

EARLY MINING LEATS AND PONDS IN WALES

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Abstract: Thirteen, mostly small, leats found in upland Wales are described. The age and purpose are often difficult to determine.

All who are familiar with the metal mines of Wales will have encountered substantial leats, often miles in length, and dating from the 19th century for powering waterwheels to drive pumping, winding and crushing machinery.

Before 1700 it appears the application of

water for such uses was extremely limited, an exception being at Cwmsymlog in the 1620s, where Myddelton had water-operated stamps and pumps. From time immemorial, water had been employed for hushing and ore-dressing, and perhaps for other duties, details of which are now lost.



Fig. 1. An aerial view of Esgairhir taken by the Royal Commission on Historical Monuments (Wales), with the six leats inked in. Three skirt the ridge at A, and three converge at trial workings at B. The main lode runs from top to bottom of the picture.

When we come to study the leats and ponds associated with such activities in these islands, we find ourselves treading, literally, on new and fascinating territory; very few have had the distinction of being mapped by the Ordnance Survey.

A typical characteristic of such leats is their slight construction, for quite small flows could suffice. (For details of the hushing process, see Cranstone 1992). Hence, after centuries or even millenia of disuse their legacy is more akin to sheeptracks, interrupted and lost here and there due to soil creep and vegetation. Often their total length is no more than a few hundred yards. For want of a better term, I have called them Sheeptrack Leats, but after more than four decades studying old mines it is only in the last few years that I have paid them much attention, or at least come to recognise their frequency and potential for detailed study.

This omission has largely arisen due to the fatal and common error of concentrating too closely on areas of 19th century activity without casting further afield over supposedly barren areas. It really is remarkable how much evidence of small scale early mining and its associated features can be found beyond known sites in the mountains of Wales.

SHEEPTRACK LEATS.

Such leats frequently begin in swampy ground high in the hills where little or no running water can be relied upon. This was sometimes forced by circumstances, there being no better supply available. However, it is commonly found that inexplicably steep and uneven gradients were used, so that the source was tapped unnecessarily high up, thus limiting the potential of water available. Except where geography imposed a constraint, this is not easy to explain since, taken as a whole, Sheeptrack leats show no lack of understanding as to the basic principles of hydraulic flow on the part of their constructors. Some begin at small ponds, but often they do not.

Thus far, the evidence suggests that most sheeptrack leats are 18th century at latest, and often far older (e.g. the Gwenlais Leat, a fine piece of engineering, see later). When the supply was uncertain their use could only be intermittent; no doubt it often extended over generations or even centuries, just as the corn miller milled when there was water enough in the stream, and occupied himself in other ways when there was not. In some instances it has yet proved impossible to explain certain features, or to fathom the objective. As for obtaining the age of these leats, no cheap and simple method presents itself, though often other evidence can furnish a 'not later than' date of construction.



Fig. 2. The northern end of the Precipice Walk, Dolgellau, showing the route of the leat XXXX; the footpath takes a short cut near the boulder.

An invaluable aid to the discovery of leats and ponds, not to mention mining features generally, is aerial photography, as the Royal Commission has illustrated in recent years. However, a word of caution must be uttered. The essential factor is not merely to look, but to know what to look for. In this respect there is always more to learn. Important features can be missed, and blunders have been made by omitting to seek out confirmation on the ground. At Dolaucothi, the Gwenlais leat was missed altogether and a claimed discovery proved to be a footpath (Bick 1988).

Thirteen sites in Wales will now be listed, with little mention beyond noteworthy features where details are already published.

DYFED

1. Dolaucothi Gold Mines SN 666403

The well known Cothi Leat, usually taken to be Roman (Jones 1960), has a section much greater than almost all other early leats in this country, an exception being the Llanfair Leat. An interesting feature of the Dolaucothi mines and waterworks, not hitherto noticed, is the remarkable topographical resemblance to the Roman gold mines at Navelgas in Northern Spain. The 3 km Gwenlais leat, north-east of the mines, was first recorded only recently (Bick 1988), and a detailed archaeological examination suggests it may also be Roman (Burnham 1992). It is an example of the sheeptrack variety *in extremis*, being nowhere easy to discern and for long distances with no visible trace whatever. Where excavated, its section measures about 0.3m wide at bottom. The Gwenlais Leat is an enigma, its purpose and destination as yet uncertain. The claim by Jones and Maude (1991) that it formed the beginning of the so-called Annell Leat, well entrenched in

the literature, but concerning which no convincing evidence has ever been published, merely adds one improbability on top of another. The fact is, that if water at a high level was needed for Dolaucothi, it could have been gained from the Annell at far less effort than by tapping the Afon Gwenlais several miles further away (Bick and Boon 1993).

2. Llanfair Clydogau SN 640518

This resembles the Cothi Leat in its dimensions and may have been associated with the Llanfair silver-lead mines (Bick 1978). It is ancient, but as yet has received no proper archaeological attention. A peculiar feature is a drop in level near its end, which fades out inexplicably, high above the mines.

3. Nantymwyni SN 788442, 789449

This large lead mine is by tradition Roman, and a stone hammer has been found there. Two separate areas of hushing were noticed in 1991, and both are associated with very small ponds only a few metres long. The origins of the northern leat are lost in forestry (Bick 1992).

4. Esgairwyn SN 757692

This mine probably began in antiquity, the opencast bearing a close resemblance to the Bronze Age site at Copa Hill, Cwmystwyth, both being fed by sheeptrack leats. The hydraulic system here is complex with unique features such as 'flying' leats across minor valleys or depressions in the ground. Some of the features are shown on a plan of 1753 (Bick 1990a).

5. Cwmystwyth SN 810752, 803751

Ponds, leats and hushes on Copa Hill have long been known (Timberlake 1990), but recently the Royal Commission on Historical Monuments (Wales) has examined another extensive network above the main workings to the

west. These apparently developed over a long period, and are the subject of a separate paper by Stephen Hughes (below).

6. Bwlchgwyn SN 742790

In the 1740s, Lewis Morris described workings here as 'ancient', and to them a Sheeptrack Leat can be traced some 600m from a bog to the NNE. This leat has several steep drops in level as well as a discontinuity in both planes near the workings as if for operating a machine of some kind in its passage. There are also two shorter sheeptrack leats converging from the north-west. (Bick 1991a; Bick and Davies 1994). Somewhat similar leats can be found at Pencraigddu, SN 711825 (Bick 1991a).

7. Esgairhir SN 732913, 726912

According to the written record, this notorious mine was discovered in 1689, but evidence is mounting of old workings already there at the time. Only this year I found a series of sheeptrack leats north and west of the 17th century workings, none exceeding a few hundred yards in length. At least one of them must pre-date the workings as it has been buried, in places, by spoil. This, the lowest of three leats contouring round a spur, served an unusually large pond for the period (1.25 acres) that still holds water. Surprisingly, the leat began at a very weak spring, ignoring a stream just beyond which could easily have been tapped.

The second leat is 7 or 8 metres vertically higher and begins at a small pond, now breached, in the middle of a swamp. This is much better defined and is clearly later, apparently having been built to avoid the mine-workings just mentioned. It also ended in the large pond.

The top leat is 6 or 7 metres above the second, and of the same sheeptrack variety as the first; indeed, it appears to be much of the same age. It rises even higher in the bog and could have attracted very little water and none at all in dry weather. Its section is well revealed in a rock cutting, being V shaped and only 6 or 7 cms wide at bottom. Having turned the spur of ground it then descends steeply to the present road, beyond which its course is lost in surface workings. The purpose of such a leat is very difficult to understand, when a shorter and more potent route could have been chosen. It appears the available head was not used for hushing.

West of these three leats and tapping the same source, much of another sheeptrack leat can be traced above and parallel to the road. On a grade of about 1 in 20, this ends at a small but enigmatic series of ancient trials on a copper-zinc lode that hitherto seems to have escaped historian's notice. At the site, the leat splits into two branches, one of which has been cut through a grassgrown tip thrown out of a trial trench. To the south or downhill

side, the road, built in the 1840s, has obscured the destiny of these watercourses and nothing shows beyond it.

These small workings were also served by two more sheeptrack leats one above the other, originating in boggy areas to the west. They decline at an equal or even steeper rate than those described above. The upper one has been deeply incised by a long-abandoned peak-track and thus must be very old indeed. Both have also been eroded by a cart track near the workings and in the absence of evidence of any real production at the site, or of hushing, the purpose of all three is a mystery.

POWYS

8. Dylife / Dyfngwm SN 855934, 849933

Outcrop lead workings on the Dylife lode which run along the crest of a mountain are very ancient, perhaps Roman. There are indications of a pond near a Roman camp on the summit and close to the workings. Farther west, in the Dyfngwm sett, are remnants of an apparent small pond which seems to have fed a gully or hush striking south-east to the lode. These features show up well on aerial photographs.

9. Craigmwyn SJ 076286

In 1755, Craigmwyn was described as 'rent to pieces by hushing in former times' (William 1985). The Sheeptrack Leats and ponds have been briefly recorded (Bick 1990a), but aerial photography has indicated at least one more pond and leat. Here again the source of water is extremely limited, suggesting a very intermittent and seasonal type of mining, perhaps augmented by melting snow, as at the Roman gold mines at Puerto de Palo, northern Spain.

GWYNEDD

10. Precipice Walk, Dolgellau SH 734210

I claim no credit for this unique example, which is really two leats starting from a common point but going in opposite directions. The likelihood of its origin was drawn to my attention many years ago by George Hall, but unlikely though it seemed, having explored its course from end to end, I became convinced of his belief, that it had been dug long before to supplement the water in the nearby Llyn Cynwch. The number of places where the original leat has been bypassed to provide a more convenient path leaves precious little doubt in the matter (Bick 1990b).

Since there are no springs or even bogs to be tapped, at least at the present time, we can only assume the prize was heavy

rainfall and melting snow, much as at Roman gold mines in Spain. The water was perhaps subsequently used in working gold in the area to the north.

CLWYD

11. Minera Lead Mines SJ 253522

Workings at the west end are probably Roman, at least in part, and one lode is known as the Hush Vein, to which a sheeptrack leat is evident. However, the way it weaves through old workings does not imply great antiquity.

GWENT

12. Blaenafon SO 255103

This is one of two instances I have thus far encountered of watercourses feeding hushes or 'races' for scouring the Coal Measures for bedded deposits of clay-ironstone - the basis of the South Wales iron industry.

It was long ago recorded (Rogers 1861) that remains of these activities were to be found at the head of nearly every valley. Some certainly dated from before the 18th century, of which the Blaenafon example appears to be one. Hundreds of acres above the town were turned over for coal and iron ore, a plan of 1812 showing the whole hillside totally undermined by iron-workings.

Just east of the Abergavenny road at the above grid reference, a leat about 50m long survives. It clearly began at a nearby stream, but an old cart-track has deeply cut through and destroyed the upper end, so that the junction is lost. The lower end is obliterated by later workings.

13. Upper Race, Pontypool ST 275985

The name of this locality is fully justified by a spectacular quarry-like hush or race, some 500m long, 15m deep and 60m wide. It is prominently marked on the 1:25,000 Ordnance map, which also reveals several leats, all long since abandoned. The following notes summarise the outcome of a preliminary reconnoitre in the spring of 1994 (Fig. 3).

Ironworks were hereabouts in the 16th century (Riden 1987), and many veins of iron-ore and coal were extensively worked (Strahan 1909). At least two seams of coal outcropped in the race itself, and most if not all, of this vast area of surface-workings must date from the 18th Century at the latest.

The most prominent leat (1), is still over a metre deep in places. It tapped Afon Bran over a mile to the south, and fed into a pond below White House, for scouring operations east of the main race. The western side of the latter is cliff-like, to the top edge of which, several leats were directed.

About 400 m to the south-west, where the mountain rises steeply, are three channels with the appearance of races, though they may be natural; I had no time to see if any leats led to their upper extremities. At all events, any water that emerged was directed into a rather insubstantial and clearly ancient sheeptrack leat (2) of uneven gradient which divides at the edge of the main race (c) into two channels. At a later date it was replaced by a bigger leat (3) to feed an impressive pond, now dry, having an upper boundary some 40m long, and with a massive masonry and earthen dam, sufficient to feature on the Ordnance map.

The pond discharged at D into a leat leading towards the top of the race at E, although there is a possibility that this was in fact a feeder coming from the south before its course was quarried away. However, a small dam was later built in it near D to deflect the flow straight down the mountain and parallel with the main race in a channel constituting a second and minor race towards the bottom (H); but there are also tappings from it to the edge of the main race at F and G. Higher up, at C, the original sheeptrack leat (2) was entirely cut through by this minor race and left like a hanging valley.

Lower down the hillside, leat 4 appears of similar antiquity to leat 2, but has very little source of water for its sustenance, the whole area being surprising dry after prolonged wet weather. It divides into two near its eastern end, the upper branch leading to the minor race area.

Another watercourse (6) runs as a shallow channel directly downhill towards Cwm Lickey Pond. At B leats 2 and/or 3 seem originally to have tapped it, though the process was later reversed. At K (6) clearly post-dates leat 4, cutting right through it.

Some at least of the features described could well be 17th Century or earlier, and no doubt much more of the kind awaits discovery in the South Wales Coalfield.

OBSERVATIONS

a. At several of the above sites, an uneasy suspicion lingers that a use other than ore-dressing or hushing justified the watercourses, of which neither record nor tradition remains. Furthermore, not only the purpose, but also the destinations of some of the leats is uncertain.

b. The scope for further fieldwork in the uplands of Wales, where not already desecrated by afforestation, is very great. It could yield important contributions to our knowledge of the extent of early mining in the Principality, and its technology.

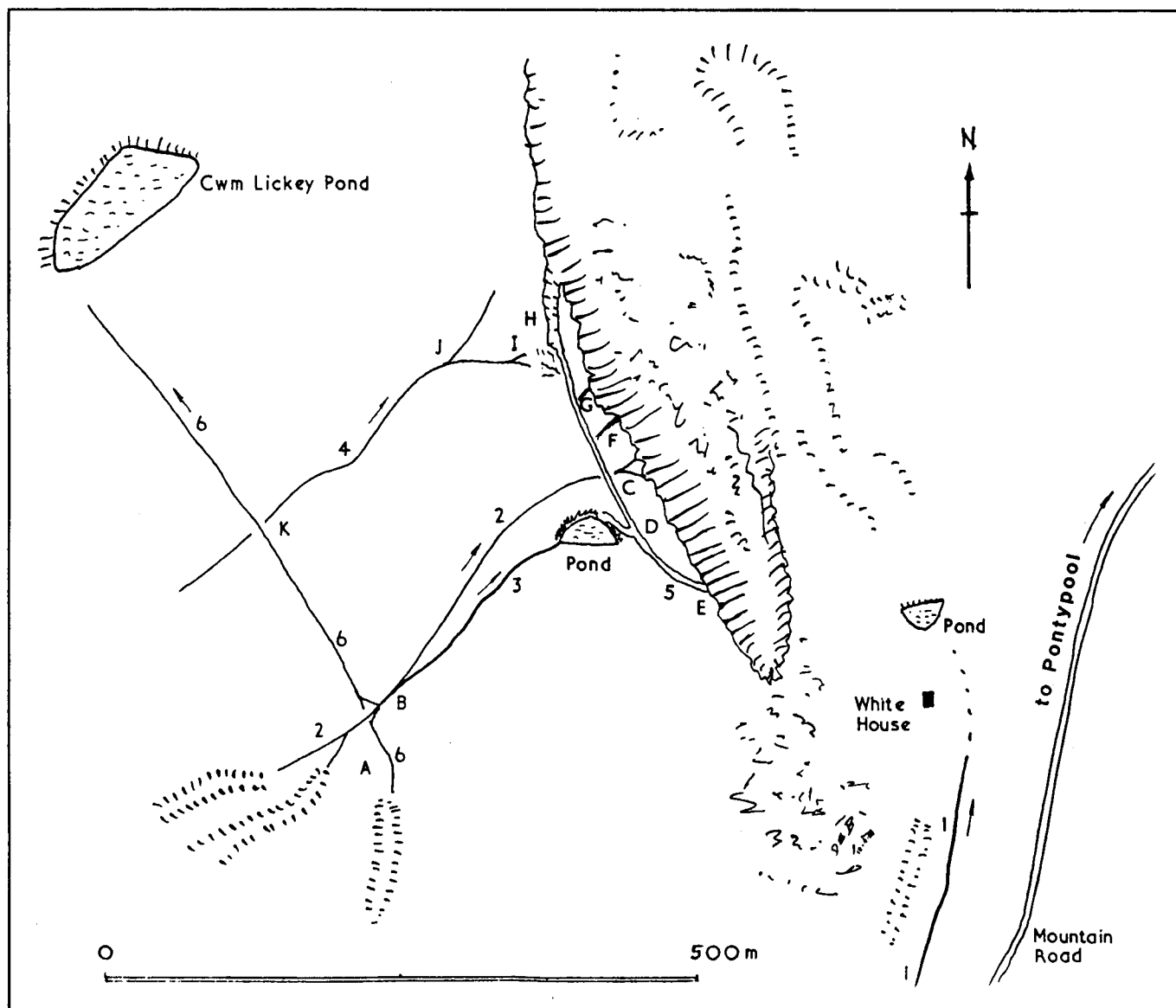


Fig. 3. Pontypool: The Upper Race.

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