THE WOOLHOPE NATURALISTS' FIELD CLUB

(ARCHAEOLOGY RESEARCH PAPERS)

RESEARCHING THE LEOMINSTER CANAL

Paper 3 : 'PUTNELL FIELD'

(Setback - becomes "killer blow")

Recalling the Survey of 1789

by

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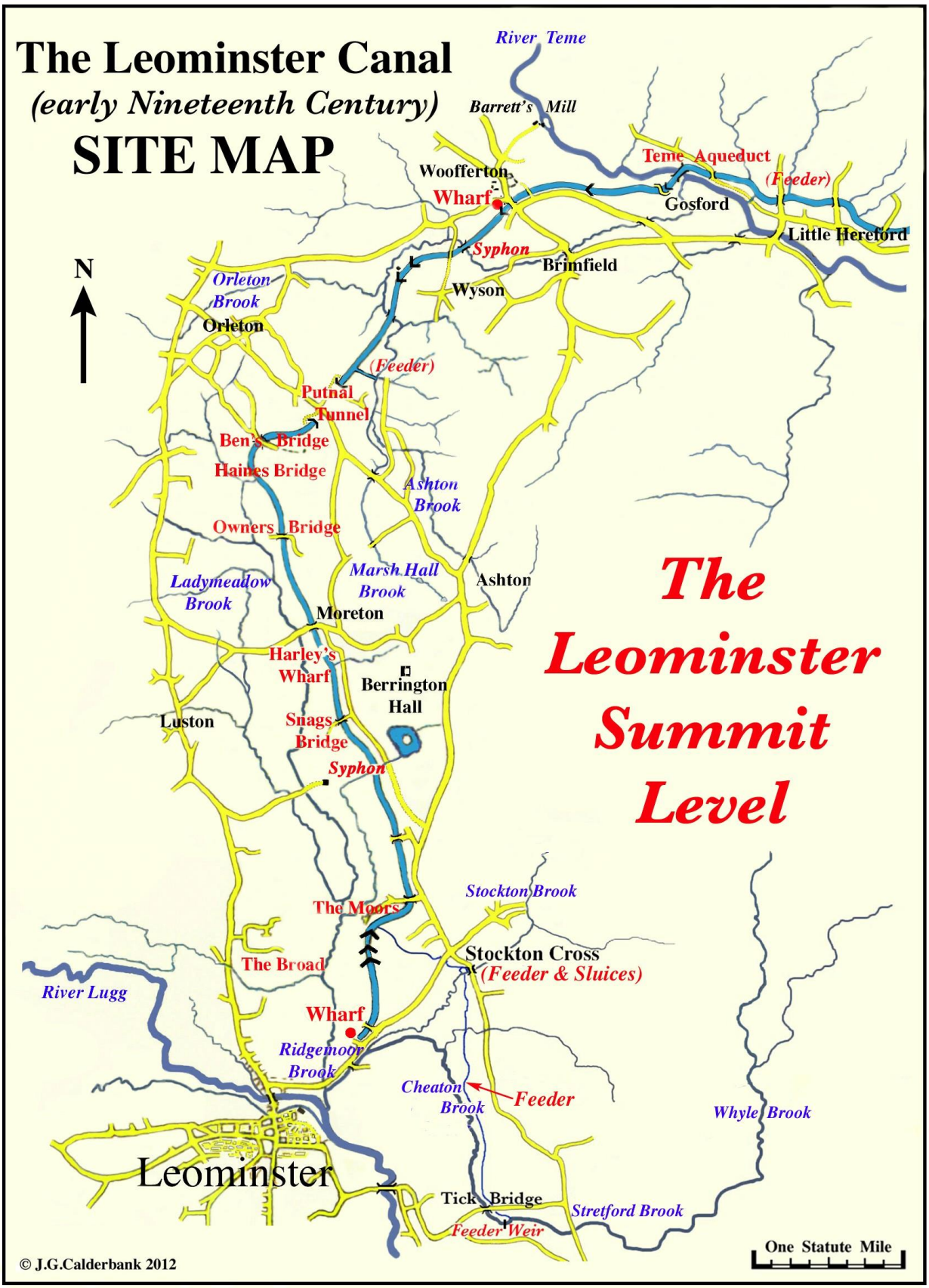
(revisited with Gerry Calderbank)1

THE W.AR.S. LEOMINSTER CANAL INVESTIGATIONS REVISITED

The Leominster Summit Level



Gerry Calderbank

- A GLACIAL LEGACY -

. . . the source of trouble for Dadford at Putnell Field!

- **Dadford's plan allowed for some slight flexibility since in 1789 the law did not (as yet) require him to follow his line precisely - but merely to visit each of the parishes listed within the Act of Authorisation.**
- **He consequently varied his line slightly in a few places, as on nearby Wyson Common: Dadford could thus conceivably have juggled with the two inter-dependent variables - water level versus plan position.**
- **Such change could have offered some slight chance of shortening the summit tunnel at Putnal Field - whereas we were later to discover that, in practice, the tunnel had actually been lengthened!**
- **Initially, this discrepancy seemed puzzling since Dadford would never have wished to change his levels, simply because he needed the maximum length of summit level in order to conserve water.**
- **His plan depicts a 990' tunnel - shown by Cohen and all later writers - whereas the OS mapping and our own field survey indicated something well in excess of that figure! Hence the 'Putnal Tunnel Anomaly'.**

- ORLETON MORAINE . . . the tunnel and a 'Killer Blow' ? -

Brief reference was earlier made to the moraine and tunnel *(Paper 2, pp.7-9)*, and here we take a closer look at both. Although often referred to as the Wye Glacier terminal moraine, the Orleton district deposits mostly derived from sheet glaciation that had originated and travelled much more directly from uplands beyond the Kington / Gladestry district. This source is known from our field observations at Putnal where certain outwash deposits were specifically identifiable; as, for example, when the freshly ploughed, field No. 873 (Upper Stocking) yields fragments of Hanter Hill Gabbro that would not have come via the Wye valley ice.

Although the tunnel is brick-lined, when surveying the interior (by canoe) we were nevertheless able to examine some collapsed construction shaft debris, consisting almost entirely of clay, which accords with what John Rennie had reported following his inspection:

> *"…The Tunnel through Putnal Hill, has hitherto been considered an arduous and difficult undertaking; but this has arisen, more from mismanagement, than any real difficulty in the work itself. - the soil in the line of the Tunnel is in part a strong clay, and in part sand, containing a considerable quantity of water. - The strata of clay is very uneven, particularly so for about one hundred and fifty yards in the middle of the hill. - So far as the tunnel was wholly in the Clay, so far was it easy; but as soon as it is got out of the Clay, the quick, or running sand, came in such quantities into the Tunnel, as to drive the workmen out of it, and fill it up for many yards behind them. In this dilemma, many attempts were made, and various Schemes tried to proceed with the Work; but without success. Some were for cutting it open; others for persevering in the form Plan; but none of them ever considered the real cause of the evil, namely the water, and no serious attempts were made for some time to rid them of it. - At last a small tunnel was struck out from the side of the large one, and carried parallel to it, for some distance. This remedied the difficulty in a certain degree; but not effectually. In this situation Mr. Abbott, Steward to Sir Walter Blunt, (sic) undertook the business. His first object was to proceed in the compleation of the said Tunnel, and he has succeeded in draining the hill to a certain degree; but had he left this small tunnel, and made one directly through the centre of the large one, his success would have been more certain, his progress more rapid, and the Expense less. His motives however were to save money, if possible, but in this he was mistaken; I must however say on the whole, that he has conducted the work with great credit to himself. If proper shafts had been sunk in the first instance, and the small tunnel carried through the hill, in the line of the large one, I apprehend the execution of this job would have been easy, and many hundred pounds and much time would have been saved to the proprietors; which is now wholly lost. There are now only ninety eight yards to Tunnel, which I apprehend may be executed for the sum stated in my Estimate; which is not above half the Expense of cutting it open."*
>
> (extract from 'Rennie Report' of December, 1795, courtesy of the Institute of Civil Engineers)

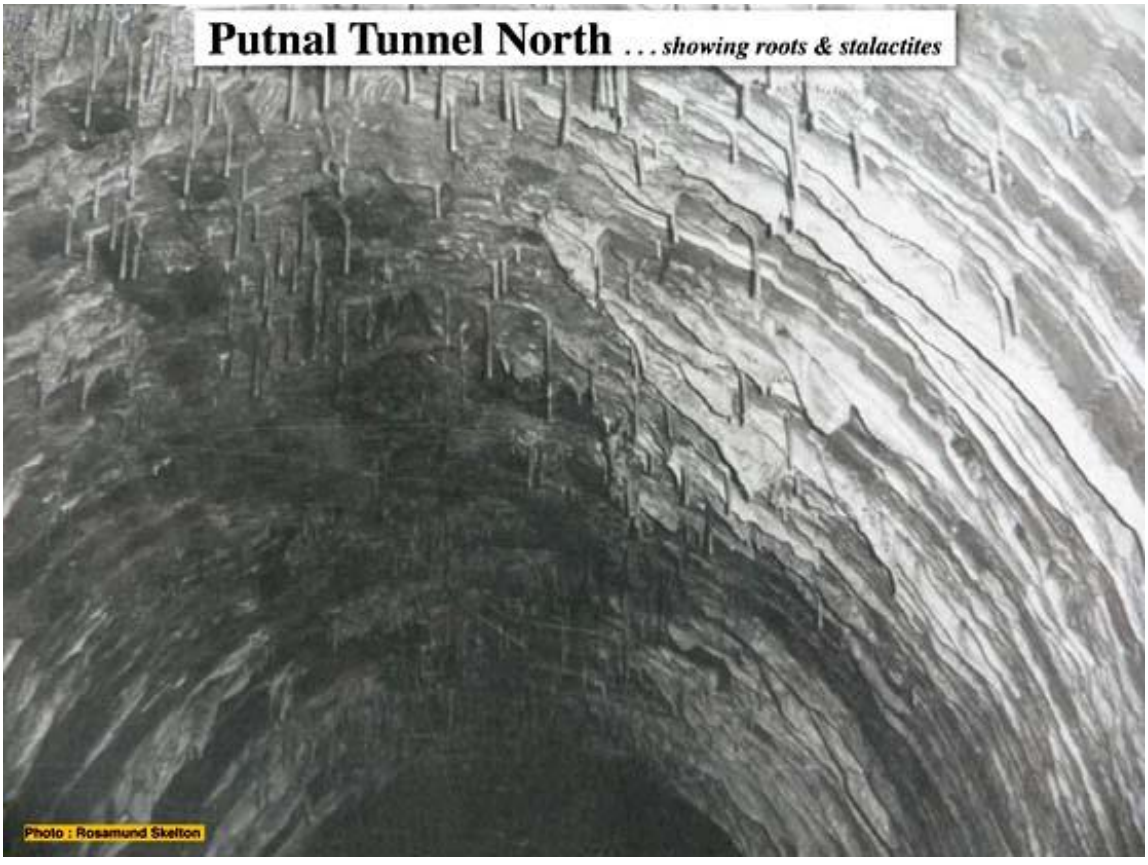
There would seem no better assessment than Rennie's and possibly he may even have (privately) thought to himself - as the Canal Mania loomed - that it would likely be a 'killer blow' to completion of this Kington, Leominster, Stourport canal project? Certainly, Rennie made little secret of his scepticism elsewhere in his somewhat scathing Report.

- What happened at Putnal? -

It's not clear when the tunnel's construction shaft collapsed, but possibly it was a deliberate blockage. If so, it may even be a World War 2 demolition exercise like the Gosford aqueduct - as was sometimes claimed? We located its position by sighting S with prismatic compass and ranging rods, from the tunnel N portal towards the skyline summit. Because the the S portal wasn't line-of-sight, this bearing was directed by NGR.

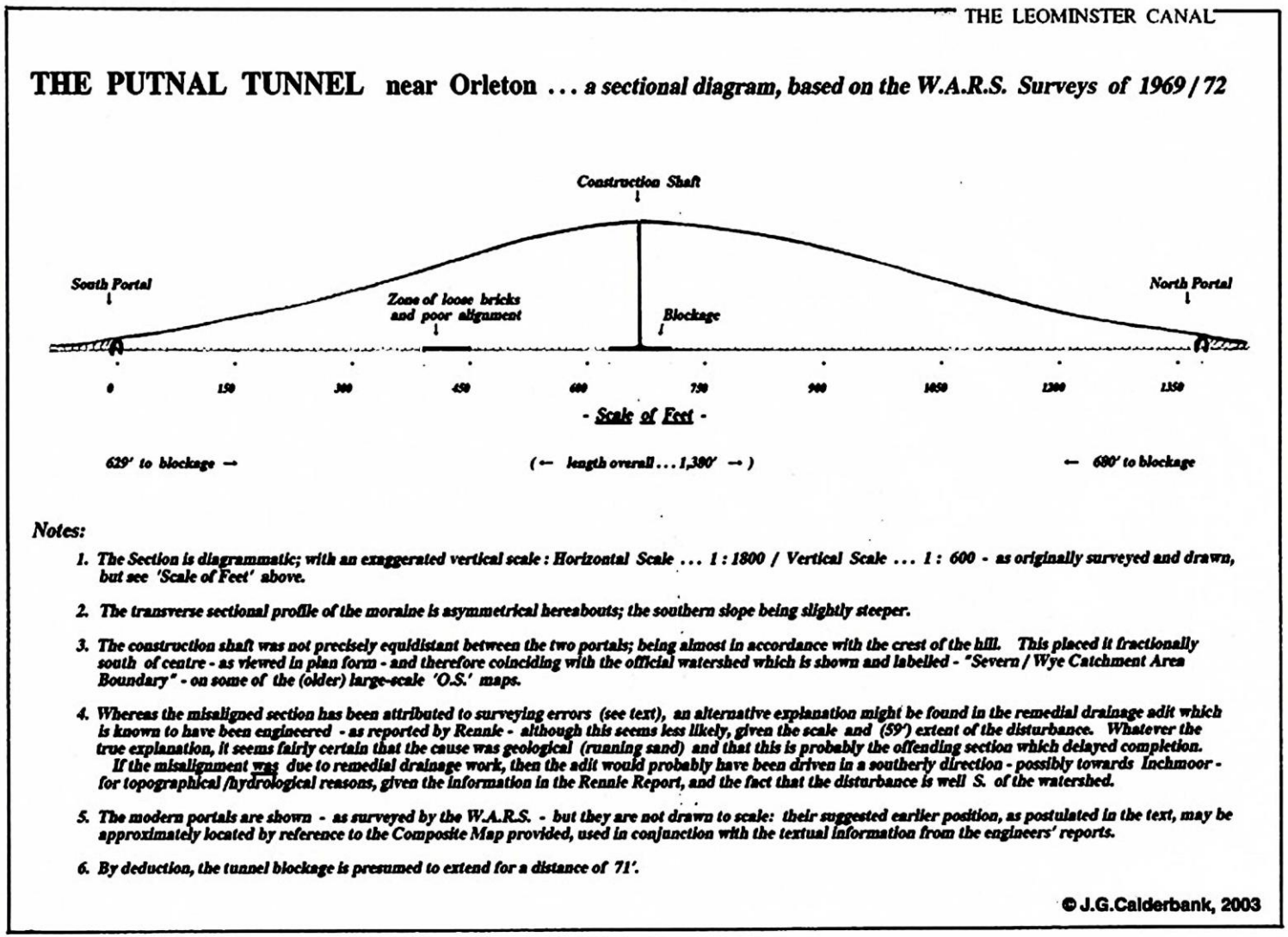
A similar technique was used (with requisite W offsets) when measuring the precise inter-portal tunnel length, whereas the internal distance from each portal to blockage were measured with 100ft. linen tapes deployed by the two teams of canoeists. The main dimensions were recorded on the Sectional Diagram (below) and the full account appeared in LCP Booklet 1: 'Leominster & Its Waterways'.

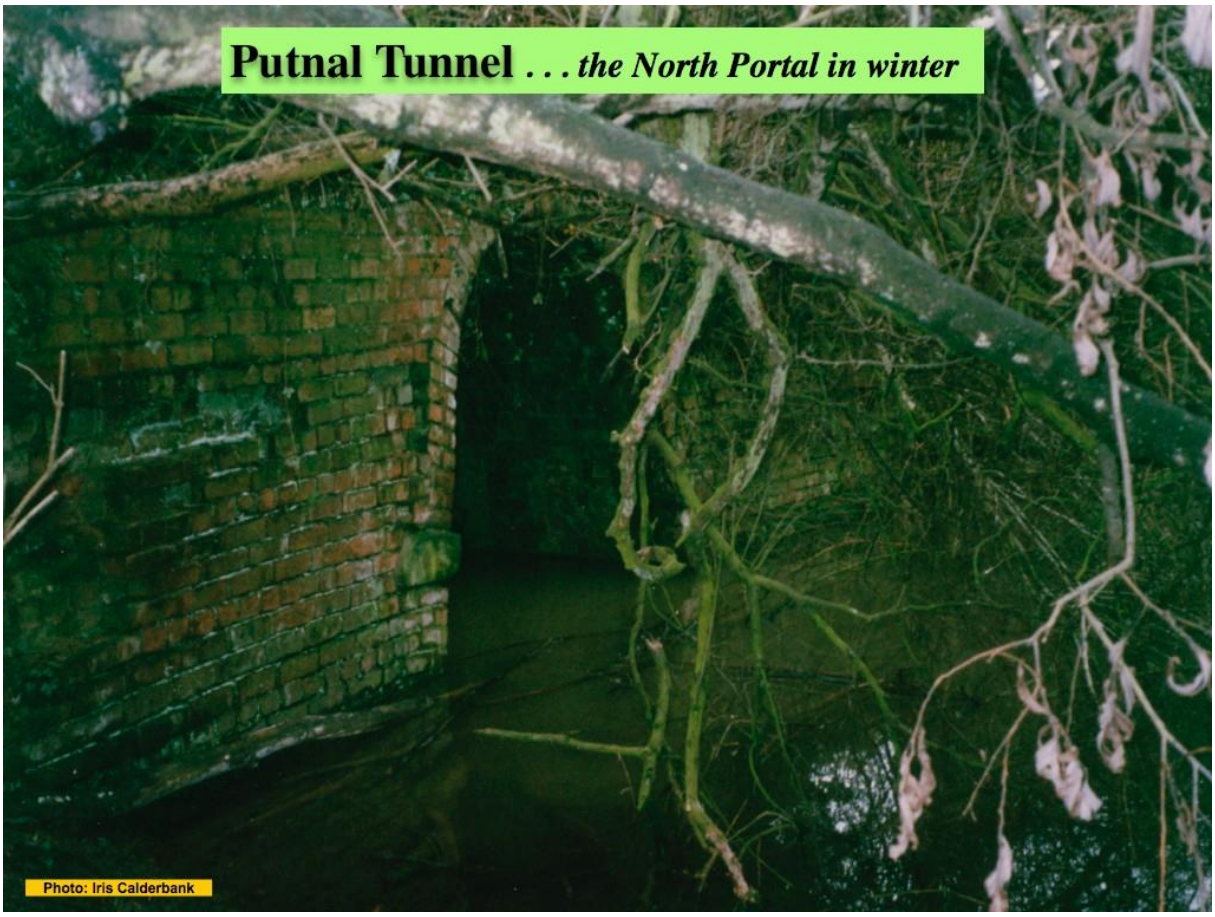
At first, we were puzzled by the 390 ft. inter-portal discrepancy but eventually fathomed out the reason for this, although only after having consulted the Rennie Report and - at Dr. Stanford's behest - various papers and maps from the Pilley Collection housed in the Hereford City Library. Again, the full account appeared in our LCP Booklet 1 (Section 4, pp. 35 - 51) but, in brief, whereas the original tunnel was indeed bored - albeit with huge difficulty! - as intended by Dadford, the moraine subsequently proved unstable in the deep approach cuttings. They later resorted to arched extension at both portals, with the N end so thinly backfilled that weeds and groundwater have penetrated the bricks.

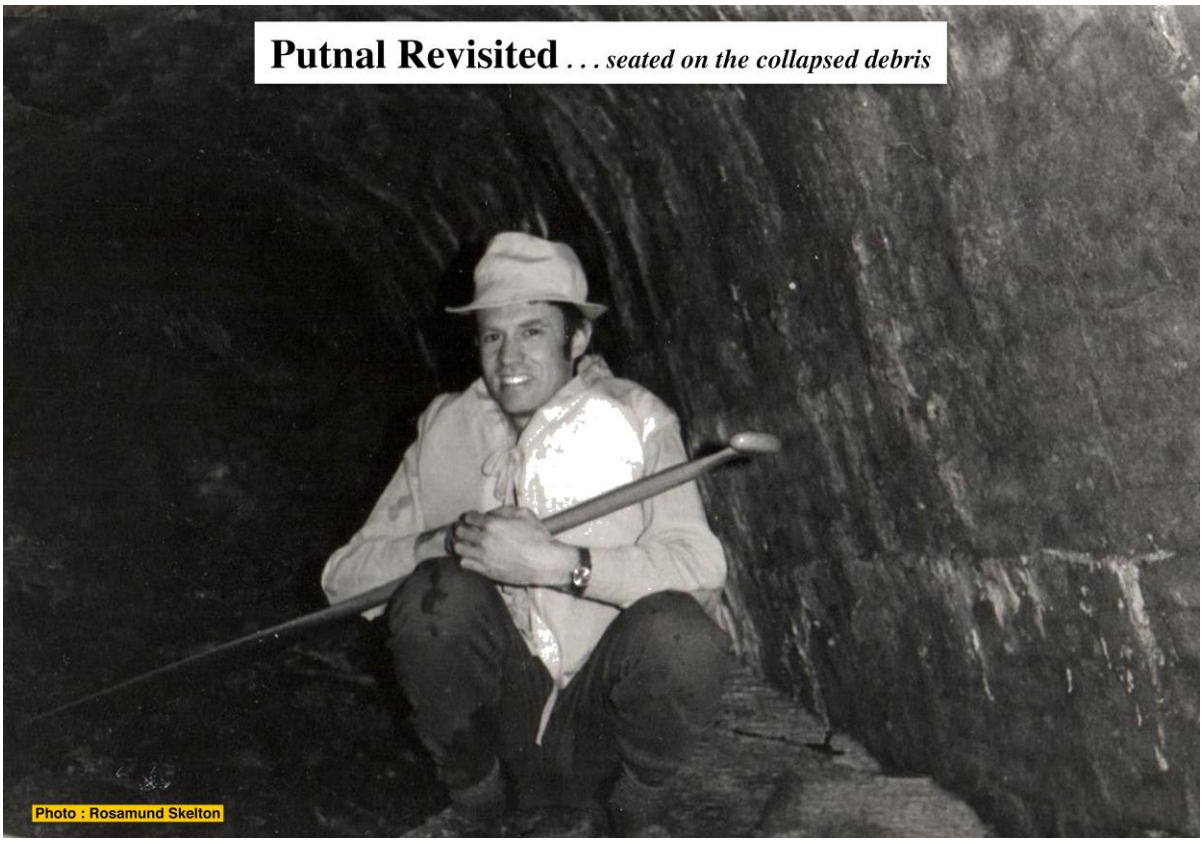


- THE PILOT CHANNEL -

There was a further surprise at Putnal when we discovered the original Ashton Brook feeder point to be still intact in the coppicing, close by the railway embankment. This would have been actively feeding the canal when operational of course, but redundant following closure when the water was 'let off', thus leaving it high and dry, but more about this when we deal with the topic of Water Management.

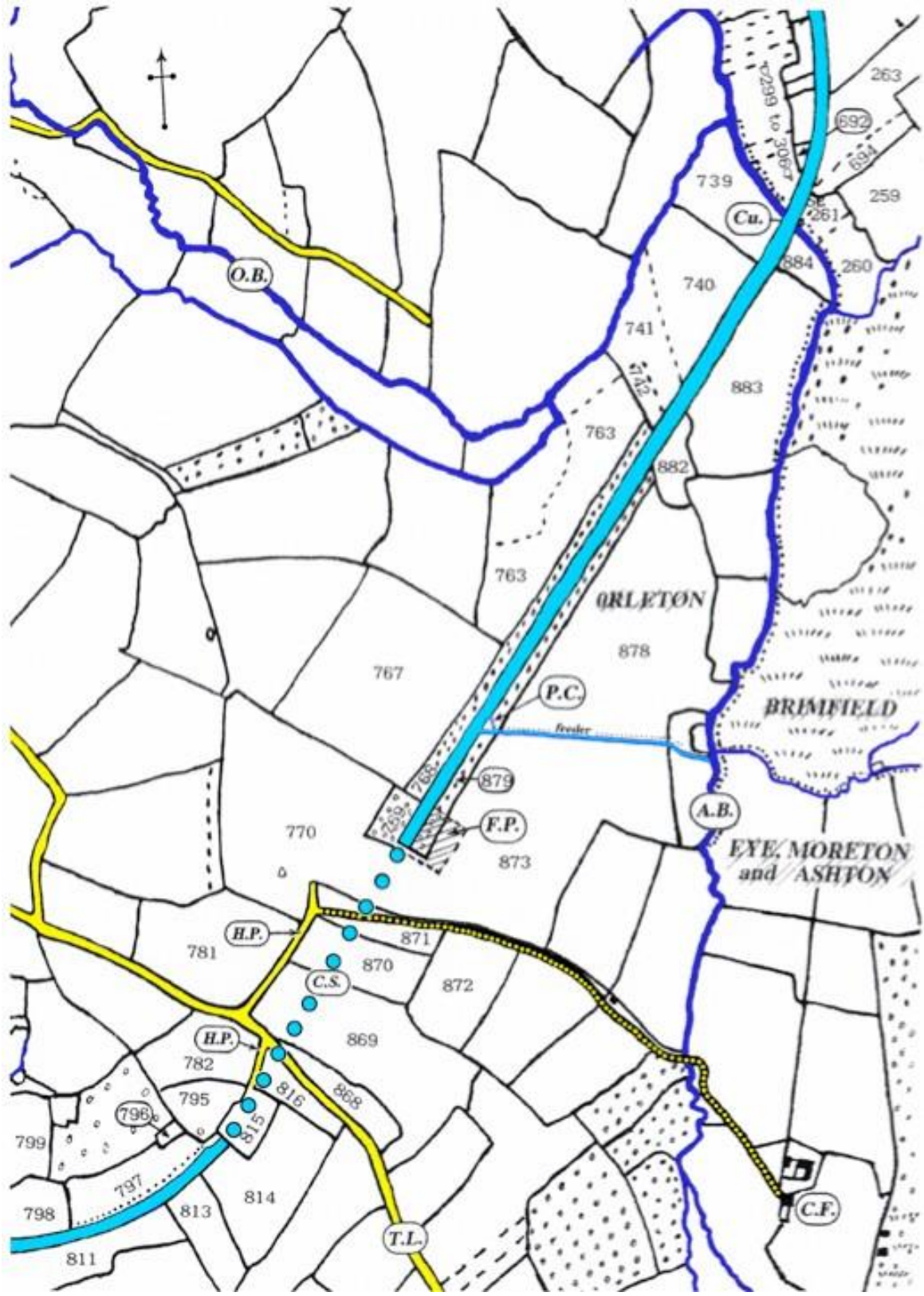



Putnal Tunnel . . . the North Portal in winter
Photo: Iris Calderbank


Putnal Revisited . . . seated on the collapsed debris
Photo : Rosamund Skelton

PUTNAL . . . *Composite Map - circa 1850 - sourced from:*

Bryant's Map (1835) Brimfield Tithe Map (1840) Orleton Tithe Map (1840
Eye, Moreton & Aston Tithe Maps (1843/40 and Ordnance Survey mapping of 1884



- Significant Features -

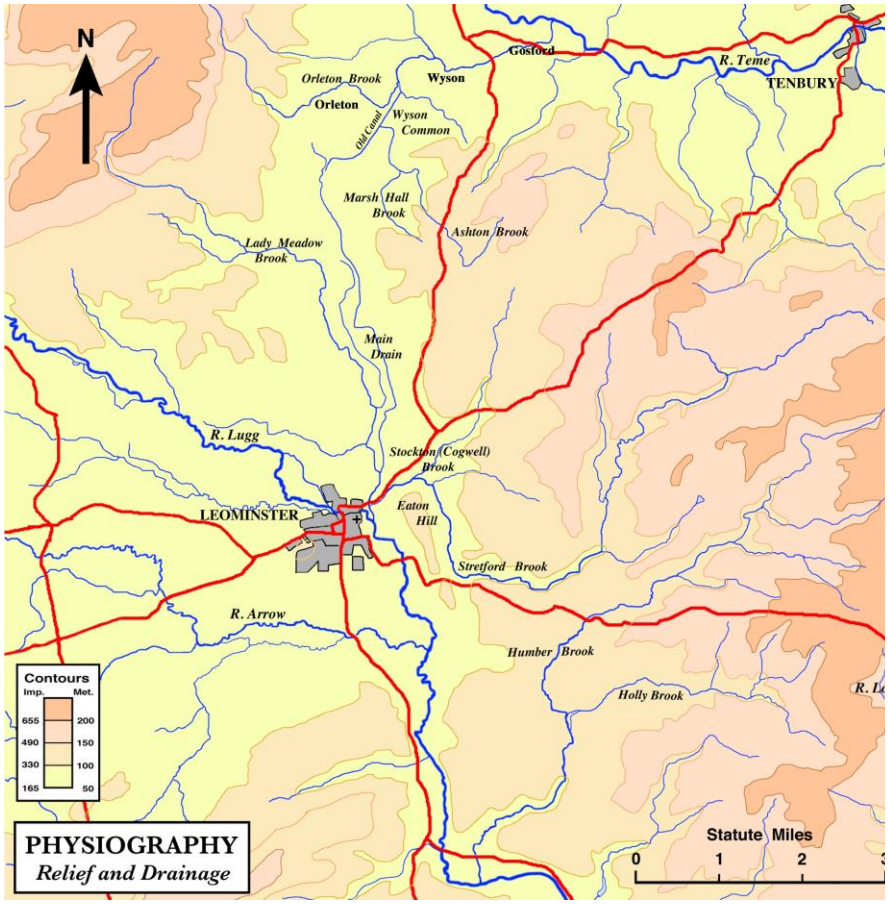
O.B. - Orleton Brook A.B. - Ashton Brook T.L. - Tunnel Lane P.C. - Pilot Channel
H.P. - Horse Over-path C.S. - Construction Shaft C.F. - Coppice Farm F.P. - Former Plantation
***815 - Tunnells Mouth 869 - Putnell & Carns Hole 797 / 811 - Spoil Bank 769 -* New Plantation**


BRYANT'S MAP
Leominster to Woofferton
Woolverton or Woofferton
Woofferton Lock
Gostford
Brimfield Cross
Bridge Ho
Bilbery Brook
Comberton
Portway
Maidenhead
ORLETON
Wyson
BRIMFIELD
Wyson Common
Brimfield Common
Woodlands
Merry Vale
Ben's Bridge
Haines Bridge
Marsh Hall
Brantley
Nurton
MIDDLETON ON THE HILL
Gobbetts
Ashton
Moreton
The Hundred
Berrington
Berrington Hawthorn
Snags Bridge
Balance
Luston
The Bury
Woofland
Blackpole
Eye Parish
Lower Kimbolton
KIMBOLTON
Sweetapple Field
The Moor
Stockton
Stockton Brook
Canal Feeder
Kimbolton
Leominster Broad
Marsh
Kenwater
Bonaventure
Parish
Kimbolton Parish
Cheaton Brook
Rowley Field
LEOMINSTER
West Street
Sandpit
Townsend
Cockcroft
Botolphs Green
Eaton Hall
Gorsty Hill
Caldwell
Stretford
The Pound

The Putnal mapping offered several clues regarding the tunnel's history. The archaic spellings were nothing unusual - it appears to have been 'Putnell' at that time - and Carns Hole almost certainly pertains to the former shaft, whilst the two N Portal flanking plantations were obviously intended to stabilise the cutting. They were probably matched in size when planted, whereas the 'Former Plantation' would have been reduced by Thomas Brassey's railway workmen; nearby, the farm track leading to Coppice Farm was still in use and therefore required the (still existent) level crossing. Two of the tithe-map boundaries were particularly significant for our research: Field 871- Putnell is thought to have bounded the original portal site before its brickwork extension, whilst Field 815 -Tunnells Mouth seems an absolute "give-away" at the southern end! Bryant's Map confirms these assumptions, but is also indicative that Coppice Farm seems to have lost some of its identity since it is seen to have originally been known as 'Bathhursts Coppice Farm'.

- *GEOLOGY REVISITED . . . a tale of disrupted drainage* -

Having mentioned the pilot channel and Ashton Brook feeder, the latter has an interesting history, and it's a story of even greater glacial disruption! We've previously noted that the S Cambrian ice sheet had blocked the course of a former river PLTO - thus causing the R.Teme reversal - and the following map shows the scale of effect this disruption had on the local drainage in the following sequence:



1) Before glaciation, all of this PLTO drainage flowed S directly towards the Hereford region and beyond, presumably with the Wye as its major tributary?

2) When blocked by the Orleton ice front, it could no longer do so - and hence Lake Wooferton.

3) When the lake drained (towards Powick and the Severn) a new pattern was established across the freshly exposed lacrustine deposits.

4) Consequently, some marked 'elbows' resulted as new escape channels were formed, but this time towards the Teme valley.

5) The most striking examples are the Orleton Brook, Stretford Brook and Ashton Brook, each of which was forced into a right-angled turn.

6) The ice also caused many other changes to our regional drainage, but they're a different story - and not directly related to these particular Putnal events.

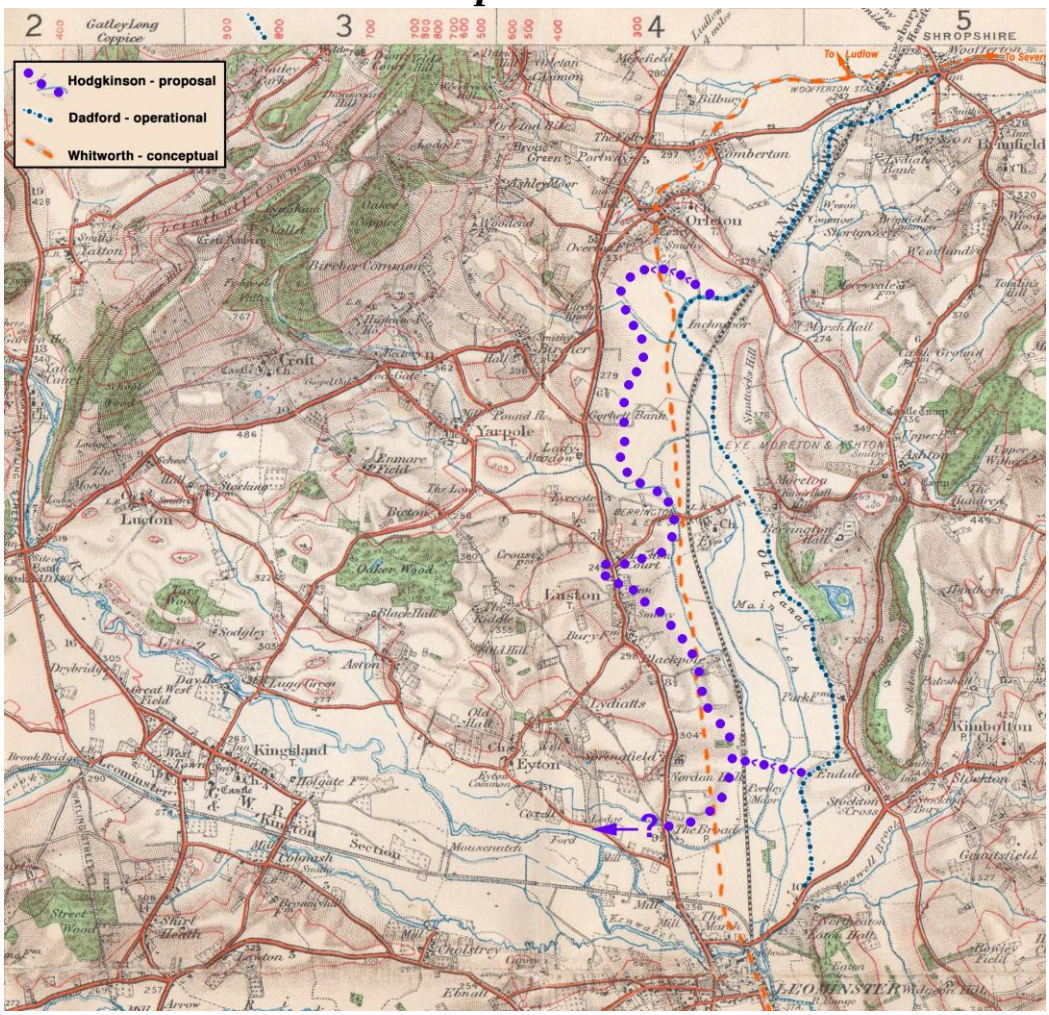
- *'LAKE LEOMINSTER'* -

Many other geologists have researched the glaciation apart from Peter Cross, who's Woolhope papers were listed elsewhere in the series, although one particular aspect has been possibly underplayed - and it's something that directly concerns our present topic. We've dealt fairly exhaustively with the happenings N of the Orleton moraine, the Wooferton/Brimfield district, and adjacentTeme Valley, but what else happened in this Orleton/Berrington locality when the ice melted?

South of the morainic ridge, the ice was also melting, equally rapidly, and of course meltwater was now imprisoned to the S (behind) the moraine, with no immediate escape possible in any direction. Soon this impounded water overflowed the lowest point of the Orleton moraine, which lay just to the E of Shuttocks Hill - as shown on the Cross & Hodgson mapping *(Alluvial Deposits map, Paper 2 p. 9)*. This rapidly cut the Marsh Hall Brook overflow channel as the volume of meltwater swelled until, eventually, Lake Leominster would also have released its impounded water - but this time southwards down what is now the Lugg valley and onwards, eventually via the (lower) Wye. It seems likely that despite Harley's dominance, John Hodgkinson possibly had a potential Marsh Hall Brook route very much in mind when he first surveyed the water resources together with a scheme that could be either a canal extension, a feeder, or both!

The foregoing was merely speculation, but in any case such scheming was clearly too late by that date (1803), given the company's precarious financial situation. Robert Whitworth's original route was obviously a better concept because not only could the Lady Meadow Brook have been tapped but also the River Lugg, bearing in mind that several local landowners were also influential Leominster Canal shareholders and, in particular, these included Lord Bateman who would wish to export his Shobdon Hill limestone - and was therefore a strong exponent of completion to at least Kingsland - and then even to Kington if at all possible.

Three Optional Routes?



Whitworth's scheme certainly demonstrated a good 'eye for the country' and offered prospects of feed-water, simply because it was nearer the more favourable side of the PLTO valley - with potential to tap the R.Lugg. However, there's no indication of how (if following the valley-bottom?) he could have passed the Orleton moraine without tunnelling. So maybe he'd planned a long tunnel - possibly under Orleton village!

Dadford too would most likely have preferred the W side but was obviously subject to weighty proprietorial pressure in serving the Berrington estate, and the same applied to the elevation (c. 246' OD) when traversing Harley's Berrington parkland, as previously discussed.

Hodgkinson's was clearly a 'rescue job', and as such was faced with much of the Dadford route already in hand or actually finished – apart from the tunnel. Nevertheless, he'd plenty of options, but always provided the elevation was sufficient (c. 262' OD). We have neither plan nor data, but assuming sufficient height, then his route could have passed over the moraine in much the same fashion that Whitworth may have postulated.

Westwards from The Broad, it would depend entirely upon the canal's water level plus several other factors such a possible allowance for the Kington extension (unlikely!) and a strong possibility of obtaining Lugg feed-water. At Putnal, Hodgkinson's line could ideally have been high enough to bypass Shuttocks Hill via the low col and then access the Marsh Hall Brook overflow channel down towards Wyson Common.

Finally, there was the question of linkage - how to accommodate two disparate water levels? Locks would obviously be required, certainly at Putnal, and probably also from The Broad. Any town traffics could then cross the valley floor in order to join the summit level above Endale top lock. This arrangement assumes a through route, Kingsland - Leominster - Stourport, rather than leaving Leominster on a dead-end.spur.