a synopsis of what they contain. I hope this may be useful too.]

Chapter 17
Caves of Dentdale and Wild Boar Fell
Roy Holmes

This a well laid-out chapter with good accompanying photographs and diagrams describing a complex area, but it requires some effort on behalf of the reader to get through! A small error is the reference to Crookgill Head being in Figure 17.2 when it is actually 17.3 and perhaps *Keld Head* near the top of the diagram should be distinguished from the better-known one in Kingsdale.

Having, like many, caved only in Ibbeth Peril in Dentdale, I was intrigued at the extent of the karst, not only in Upper and Lower Dentdale, but also of the adjacent areas: Great Knoutberry Hill, Wild Boar Fell, the Rawthey Valley and Mallerstang. As the author acknowledges, *"…many of the caves and potholes in this northwestern corner of the Dales are indicators of widespread underground drainage in the Great Limestone*" and goes on to note that, "*…except* [the caves] *along the floor of Dentdale, they are little known and rarely visited, but could be worthy of greater attention*."

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Chapter 18
Caves of Barbondale
Hugh St Lawrence

This a shorter chapter on a small area and I wondered if it should not have been included in Chapter 17 – *Caves of Dentdale and Wild boar Fell* – or even in Chapter 19 – *Cave Systems of Ease Gill*. But on reflection, it does stand alone, appearing not to be linked hydrologically to either, because it is isolated by various elements of the Dent Fault system. It is also unique in that its caves have formed in steep, almost overturned, beds of the Great Scar Limestone, due to up-warping within the fault zone. The author does, however, acknowledge that whereas modern drainage is confined to the Dale, it intersects older trunk passages that might have past links to the *Three Counties System* (see below). It is interesting that the Aygill Caverns system lies close to both, and has theoretical links to both, by sump to the former and with high level fragments leading towards Barbondale (as described in the following chapter).

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Chapter 19
Cave systems of Ease Gill
Paul Swire

This chapter describes the northwestern part of the *Three Counties System* (Cumbria, Lancashire and North Yorkshire), the longest cave complex in Britain, approaching 90km, and also the second deepest at 253m, after Ogof Ffynnon Ddu. Known as Ease Gill Caverns or the Ease Gill Cave System, it constitutes some 40km of the whole. Should this part be described separately from the rest, which is the subject of Chapter 20 - *Caves of Leck Fell* and Ireby Fell? Figure 19.2 (also repeated in 20.3 and 21.3) clarifies the choice, where Leck Beck Head drains most of the system and a single, dived passage from Witches Cave to Lost John's Cave separates the entire system into two massive cave complexes. And complexes they are; in my early caving days, I confess to being lost and ignominiously found on a trip from Lancaster Hole to County Pot! Many traverses through the system are possible because of its numerous entrances. Glacial rejuvenation has allowed many swallet type entrances to develop in the Gill floor, but the subsequent juvenile passages target larger high-level passageways that likely developed earlier beneath a more extensive shale cap, and this has general application to many of the high-level passages seen elsewhere in the Dales.

Paul Swire leads us through Ease Gill via six plan maps and one elevation perspective, containing five simplified elevation views showing gentle dips generally towards the north. Together with an excellent array of surface and underground photographs, these give a detailed view of the system and an intriguing read. Paul Deakin's picture of water crashing through the Main Drain (in moderate flow!) or the decorated splendour of Easter Grotto and many other superb photographs just make you want to be there.

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Chapter 20
Caves of Leck Fell and Ireby Fell
Tony Waltham and Tim Allen

The *Three Counties System* account continues here by describing the caves of the southeastern complex that pass under the Lancashire/North Yorkshire border, some 50km of passageways. Whereas Leck Beck Head drains a large part of this complex, the Keld Head resurgence in Kingsdale is also involved. But for a 320m gap, a connection to the Kingsdale caves (Chapter 21) would add another 27km of passage, allowing the Three Counties System to grow to 117km, consisting of three major complexes. Figure 20.3 gives a good overview.

Ireby Fell Cavern and the farther-east cave Rift Pot, with more than 1km of large, phreatic passage, contain the dominant, high-level relict passages. These high-levels are aligned NW–SE and their explored limits are only some 400m apart (although a smaller high-level connection exists). However, the similarly-trending complex extends over more than 4km and includes (mainly) Lost John's Cave, Notts Pot, Ireby Fell Cavern, Marble Steps Pot and Rift Pot, and passes from Lancashire to North Yorkshire (or vice versa!). An excellent cross-section (Figure 20.9) shows modern draining from Ireby Fell Cavern to rise >30m as one component of the westerly Leck Beck Head. Relict passages extending SE from Ireby Fell towards Kingsdale are suggestive of an earlier drainage in that direction, with the enigmatic Marble Steps Pot likely to drain to Keld Head. In a full-page green box, the authors, in text and cross-sections, provide two possible explanations for the palaeo-drainage; one that drains to Leck Beck Head and the other to Keld Head (which includes the still-farther east Chapel-le-Dale). There is no definitive evidence yet for one or the other.

In summary, this is a masterful account, strongly supported by graphically appealing diagrams and top quality photographs.

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Chapter 21
Caves of Kingsdale
Dave Brook

DB ably continues the theoretical *Three Counties System* story, by discussing the humanly unconnected Kingsdale karst. Except in flood, all the groundwater in Kingsdale drains to Keld Head. Most of the caves are connected in a system of >27km, the *Kingsdale Master System*. One of the dominant passages manifests as a large vadose streamway incising a prominent phreatic tunnel. The flooded East Kingsdale Branch, which extends eastwards before heading up the east side of Kingsdale, is a major component and is intercepted by the long sink cave of King Pot. The latter may have connections to Chapel-le-Dale via relict passageways. Dale Barn Cave, which has its entrance in Chapel-le-Dale, but heads westerly to end within 400m of Keld Head, is intriguing. However, its flooded Boottrapper Passage proceeds upstream, northwards ending within 200m of the East Kingsdale Branch. Boottrapper resurges in Chapel-le-Dale at Dry Gill Cave in flood; could it be an overflow spring for Keld Head? Brook suggests an unknown source. On a final note, DB alludes to the fact that whereas the cave system down Kingsdale may be largely explored, much remains to be learned of an earlier generation of caves at the lower end of the dale.

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Chapter 22
Caves of Ingleborough
compiled by Tony Waltham and Dave Brook, comprising:

White Scars and Newby Moss
Tony Waltham and Ged Campion

The Allotment and Ribblesdale
Dave Brook and Tony Waltham

Chapel-le-Dale and Ribblehead
Dave Brook and Phil Murphy

Ingleborough along with its lesser peak, Simon Fell, are summits composed of flat-bedded Millstone Grit underlain by the Yoredale Group. While the Yoredale sequence includes thin limestone units, in which substantial caves can form, here the Grit/Yoredale beds act as an impermeable cap where streams radiate outwards to sink in the Great Scar Limestone benches lower down. This results in an extensive karst of ~150km^2 and a focal point for caves in the Yorkshire Dales. Here this chapter is divided into 4 sections: an introduction and descriptions of three distinct karsts (as above); a further area, the most extensive and complex, is *Gaping Gill*, which has been assigned to Chapter 23.

White Scars and Newby Moss occur on the western corner of the Ingleborough Plateau, ice-scoured limestone crags are highly conspicuous. The most extensive system here is the stream cave of White Scar (partly a show cave), which comprises close to 7km of mapped passage, and while accessed from the bottom, is recharged by substantial streams flowing off Ingleborough. Large decorated sections like the Battlefield (with speleothem dates) indicate palaeo-drainage routes, perhaps linked to the early main drainage of Chapel-le-Dale. On the benches are classic swallet caves such as Quaking Pot and Tatham Wife Hole, marked by winding, locally very tight, vadose streamways and punctuated by short pitches. The potholes of Newby Moss lie around the southern margin of Ingleborough, of which the long, fluted shafts of Long Kin West and Hurnel Moss Pot are the most spectacular (photos by John Forder, Geoff Yeadon and Paul Deakin). The eastern part of Newby Moss boasts caves, among which Grey Wife Hole, Newby Moss Cave and Hurnel Moss Pot are substantial. These have been traced to Ingleborough Cave (Gaping Gill System) and, just to the east, Stream Passage Pot is in fact an entrance to Gaping Gill.

A wide bench south and east of the Ingleborough massif forms the Allotment and [western] Ribblesdale area. Glaciation has marked the area with some spectacular limestone pavements (referred to in Volume 1). The Allotment is marked by a number of sinks, some of which drain via spectacular shafts to rise at Austwick Beck Head or Turn Dub; Juniper Gulf and Alum Pot with long pitches are fine examples. Alum Pot is also long, boasting some 5km of mapped passage, most of which feed from upstream vadose canyons, intersecting the spectacular fault-oriented entrance shaft. This fault (or "master joint") receives attention in a full-page yellow box.

The upper reaches of Chapel-le-Dale, southwest of Ribblehead, are dominated by a large, discontinuous, mostly flooded, 4km-long conduit system of Weathercote Cave, Hurtle Pot, Midge Hole and Meregill Skit, with the God's Bridge resurgences at the lowest point, all pirating the valley beck. In normal conditions, the stream starts as Winterscales Beck, which has sink points and short caves along its length before entering Weathercote Cave, which swallows all of the water. It then rises partially as Chapel Beck until sinking again just before God's Bridge, from where it travels overland to Ingleton as the River Doe. The flooded valley cave system is fed from bench sinks on both sides of the valley, the main contribution coming from the northwestern Ingleborough slopes. Here there are the classic caves of Black Shiver Pot, Meregill Hole, Sunset Pot, Middle Washfold Caves, Southerscales Pot, Yorkshire Yeti and many others.

The authors do an excellent job of describing the area, with ample maps, diagrams and photographs. No doubt the exploration of the flooded system involved dedicated and hazardous diving, being the second longest water-filled system in the country (after Keld Head) at 4km. They include a welcome section on the evolution of the karst.

The caves of Ribblehead lie under a drumlin field in the saddle between Ribblehead and Chapel-le-Dale, at the northern tip of Ingleborough. Caves are developed from streams running off higher ground to the north. The River Ribble is dissected in its upper part both here and to the northwest where it sinks as Gayle Beck. The caves are shallow here but have length (Roger Kirk Cave, Runscar Caves, Middlescar Holes and Winshaw Gill Cave contain ~500m streamways of meandering vadose canyon), but a suggestion of underflow to God's Bridge would give ~100m of depth potential as well as a straight line distance of ~4.5km.

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Chapter 23
The Gaping Gill Cave System
Dave Brook and Tony Waltham

The authors have rightly placed this iconic cave system in a separate chapter, despite it being a part of the Ingleborough karst. It is widely known, with an interesting history, has the deepest waterfall shaft in Britain, and contains 21km of passageways, currently with 21 entrances. While seen by most as an archetypal cave system, the authors point out that it has a long and complex geomorphological history that is poorly understood. Volume 1 makes several references to it, but here some detailed thought is given to its many-phased speleogenesis: fault-guided passages, high-level palaeo-routes (and radiometric dating), current hydrology and relationship to the glaciokarst.

Fell Beck flows into the major sink (the entrance of Gaping Gill itself), and falls 98m spectacularly into the Main Chamber. However, other streams off the fell form a complex hydrology accounting for a number of the entrances to the system. Further, outlying sinks pass each side of the system to flow into the distal reaches of Ingleborough Cave, where it is close to the Far Country in Gaping Gill. Below the Gaping Gill Cave System, a dry valley narrows to pass through Trow Gill, an impressive glacial outwash ravine.

In summary, Brook and Waltham take us on a fascinating tour through the system, where we benefit from their insights: the system is worthy of a PhD study!

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Chapter 24
Caves of Pen-y-ghent and Fountains Fell
Graham Proudlove and Tony Waltham

This area boasts some of the most classic individual caves of the Yorkshire Dales. The various karsts lie on the eastern flank of Ribblesdale, which comprises the peaks of Pen-y-ghent, Plover Hill and Fountains Fell (the authors present a very useful cross-section). Streams from these slopes sink principally at the Great Scar Limestone and have resurgences around the ancient basement inlier exposed in the valley bottom.

Amid the drumlin field in Upper Ribblesdale is the ~1km-long Calf Holes/Browgill Cave system. Immediately south is the Birkwith Cave System, essentially a linear passage paralleling the shale boundary and intersected at various points by other cave inlets. It is over 4.4km in length. Other, shorter caves, lie along the Birkwith alignment, due perhaps to the presence of a major strike-slip fault. Whereas the Birkwith system resurges at Birkwith Cave itself, with an overflow to Coppy Gill, other caves farther south drain to Turn Dub or New Houses Rising.

South again from these risings, Brants Gill Head (~2 cumecs) is the most significant resurgence of the area, mostly draining >26km^2 of karst under which lie over 30km of passageways in

major caves and a vertical range of almost 300m. Around 1km southeast of Brants Gill, the extensive Dub Cote Cave, drains via sumps to Brackenbottom Rising and is included above. The longest cave here is the challenging Penyghent Pot, with almost 6km of passage, described as one of the finest potholes in the country (I would concur). With proven drainage to Penyghent Pot, Hull and Hunt pots have very impressive entrances (good photographs in this chapter). Little Hull Pot, with a 30m waterfall shaft and over 400m of sumps, gets within 100m of the Hunt Pot Inlet in Penyghent Pot.

Some 5km southeast of Brants Gill the Fountains Fell Master Cave (<7km) and Magnetometer Pot (~5km) are two large cave systems that drain to the Gill, but the nearest point reached underground is still ~4km away. The Master Cave carries a large stream travelling in that direction. Close to Magnetometer, Hammer Pot, while short and notoriously tight, does lead to a short section of a large stream from an unknown source, which eventually ends up at Brants Gill Head. Echo Pot, with a stepped shaft of 100m, reaches the Master Cave level, but does not join it.

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Chapter 25
Caves and karst of Malham and Settle
Phil Murphy

The karst of Malham and Settle is extensive, a broad swath of exposed Great Scar Limestone, some 2–3km wide, stretches 18km from west to east between the North and Middle Craven faults; at Malham some 35km^2 of karst extends northwards from the North Craven Fault. The total area comprises some of the finest glaciokarst in the country, with world-class landforms such as Malham Cove and its associated limestone pavements and Gordale Scar. Because of the wide area of exposed karst, recharge to the area tends to be autogenic in nature and very few long caves have been found there. The allogenic exceptions are at the North Craven Fault where the Silurian impermeable basement is in contact with the limestone; the best example, Malham Tarn, lies on this basement, with its outflow crossing the fault and sinking in the limestone. Whereas the subterranean hydrology is highly complex, discharge from the area is somewhat focussed, occurring at the base of the Cove and south of Malham village at Aire Head, which is the source of the River Aire.

The longest cave in the area is the almost completely flooded Malham Cove Rising at the base of the cliff. The cave has been extended back ~0.5km towards the Malham Tarn sink and is 1.8km long. Otherwise, the relict phreatic Pikedaw Calamine Caverns (partly mined) is the only other cave of any length (~1km), found near the highest point in the karst between the bounding Craven faults. Because of its phreatic nature and elevation in the karst, it is thought to be Pre-Anglian (>0.48 Ma) in age. Its elevation is around 330m above the Aire Head Rising.

Intriguingly, the author points out that the origins of the two most prominent features of the area, Malham Cove and Gordale Scar, are not well understood. In interplay between karstic, fluvial and glacial processes, Malham Cove appears to be a stream capture process leaving a dry valley leading to the edge of the impressive 100m-high amphitheatre scar, whereas Gordale Beck is essentially surface drainage, crossing the karst, before descending a waterfall with extensive tufa deposits, still active. The details given in this chapter of the Malham area allows speculation of the karst evolution – another PhD study perhaps?

The Settle area to the west hosts some 15 caves on each side of Ribblesdale, bounded by the two Craven faults. On the west side of the dale and adjacent to the South Craven Fault, Giggleswick Scar contains a number of relict, phreatic caves thought to belong to an earlier landscape, perhaps associated with meltwater flows from ice-dammed glacial lakes. East of Ribblesdale, the most significant caves are Wizard Cavern, with 450m of descending phreatic passage adjacent to a fault in the Yoredale Group. The other is the relict Victoria Cave, which contains rich deposits of Quaternary mega fauna, radiometrically dated back 500ka, making the cave one of the most important archaeological sites in the Dales. It has been studied since Victorian times.

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Chapter 26
Caves of Wharfedale and Littondale
Harry Long

Five separate areas are covered within a ~250km^2 region dominated by the two great glaciated troughs of Wharfedale and its slightly smaller tributary Littondale. With these deep valleys, both the Yoredale Group and the underlying Great Scar Limestone play a part in cave development. Whereas there are significant resurgences, such as Sleets Gill Cave, the majority of the caves are of the swallet type, fed from higher slopes composed of the Yoredale Group and Millstone Grit. Notable is that many of these sinks are well onto the limestone benches, implying a retreat over time of the overlying impermeable strata.

In Langstrothdale a number of fine caves can be found, such as Strans Gill Pot and Pasture Gill Pot. The longest caves are the Hagg Gill Pot/Deepdale Rising with 2km of passage and Langstroth Cave and Pot with 1.5km. Upper Wharfedale contains the two parallel systems of Birks Fell Cave (3.2km) and Redmire Pot/Birks Wood Cave (1.6km), with only 10–20m of separation and running sub-parallel down-valley, but diverging to resurgences 0.5km apart. The two cave systems are thought to follow strike-slip fractures. Farther down the dale on the east side is an unusual cave system 3.7km in length: the two swallet caves of Dow Cave and Providence Pot, each occupying separate drainages off Great Whernside 1.3km apart, are nonetheless joined by a remarkably straight rift known as Dowbergill Passage. This has formed in the relatively thin Yoredale limestones and seems likely to have followed a strike-slip fault there. Farther down the valley at the junction with Littondale, two important resurgences occur that appear to drain the extensive Kilnsey Moor. Sleets Gill (2.4km) is a flood-prone cave with two large phreatic lifting ramps in horizontally-bedded Great Scar Limestone, one is an active entrance and the other relict and buried. While perhaps associated with small faults, these ramps are not well understood. Farther south, Sikes Gill Rising is large but so far has not been penetrated far, and south again is Chapel Lodge Cave with 730m of passage and Robin Hood's Cave with 400m.

The head of Littondale and the headward tributary, Foxup Beck, have a number of small caves, none more than 350m long. However, farther downstream, the major tributary Pen-y-ghent Gill contains significantly longer caves, most of them associated with the Gill stream, which sinks on entry to Littondale to travel underground for 3.5km before rising as the River Skirfare. The longest cave in the Gill are Giant's Grave Cave, Upper Hesleden Caves 1 and 2, Out sleets Beck Cave and Snorkel Cave, which have respectively 700, 520, 975 and 800m of passageways. The valley appears juvenile, with the caves small in cross-section and clean-washed. Once in the main dry valley of Littondale close to the Litton Risings are Scoska Cave (1400m), Bown Scar Cave (1150m) and Boreham Cave with 4.2km of passage and the spectacular China Shop, a forest of long soda straws above a lake. The relict upper section of this well decorated cave is protected by 5 inward-draining sumps, the current entrance being the site of a former resurgence.

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Chapter 27
Caves of Grassington Moor
Dave Brook and Phil Murphy

Grassington Moor is perhaps unique in the region in that its major caves exploit both the Yoredale and the Great Scar limestones. The ramifying stream passages of Langcliffe Pot and Mossdale Caverns exemplify extensive cave development mainly in the Middle Limestone of the Yoredale Group whereas the resurgences of Black Keld and White Keld yield flooded cave in the Great Scar. A maximum elevation range of ~300m separates the highest sinks and resurgences, but as yet there is no human connection. A number of mineralized faults in the area have been exploited for mining and some 500m of relict cave passage have been exposed as a result.

Below the Moor is Wharfedale, a deep glaciated trough, with Great Scar Limestone benches rising to more subdued topography as the Yoredale outcrop is reached. Mossdale Beck is the main stream that drains the extensive high ground to the east giving the extensive Mossdale Caverns (10.5km). On the upper moor (including Barden Fell some way to the southeast) are large dolines within the Millstone Grit, which are rare in Britain (Wales has fine examples too). With a gentle dip towards the southeast, most of the sinks occur on the west side edge, with caves rambling southeastwards before apparently breaking through into the Great Scar to travel back westwards to the resurgences; some 21 sinks feed the larger Black Keld (>3km of dived passage). Mossdale Caverns and Langcliffe Pot (9.6km) are the major upper caves in the system, although Mossdale carries most of the water seen at Black Keld.

The authors leave us with a tantalizing mystery of the Yoredale–Great Scar connection and of what lies under Langcliffe Scars and Conistone Pastures, a large swath of karst between the line of sinks at the edge of the moor and the resurgences far below.

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Chapter 28
Caves from Greenhow Hill to Cracoe
Harry Long

This area is along the southern edge of the Askrigg Block. It crosses Wharfedale south of Grassington and essentially south of the North Craven Fault, the latter giving some interesting geological structure to the east where extensive lead mining has taken place. Eastwards and just west of Greenhow Hill, the Great Scar Limestone hosts Mongo Gill and the show cave of Stump Cross Caverns, the two being joined in a 6.2km-long system, which has seen extensive mining. Stream sinks from the North Side Allotment feed Stump Cross, Whereas Mongo Gill feeds the Hole from the southeast. Pleistocene bone deposits in the system have yielded mainly wolverine remains.

To the southwest, the descending valley, Dry Gill, associated with the Stump Cross–Mongo Gill cave system, goes through a ravine in Trollers Gill to form Skyreholme Beck, which rises above and below the ravine (Jackdaw Nick) depending on flood condition. Nice examples of periglacial scree exist here.

Mainly on the southwest side of Wharfedale are reef knolls of the Cracoe Limestone. These host syngenetic phreatic fault-aligned cavities, of which Elbolton Cave high up in one of the reefs is an example. Such caves here are associated with parallel mineral veins and are thought to be very old. Elbolton Cave has further interest as it was used as a Neolithic burial site (Volume 1, Chapter 16). A flooded cave chamber (now quarried away) was found in the Swinden Knoll, but 60m below the valley floor. Threaplands Cave is a resurgence with has 550m of small streamway with sumps.

As Harry Long points out, with the diversity of karst and the fact that it is away from the mainstream area, there is much still to be found and understood.

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Chapter 29
Caves of Nidderdale
Chris Fox

Nidderdale is the most easterly of the glaciated (limestone) dales. The River Nidd travels eastwards then turns southwards across a fault to where it sinks in restricted Yoredale limestone inliers. It runs underground for >3km through Manchester Hole, Goyden Pot and New Goyden Pot, the latter being connected by sumps, and resurges near a major tributary flowing from the west, How Stean Beck.

A large Yoredale limestone inlier occurs here so, in addition to the Nidd risings just east of the confluence, How Stean also hosts 2.5km of genetically connected cave passage to the west, of which Eglin's Hole is the largest part. The impressive How Stean Gorge parallels Low Eglin's Hole and is thought to be a periglacial feature.

While Manchester Hole, Goyden Pot and New Goyden Pot are a connected system, there are nevertheless separate entrances for each, especially useful for New Goyden, which is several sumps away for the other two, and has a continuation of the magnificent streamway seen in Goyden Pot. The 3-cave system is complex in its upper part, becoming linear as it proceeds towards the Nidd risings, getting within 1km of the upstream end of Nidd Heads North Rising (745m in length). The many sumps dived en route seem be associated with crossing faults (the author provides a useful cross-section diagram here).

The text provides an interesting discussion on the hydrology and evolution of the Nidd River in the context of glaciations, which likely exposed the inliers and the multiple associated faults that lie between the two major Lofthouse faults defining the karst area from north to south. The Nidd essentially sinks at the northern fault and rises close to the southern.

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The final four chapters describe karsts lying progressively northward of the Craven Area (Wensleydale, Swaledale and the Northern Pennines), and the North York Moors area, which lies beyond the Vale of York to the east, and is not actually part of the Dales region:

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Chapter 30
Caves of Wensleydale
Tony Harrison and Pete Ryder

Thus, immediately north of the Craven Dales, Wensleydale is the 30km-long glaciated valley that now carries the River Ure. The valley sides exhibit steps made up of the resistant limestones within the Yoredale Group, stratigraphically higher than the Great Scar Limestone of the Craven Dales. The 20 to 30m-thick Great Limestone (the major bed among 9 carbonate units) contains the majority of known caves, although mainly-short caves feature in the Middle Limestone (Coverdale) and even the Great Scar Limestone in southern tributaries of the Dale. Scrafton Pot in Coverdale is notable, with an 18m entry shaft leading to a system of rifts and chambers totalling 900m, the longest cave in Wensleydale. Its water travels underground to resurge in Otter Cave almost 1km away, with 650m of mainly walking-size passage.

Figure 30.2 of the area lists 32 notable caves, of which, on the north side, the second longest is Thackthwaite Beck Cave with more than 800m of impressive, large streamway. Whirley Gill Hole and Keldheads Cave each are around 600m in length. Sod Hole Gill Cave has >400m in a cross-jointed maze and Fossdale Beck Cave is a similar length, but is a well decorated stream passage. The northern part of the Dale is a good example of a karst catchment being greater than basinal, as underground drainage proceeds along a gentle northward dip under the surface watershed into Swaledale in a number of cases.

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Chapter 31
Caves of Swaledale
Tony Harrison and Pete Ryder

Swaledale lies north of and parallel of Wensleydale and, as mentioned above, has hydrological connections to it on its southern side. It is narrower and steeper sided, but it contains a very large tributary (Arkengarthdale) at its lower end, making the whole a somewhat Y-shaped valley system in plan. The system was glaciated as far as the Y, leaving a narrow twisting valley between cliffs of the Great Limestone. Both dales expose only the upper part of the Yoredale Group, which includes the cave-bearing Great Limestone. There are 34 notable caves, two of which are maze caves. The intriguingly named Buttertubs are a series of fluted shafts high in the head of Swaledale, making a good roadside pullout. Nearby is Cliff Force Cave, comprising a rather linear upstream, eastward-trending passage, with a couple of sumps, some 2.3km long, this area's longest stream cave. Six kilometres farther east is Crackpot Cave (550m), which has a large rising just below its entrance; the upper dry part had been considered for tourism by the Victorians. High on the fell south of the Y lies Devis Hole Mine with more than 6.7km of passageways, some exhumed by mining. Essentially the cave consists of three maze networks connected by mined levels.

Windegg Mine Caverns and Faggergill Mine Caves are two significant maze caves exposed by lead mining on the east side of Arkengarthdale, with 1.2 and ~7km of natural passages respectively. The hypogene origin of all of these maze caves is usefully explained in a full-page yellow box. Arkengarthdale also boasts a rather fine stream-cave system on its western side: Great Punchard Gill Cave is in fact two genetically connected caves with almost 1km of passage.

I found the description a little confusing at times, but with careful reading and alternating between diagrams on different pages it became clear in the end.

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Chapter 32
Caves of the Northern Pennines
Pete Ryder and Tony Harrison

This is the most northerly of the karsts. Ryder and Harrison tackle an area of around 2000km^2, essentially across the main part of the Alston Block within the Northern Pennines. Whereas this and the North York Moors (Chapter 33) are not in the Yorkshire Dales, both are important karsts; in fact the Northern Pennines has been designated an "Area of Outstanding Beauty." Entitling the book "*Caves and Karst of the Yorkshire Dales and Adjacent Areas*" would have been too cumbersome and, in any event, the karst covered in the volume extends into four counties.

The area is a glaciokarst formed by the melting of an ice mass centred on Cross Fell. There are many caves here, of which most are short, <100m of passage, and shallow. Most are formed in the 10m-thick Great Limestone of the Yoredale Group (not to be confused with the Great Scar Limestone, which primarily constitutes the karst of the Yorkshire Dales). Nonetheless longer caves have been found here. The longest in fact are the rectilinear maze caves of Hudgill Burn Mine Caverns (13.3km) and Knock Fell Caverns (4.9km). Each is contained within a very small area, and the latter must be one of the highest caves in Britain at 762m. Their passage morphology bears no relation to the surface topography and is the result of transverse hypogenic speleogenesis (explained in the previous chapter). The presence of such caves (or their precursors) perhaps explains the extensive mineralization and the mining that was carried out across the area.

Of the many stream caves, Weardale's Fairy Holes (which would have been 4.0km long had it not lost 0.6km to quarrying) and Smeltmill Beck Cave (1.9km), at the head of the Vale of Eden on the Pennine Escarpment, are the longest.

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Chapter 33
Caves of the North York Moors
John Dale and Carl Thomas

Separated from the Yorkshire Dales, the North York Moors host two upper Jurassic oolitic limestone formations. Divided by the River Rye, there are the Tabular Hills to the east and the Hambleton Hills to the west. The former host stream caves whereas the latter are best known for non-karstic fissure caves formed by escarpment land-slip (nevertheless these talus caves are impressive, as evidenced by a photograph of Mr Sparkler's Glory Hole). Whereas these caves represent a minor karst area and they are not in the Yorkshire Dales, I was glad to see that they had been included.

It was only at a Hydrology conference that I realized that caves of any extent existed here. Nonetheless, the multi-entrance Excalibur Pot with 2.8km of stream passage is worthy of report. The short but impressive resurgence (Bogg Hall Cave) 30m lower than Excalibur, is 1.8km from one of the downstream ends; Excalibur is complex. The southward-flowing Hutton Beck is the source of the water entering at the so-called Top Sink (not connected). However, west and parallel to Hutton Beck is the River Dove which sinks and rises at Bogg Hall Cave around 2km away. The only cave of any length here is Guinevere's Slit (<100m) at the mid-point of sink and rising. Given the commonality of Bogg Hall, one could envisage an extensive system here. Farther to the west are Hodge Beck, which hosts the Kirkdale Cave (an abandoned passage and important archaeological site), and the sinks of the rivers Riccal and Rye.

The authors have done a fine job in bringing this lesser known karst area to the fore, and their account is well illustrated with diagrams and photographs.

Reference:
Yonge, C J, 2013. [*Review of*] **Caves and Karst of the Yorkshire Dales, Volume 1**. *Cave and Karst Science*, Vol.40, No.2, 97–99.

Book Review

Northern Caves – The Three Counties System and the North-West

Sam Allshorn and Paul Swire, 2017.
[Leeds: High Mead Publishing.]
£30, A5, 27mm thick, 1kg, 472 glossy pages; full colour.

Most cavers who frequent the north of England will be familiar with the *Northern Caves* series of guidebooks. The famous ~A6-sized black books have become one of the most instantly recognisable pieces of caving literature, methodically cataloguing and describing all caves and potholes across the north of England, from tiny cavelets to the major systems. Such was the magnitude of this task that the books were broken down into three volumes, covering Wharfedale and the North East (Volume 1), the Three Peaks (Volume 2), and the Three Counties System and the North West (Volume 3). The last versions of these volumes were released in 1988, 1991 and 1994 respectively. Not only are the 1988–1994 books out of print, but they are also out of date in many areas. New caves have been discovered, old ones extended. Nowhere can this be exemplified better than in the Three Counties area, which has been the location of some of the most substantial and well publicised discoveries of the last two decades. A rewrite was badly needed, but with this volume alone totalling several hundred entries, this must have been a daunting task for prospective authors.

Sam Allshorn and Paul Swire have risen to the challenge. As experienced northern cavers, who have also been involved in many new discoveries, they are perfectly qualified for the job.

So, does the new *Northern Caves* live up to the standard of its preceding version?

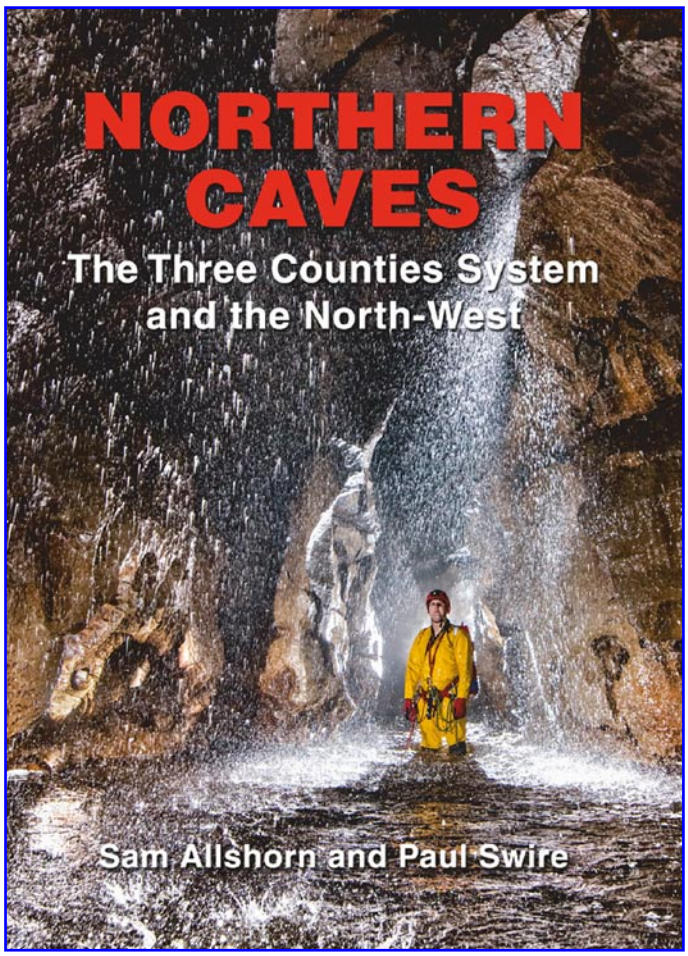
The first thing to note is that the volume number has been dropped; this book is simply called *Northern Caves*; The Three Counties System and the North-West (presumably as the release order is now reversed compared to the previous books). It is also a much heavier and larger book than its predecessor, at least double the size and exactly three times the weight (1kg vs 330g).

As with earlier versions of *Northern Caves*, the book is broken down into chapters for individual areas, each chapter starting with an area map showing all the listed caves. The authors have taken advantage of Ordnance Survey, Natural England and OpenStreetMap data, using full colour, to make their maps clearer and more modern than previous versions of the guidebook. This is an excellent use of modern technology to improve upon an already very effective format.

Full colour has also been used throughout the text to distinguish headers (blue), warnings (red), and rigging details (blue and yellow tables). Furthermore, the book has been furnished with numerous high-quality colour photos showing off some caving highlights. In a trend seemingly set by its recent counterparts in the Peak District and on Mendip, the book is visually much more appealing than the previous version.

The format of the description for each cave remains much as before, starting with the name (and any alternative names), with a grid reference (now updated to 8-figure), altitude, cave length and depth, a brief note about the exploration history, and a difficulty grading (1–5). The authors have rightly retained the same format from the earlier version to maintain familiarity.

In writing an updated version of *Northern Caves*, it would be tempting (and easiest) simply to reproduce the original 1994 descriptions, and only to amend those where new extensions have been made. This has clearly not been the approach taken here. It is apparent that almost every cave in the book has been systematically revisited or at the very least reconsidered, and no corners have been cut by assuming that the 1994 information remains correct. As definitive proof that such a thorough job has been done, 8-figure grid references have been obtained for all caves, photos have been taken of the entrances (and put on the website, of which more below) and descriptions and access details have been added or updated where necessary.



Perhaps the most significant change is the presentation of the tackle requirements. The new book includes extensive information about the nature of belays (including anchor type, naturals or otherwise), and for deeper potholes, ladder and lifeline requirements have been replaced with, or supplemented by, equivalent SRT details. Sensibly the authors have resisted the temptation to include rigging guides (topos), helping maintain the focus of the book on the cave, and what is needed to explore it, rather than subjective matters such as how the cave should be explored.

The descriptions also focus on the facts of the cave, without veering off into the territory of explaining how to explore that cave or what routes an explorer should take. This is, after all, a guide to the caves, not the caving trips, and it (quite rightly in my opinion) is down to the reader to extract the information necessary to support their plans. Therefore, for example, you will not find step by step descriptions of how to complete an Ease Gill round trip in here; but you will find descriptions of all the sections of Ease Gill Caverns that form part of that round trip, and a survey, to allow all the information necessary to support most trips to be pieced together.

Naturally, the new discoveries of recent decades are covered; including the many new entrances on Leck Fell, and the Notts II system. Surveys of all the largest systems have been included, in much clearer detail than the solid black-line surveys of the 1994 version.

Perhaps the only niggle I have with the book is its size. At over twice the size and three times the weight of its predecessor, this is no longer a book that can conveniently be carried in your walking bag or coat pocket, ready to be pulled out each time you chance upon a shakehole or opening while out and about. Although some of the size increase is because we now know more cave than we did 23 years ago, much of the increase is due to aesthetic changes such as the inclusion of photos, a larger font size, and more text spacing. These changes make the new book much more pleasing visually, but sadly rather less portable. Personally, I'd rather have a slimmer book with more compact content. But that's purely personal preference and not a criticism.

The new *Northern Caves* really is THE definitive guidebook to caves and potholes in the Three Counties and North-West region. The book has remained true to the successful format of previous versions while modernising the style, updating the details, and adding new discoveries. This is an excellent, thorough, and much needed piece of work and is a must-have book for any serious northern caver, regardless of whether you already have the 1994 version.

Finally, the book is complemented by a website (www.northerncaves.co.uk), which includes a searchable catalogue of all the caves from the guidebook, their vital statistics, a photograph of the entrance, and a thorough bibliography for anyone wanting further reading (of course, if you want the descriptions you will have to buy the book, which can also be done through the website). There is also an interactive map showing the location of every cave. This is an excellent resource and a perfect accompaniment to the book.

My heartiest congratulations and thanks go to the authors and contributors; for taking on a task so daunting but also so necessary, and for doing such a fine job. Only two more volumes to go…

Matt Ewles
York Caving Club
20 November 2017