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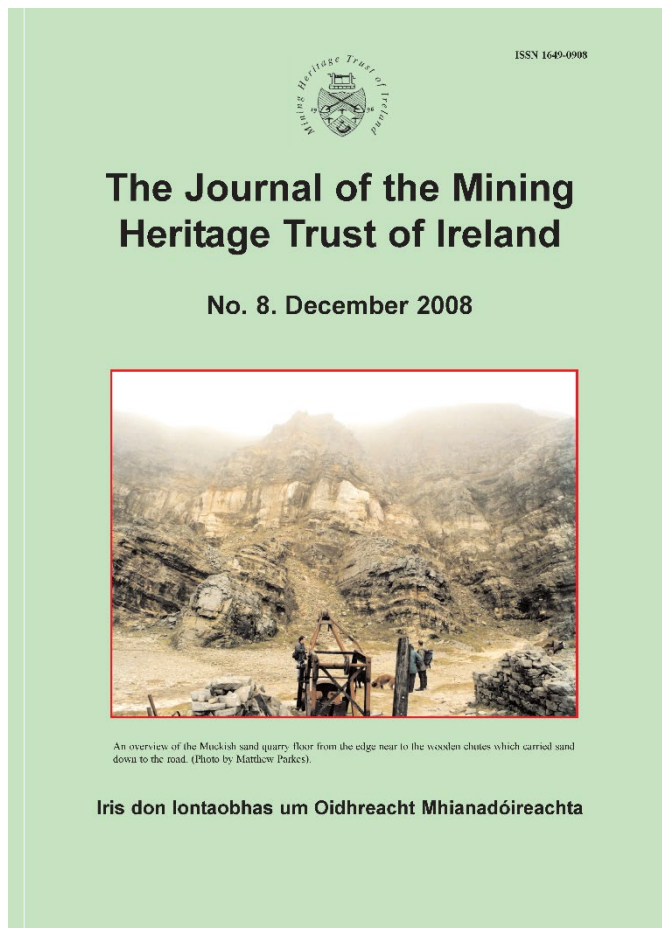
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AN INTRODUCTION TO SOME OF THE HISTORIC MINES OF GLENMALURE, CO. WICKLOW

by John Morris

Abstract: This article is a modified version of a field guide produced for a visit to Glenmalure led by the author, for participants at the NAMHO 2003 Meeting in Rathdrum, County Wicklow. It describes all the mining operations known to have taken place in Glenmalure and the visible remains present today from those mining activities. *Journal of the Mining Heritage Trust of Ireland*, 8, 2008, 27-38.

INTRODUCTION

The vale of Glenmalure is one of the most remote, and arguably, one of the most beautiful of all of the glens of County Wicklow. In viewing its majestic tranquility it is now maybe hard to visualise the tides of events which have swept through this glen: from the time during the last Ice Age when glaciers flowed through the valley, ripping and gouging through the rocks to form the basic structure of the valley as we now see it, to the periods of human occupation up to and beyond the time of the events of the 1798 rebellion, and 19th Century mining activity. This guide focuses upon the latter event only, but evidence of the earlier events are readily discernible: several memorials to the Irish patriots from this valley, who fought in the 1798 rebellion; and the form and shape of the valleys and

the sediments dumped as the glaciers finally melted away about 12,000 years ago - not least to form a lake which was exploited in the 19th C as a reservoir to power mining operations at one of the mines [Baravore, see below].

Even by Irish standards, the historic mines of Glenmalure, all lead mines, are relatively obscure, and none were substantial enterprises - even though the first of them was opened before those of the much better known mines in Glendalaough and Glendasan. There were a number of attempts to work visible galena (lead sulphide)-quartz veins at various locations, some of which developed in to more substantive operations. An 1854 inventory of mines throughout Ireland (Anonymous 1854, see also Morris 2001) and Cole (1922/1998), in their respective listing and descriptions of these operations, note a total of six principal lead (with or without zinc and copper) mines:

Ballinafunshoge, Ballinagoneen, Baravore, Clonkeen, Corrasillagh and Cullentragh Park. The 1854 list also notes a further 3 sites: Ballyboy, Camenabologue, and C(l)onavalla. The anglicisation of the original Gaelic townland names, from which the mines derive their names, has resulted in many spelling variations of the names of these mines in various English language publications: those listed above are as given in the 1854 list. The current spelling will be used for the selected mines described below, and others mentioned in passing: the largest of these historic mines, Ballinafunshoge, and Baravore, with mention of Cullentragh Park and Ballygoneen.



Figure 1. A general view of Glenmalure, looking northwest from a location about 500m southeast of the ford over the Avonbeg river. The Ballygoneen mine spoil heaps are just visible in the mid-distance, about half way up the right hand (northeast) side of the glen. All photographs throughout by John Morris.

BALLINAFUNSHOGE
(Ballinafinchogue, Ballynafinshogue)
Grid reference: 306300 194190

The Ballinafunshoge mine site is the first obvious site of its type encountered when driving northwest along the cul-de-sac road from the Laragh-Aghavanagh/Rathdrum-Glenmalure cross roads beside the Glenmalure Inn. At a point about 2.5km northwest of the crossroads, extensive, pale creamish white, largely unvegetated spoil heaps are visible on either side of the road [Figs. 2 and 3]. The mine site consists of several discrete, but separate features: the principal ore extraction and processing site, the site of a nearby school house about 100m to the southeast, and about 300m to the northwest, the site of a lead smelting complex [Figure 2].

Mine History

Cole (1922/1998) provides a succinct summary of the known history of this mine. One reference indicates that this mine may have been opened as early as 1797, though other sources cited suggest a slightly later date of about 1800, and that, at that time, it was the only operational mine in Co. Wicklow. Whichever is correct, both dates suggest that the mine opened during the period of the 1798 rebellion. This is, in itself, quite remarkable, as Glenmalure was one of the last places in which the rebellion was eventually suppressed. Indeed, one memorial, to a man by

the name Mernagh, notes his active involvement in the rebellion between 1798 and 1804, followed by his transportation to Australia in 1805.

A plan by Thomas Weaver, dated 1812, shows the substantial extent of underground workings which had by then been developed (Cole 1922/1998). This included an adit, which provided both access to, and ventilated the underground workings: the location of the run-in portal of this adit, and drainage issuing from it is shown in Figure 3. The adit intersected the west-northwest trending, c. 12 - 36 foot (3.6 - 10.8m) wide lode zone about 510 feet [153m] below its surface expression in the region of the upper level shaft shown in Figure 3. Smyth (1853) notes that the lode had been proven over a length of more than 3,000 feet (900m), although mining had been undertaken only over about one third of that length, and provides a description of it in the main adit, and in the area behind the smelting house. He further notes an internal shaft developed below the adit level, levels at depths of 25 and 35 fathoms (150 feet, 45m; 210 feet, 63m), and provides an illustration and description of the ore vein at the working end of the 35 fathom level, reproduced here as Figure 4.

There the ore vein consisted of four distinct bands of material, of which the galena (lead sulphide) rich part of the vein formed a distinct layer along the lower edge of the inclined structure (Figure 4, unit "e"). Quartz is an important vein component in other areas. In describing the enterprise as a "fine mine" Smyth (1853) is, nonetheless, very disparaging about the manner in which it had been worked. He is particularly critical of the choice of location of the adit and shaft, and their relative disposition which inhibited efficient operation of water drainage and ore raising machinery. Plans and sections of the mine still exist in the Mine Records Archive of the Geological Survey of Ireland, including that of 1812 by Thomas Weaver.

A recorded output of 334 tons of lead is noted in 1811, when the metal was worth £30 per ton. Production in 1819 is given as 300 - 400 tons of ore, grading 68% lead. Later production figures are given in "Mineral Statistics" summarised in Table 1.

The mine continues to be listed for various intervals after 1864, either to note production aggregated with other mines, or to note that works had been suspended:

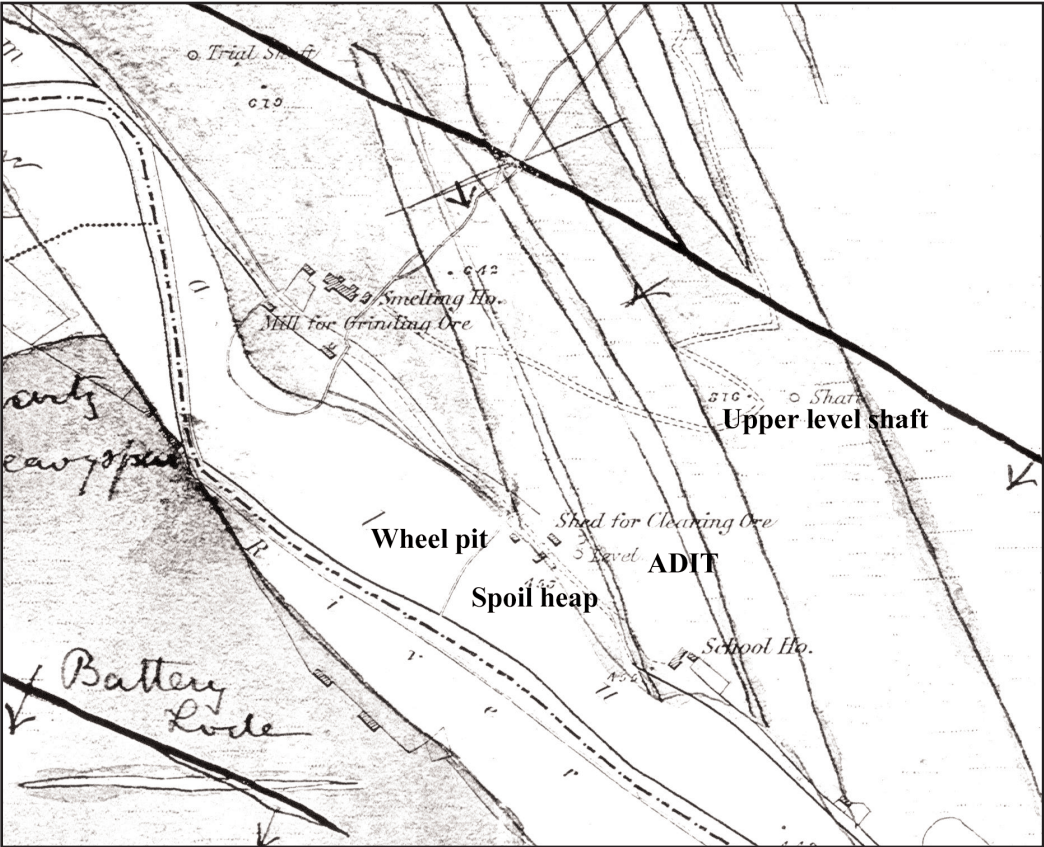


Figure 2. An enlargement of the c. 1865 Geological Survey of Ireland 6": 1 mile scale field sheet, showing the principal features of the Ballyfunshoge Mine: smelting house complex; the main adit, spoil heaps and processing features; and the school house. The two thick lines show the surface trace of two of the principal ore veins: the Ballyfunshoge lode at the top right, and, on the opposite side of the Avonbeg River, the "Battery lode", presumed to be one of the veins worked in the Clonkeen Mine.

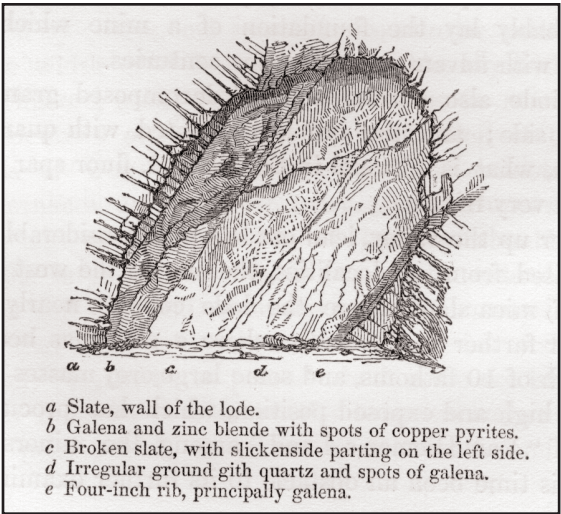
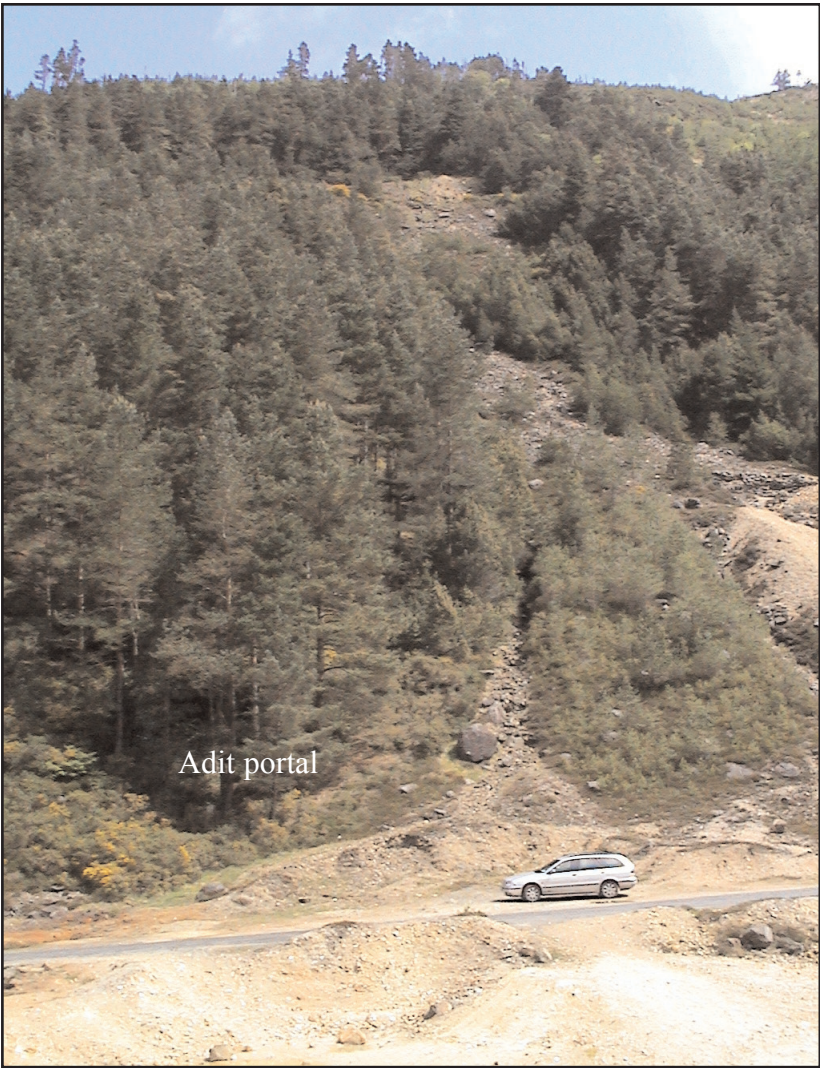


Figure 3. Left. Ballyfunshoge, showing principal mine workings.
Figure 4. Above. Ore vein structure at the end of the 25 fathom level (from Smyth 1853)

| Date | Lead ore | Lead metal (tons) | Silver (ounces) |
|-------------|-----------|-------------------|-----------------|
| 1845 | 367 | 270 | |
| 1846 | 314 | 250 | |
| 1847 | 120 | 72 | |
| 1848 | 45 | 30 | |
| 1849 | 45 | 30 | |
| 1850 | 200 | 125 | |
| 1851 | 105 | 65 | |
| 1852 | 201 | 144 | 950 |
| 1853 - 1856 | No record | | |
| 1857 | 158 | 98 | |
| 1858 | 158 | 97 | |
| 1859 | 60 | 37 | |
| 1860 | 82 | 49 | |
| 1861 | 101 | 65 | |
| 1862 | 109 | 66 | |
| 1863 | 104 | 62 | 180 |
| 1864 | 100 | 60 | 180 |

Table 1. Ballinafunshoge lead ore production summarised from Mineral Statistics.

1869 - 1873: works stopped
1891 - 1892: production aggregated with Luganure
1893 - 1894: production aggregated with a total for Ireland
1895 - 1890: production aggregated with Luganure

Nothing is, so far, known about the people who worked in the mines, or where they lived, and very little about either the mine owners or management - a lacuna of knowledge all too common for many historic mines in Ireland. Kane (1845) notes that about 30 men were working at the mine in the early 1840s.

Henry Hodgson, who also owned other mines in Glenmalure (e.g. Baravore) and elsewhere in Co. Wicklow, is recorded as the mine owner between 1861 and 1873. It is conceivable that this Henry Hodgson, as well as the Thomas Weaver mentioned above, are both related to individuals involved with the "Associated Irish Mine Company", established about 1787 to work the copper mines at Cronebane in the Avoca district of Co. Wicklow. Amongst those listed as its then Directors, there appear the names Robert and Bryan Hodgson, and a Thomas Weaver "the Elder" (Morris 2003). While the latter might be the same Thomas Weaver who drew the 1812 mine plan, Henry Hodgson, on the other hand, is most likely to be a son or a nephew of one or other of Robert or Bryan Hodgson, given the dates of their respective involvements. A Mr. H. Robinson is recorded as the mine manager at Ballyfunshoge in 1867 and 1868 (Mineral Statsitics).

Ore extraction and processing site

The extent of the spoil heaps still visible either side of the road, although much has obviously been removed, presumably for track and road building applications, attest to the relatively substantive nature of this mining operation, which, from the history outlined above, occurred virtually continuously from c. 1800 to 1900, at least. Much of the spoil has weathered and blended into the landscape relatively well, particularly on the steep slope on the northeast side of the road. Natural re-vegetation is obvious here, and, in places, in the far more extensive spoil heaps on the southwest side of the road. Both areas, however, show clear evidence of debridation caused by modern-day scrambler motorbikes and quads, which have destroyed large areas of natural re-vegetation, particularly on the southeast side.

Noteworthy historic features, which may still be discerned include:

- The run-in adit portal, with active drainage creating an ochre precipitate in the drainage channel either side of the road [Figure 3];
- On the north side, spoil heaps marking workings from an upper level shaft, and, perhaps, from an intermediate level [spoil between shaft and adit, Figures 2 and 3];
- Overgrown foundation footprint of a c. 5 x 10m building, which accords with the location of that indicated on the map [Figures 2 and 5]
- Remains of a c. 1.5m wide x 8m long, masonry construction water wheel pit, which is aligned with a shallow depression, probably marking the course of the spillway down to the Avonbeg river [Figure 6]. The position of the wheel pit and inferred spillway aligns with a channel shown on the topographic map of the site [Figure 2]. The function of the water



Figure 5. *Foundation level building ruin, adjacent to the road, immediately behind. Water wheel pit, to the right [see Figure 6].*

wheel is unknown, though it might reasonably be surmised to have operated a stamps mill or some other form of ore crushing machinery. This may have been located where the foundations of another construction run parallel to the long axis of the pit, about 3m to the east. It is very noticeable that the extant spoil is generally much finer in the area to the west of the wheel pit, than it is in the larger heaps to the east: this may indicate that the crushing and ore picking processes were located in and around the wheel pit area, with the coarser waste discarded to the east. The finer spoil may represent buddle waste material, although there is no obvious evidence of buddles in this area.



Figure 6. *Waterwheel pit, with presumed axle bearing blocks at the top of the low wall on the left; and the presumed course of the spillway marked by a linear depression in the area beyond. Note the building ruins in the background, on the opposite side of the Avonbeg river.*

School house and other buildings

The topographic base map of the GSI field sheet shows a school house about 100m east of the processing site [Figure 2]. Whether or not this was in any way connected to the mine, is totally unknown, though its proximity suggests that it might have been. There is now little obvious evidence of the school building, other than an embayment into the hillside, a rectangular depression and partial remains of a wall foundation [Figure 7].

There are two prominent building ruins opposite the spoil heaps, on the south side of the river [Figures 2, 6]. Both buildings are constructed on a substantial masonry base, which forms part of a walled enclosure between them and the Avonbeg river. It is presently unknown if either or both buildings bore any relationship to the mine, though proximity again suggests a possible relationship.



Figure 7. Above. Site of school building marked on Figure 2.

Figure 8. Above right. View looking east of the site of the principal building of the smelter building complex [location about 500m west of processing site, see Figure 2]. The site is now a car park. It is adjoined to the left by a set of grass covered terraces which extend up to the foot of a small waterfall - now a popular camping site.

Figure 9. Right. Site of the ore crusher building marked on Figure 2, adjoined by a bare patch of soil containing prominent pieces of smelter slag.

Smelter building complex

The c. 1835 map of the area shows a smelter house and ore grinding mill located separately from and about 500m NW from the ore extraction and processing site [Figure 2]. There are now very few visible remains of this complex, the last remnants of which were apparently cleared as recently as about 10 years ago to make a car park and adjoining camping ground. What is presumed to be at least part of the wall foundation footprint of the principal building at this site may just be discerned as a low masonry wall around parts of the car park [Figure 8], although there is now no obvious expression of either of the other two buildings which once existed at this site. Immediately opposite this site, and right beside the road, it is just about possible to discern the roughly rectangular, but heavily overgrown outline of the ore grinding mill, and beside it a bare patch of soil in which pieces of smelting slag are still evident [Figure 9]. Peat was apparently used as the fuel for smelting (Cole 1922/1998). Nearby, and partially overgrown by forestry, it is possible to discern the outline and part of the course of the leat system, which loops around the site and back towards the stream which flows under the road, just to the southeast of the car park.



CULLENTRAGH PARK

(Cullentiophark, Cullintra Park, Cullentrapark, Cullentraphark)

Two small spoil heaps about half way up the northwest side of the valley, and about 900m west of the Ballyfunshoge smelter house site, mark the location of the Cullentrath Park mine (Figure 10).

The recorded history of this operation is extremely sparse, Cole (1922/1998) barely mentioning it, while Smyth (1853) provides only a very brief description. He notes that the mine was opened up on a c. 1 foot (30cm) wide, 373⁰ trending quartz vein spotted with crystals of galena. He notes the existence of small scale workings, which had obviously been undertaken prior to 1853. By 1871, the mine was in the ownership of the Mining Company of Ireland, with a Mr. W. Harold as agent. *Mineral Statistics* list the mine during the mid-1860s, under various spelling variations, but there is no record of any production.

All the available evidence suggest that, at best, this mine was a very small, and unsuccessful trial development.



Figure 10. Cullentrath Park, general view of two very small spoil heaps (top) and a close up view (bottom).

BALLYGONEEN

(Ballinagoneen, Ballynagowen)

The spoil heaps of the Ballygoneen mine are readily visible on the north east side of Glenmalure towards its northwest end, roughly opposite the Youth Hostel [Figure 11].

In relative terms, this was a quite substantive lead mining operation, possibly the next largest in size after that at Ballinafunshoge. Both Smyth (1853) and Cole (1922/1998) provide some details about its development, as does Mineral Statistics.

Operations were certainly in progress here by 1853, and from Smyth's description it appears likely that these started a few years earlier, after the cessation of operations at Baravore [see following description]. A Sir C. P. Roney is described as the proprietor of the mine in the 1854 inventory of Irish mines, which also notes that the produce included copper and zinc, in addition to lead. Smyth notes that operations were underway on four different levels on a roughly north-south oriented, 6 - 18 inch (15 - 45cm) wide ore vein, composed of quartz, lead, zinc and copper sulphide minerals, as well as copper carbonate.

He also provides a most beautiful engraving of the appearance of the ore vein, and adjacent rocks, at the working end of one of the levels, which is reproduced below as Fig. 12. He pays particular attention to a 2 inch (5cm) wide mica vein (marked M-M in the engraving), which he observed to cross cut both the ore vein as well as adjoining rocks, but in turn was cut by fractures filled with a clay like substance he termed "flucan".

The mine is listed in Mineral Statistics for 1854, when total produce of 20 tons of lead ore, containing 14.5 tons of lead metal and 65 ounces of silver, was produced. It is next listed in 1871, when the Mining Company of Ireland is recorded as the owner.



Figure 11. Ballygoneen Mine, site marked by two spoil heaps.

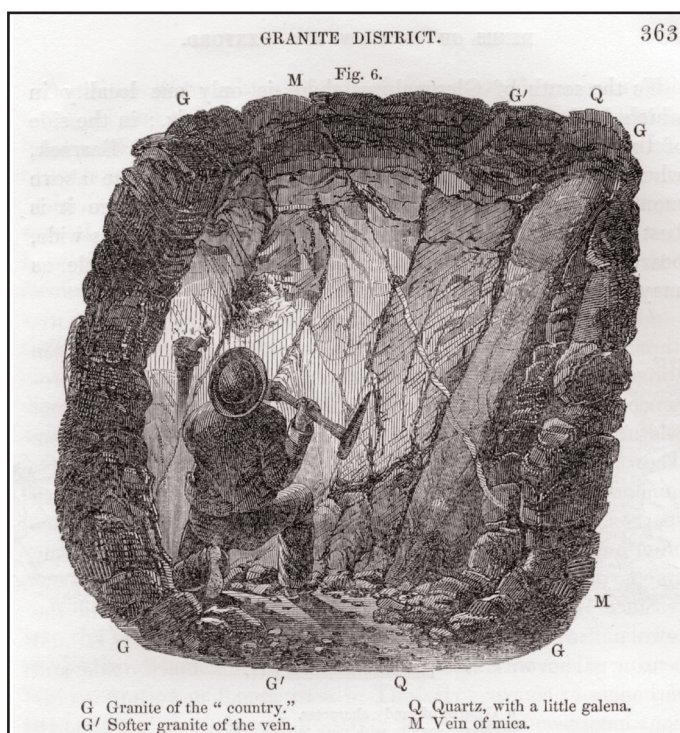


Figure 12. An 1853 engraving showing the form and method of working the ore vein in the Ballygoneen mine. Note the single candle attached to the side wall by a lump of wax: the only source of light for the miner.

BARAVORE

(Barravore, Barravone)

In terms of visible remnants of mining activity, the Baravore Mine is one of the most substantial, even though its production was, at best, only very limited. The mine site extends for some 800m or so along the southwest side of the valley, on the southwest side of the road, roughly between the ford over the river and the Youth Hostel. Smyth (1853), Cole (1922/1998) and the 1854 mines inventory all provide brief descriptions of the mine, although the most detailed description of its history, and surface and underground remains, is described in a succession of articles in the mining newspaper, the *Mining Journal*, in 1859 and 1861, and more recently, by Chester and Burns (2001).

Mine history

Mining operations commenced in 1846, to exploit what Smyth describes as a "strong" east southeast trending lode containing lead, zinc, and copper minerals, as well as barytes (Smyth 1853, Cole 1922/1998). These initial operations had, however, been abandoned sometime before 1853, when the mine owners switched their attention to developing the Ballygoneen Mine on the opposite side of the valley [see description above].

The mine apparently lay abandoned until 1859, when a new mining company, *The Barravore Silver-Lead Mining Company*, was formed, with a share capital of £6,500, to further the mine development (*Mining Journal* 1859 - 1861, as cited by Chester and Burns 2001). The Company had eight directors, four Irish and four English, with a Mr. James Skimming of Castleblayney

as Consulting Manager and Engineer (Skimming was also associated with the development of a number of the larger lead mines in the Castleblayney - Clontibret region of Co. Monaghan: Morris 2002). The terms of the purchase agreement with the previous owner of the mine provides an interesting list of assets then in existence. These include a Manager's house and offices (now the Youth Hostel?), workshops and forge with tools, 18 recently erected labourers cottages, a water wheel and ore crusher, mining implements and a stockpile of 8 tons of ore. The overall value of these assets is stated to be "not less than £3,000".

Subsequent reports in the latter part of 1859 note encouraging levels of production, and the erection of new machinery, including a water wheel for working ore crushing machinery. The monthly wage bill is, however, noted to be £200 per month. There is no further mention of the mine until January 19, 1861, in a report of a Company meeting held in Dublin. This notes that despite considerable endeavour, including sinking of new, deep workings, the prospects for the mine were not good. The Directors recommended suspension of operations, and discharge of all remaining liabilities from the remaining cash in hand (£600 from the initial capital of £3,500 raised at the time of flotation of the Company). The meeting appointed a Mr. A. de B. Bliss as auditor, and notes the role of one director, Mr. Crampon, assisted by Mr Cousins, as Company secretary. The report concludes by noting that the meeting recommended a call of 2/6 per share and the convening of an EGM in February (1861) at which a decision would be made to either re-form or wind-up the Company. Whether or not that meeting was ever held is unknown, as there are no further reports of the mine.

The mine is listed subsequently in *Mineral Statistics* for the years 1865 to 1874, although no production is recorded. Henry Hodgson is listed as the mine owner, and also mine manager from 1865 to 1868, after which Henry Robinson is listed as manager from 1869 to 1874.

Visible remains

Visible remains of this mining venture are quite extensive and variable in type. Apart from the Youth Hostel, which may have been the Mine Manager's house, these include two ore crushing buildings, with associated water wheel pits, various water channels ("leats"), a reservoir, various mine trackways, and open mine workings (NB. the location of these is not given, in order to discourage entry). Chester and Burns (2001) provide a very comprehensive description of each of these features, including plans and illustrations, from which the following descriptions are summarised. All of the features lie on the southwest side of the road, as noted in the introduction to this mine above.

The "New" Crusher House and associated features

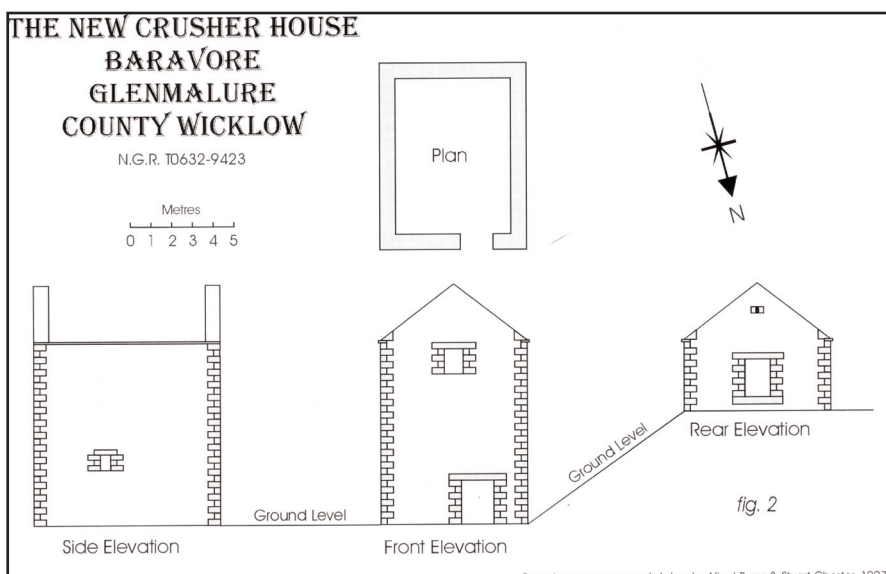
The foundation level remains of various small terraced buildings may be seen immediately upon the southwest side of the road, between about 50 and 250m southwest from the ford over the river (Figure 13). These are presumed to be the remains of the labourers cottages, and perhaps some of the workshops, noted in the 1859 inventory mentioned above.



Figure 13. Low walls and foundation level ruins of two units in a terrace, presumed to be the labourers cottages constructed prior to 1859.



Figure 14. A view of the New Crusher House, looking west northwest. Note the prominent square opening for the drive shaft from the waterwheel (located in a slot parallel to the east facing wall visible: Figure 16) to the ore crushing machinery, which was housed inside the building. Compare with plan and section views shown in Figure 15.



The "dam" is, however, a gift of nature - in this case to a mining venture, as it is not man-made: rather it is what is known technically as a "retreat moraine". As mountain glaciers finally melted away at the end of the last great Ice Age, some 12,000 years ago, rocks, gravel, mud and clay contained in the ice, were dumped around the edge of the glacier. Provided that the edge of the glacier remained relatively static in position, the dumped material gradually accumulated into a bigger and bigger pile - to form a retreat moraine, of which the horseshoe shaped moraine at Baravore, is a splendid example.

Figure 15. Plan and elevation views of the New Crusher House, Baravore (from Chester and Burns, 2001).

A little further south, and about 150m in from the road, the impressive and substantially intact remains of a large masonry construction building can be seen at the edge of the current (2003) forestry clearing. This is the "new" crusher house [Figures 14 - 16], most probably built during the 1859-1860 phase of operations.

The quality of the masonry construction is excellent, in particular the very well dressed granite coign stones, window and door lintels, and, on the inside, a cantilevered balcony above the internal opening of the water wheel drive shaft, presumed, from the remains of congealed grease streaks on masonry blocks, to have been an axle bearing structure for the ore crushing machinery. The configuration of the ore crushing machinery is completely unknown. Indeed, Chester and Burns (2001) doubt that machinery, or a water wheel were ever installed. However, the presence of grease streaks would suggest otherwise.

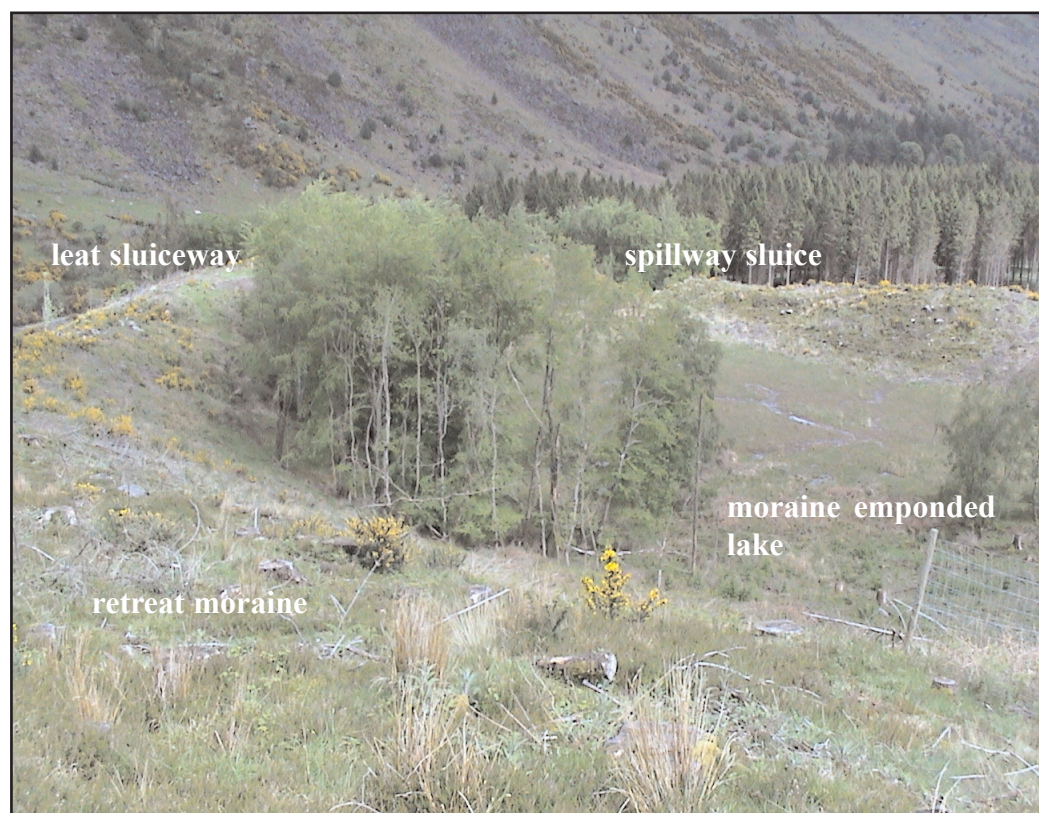
The dimensions of the external water wheel pit (Figure 16) indicate a water wheel up to 5 feet (1.5m) wide, and 24 feet (7.2 m) diameter. The remains of the "leat" to supply water to the wheel are still visible, though overgrown, in the area above and to the left of the wheel pit (Figure 16). The respective levels indicate that the water was most likely fed on to the top of the wheel, rather than at the side, in what is technically termed an "over-shot" configuration.

There is a very noticeable difference in ground levels between the front and back of the building (Figures 14 - 16), almost certainly reflecting height requirements to accommodate the water wheel. However, a very finely constructed window/doorway located near the top of the rear elevation most likely served as the entry point for ore to be loaded into the crushing system, and the crushed material to be taken out below the crusher through the doorway at the front of the building. A miners pathway passes northwest up behind the building for a short distance, before it loops back to run southeast roughly parallel to, and above the leat visible in Figure 16. Both continue further to the southeast for about 390 feet (117m), where the leat merges into a breach in what, superficially, looks like a dam [Figure 17].



Figure 16. New Crusher House, view looking west, showing front (north) elevation and east elevation. Note course of the "leat" above and to the left of the building, the water wheel pit, parallel to the east wall, and the drive shaft opening, also visible in Figure 14. Compare with Plan and section views, Figure 15.

Figure 17. Retreat moraine "dam", with man made sluices, to control water supply to the "leat" to the ore crushing building; and to drain excess water away through a spillway.



The miners then had merely to cut a breach into the moraine and install a sluice gateway to control water entry into the leat, and, to control excess water levels, a spillway, also controlled by a sluice [Figure 17]. Water levels in the moraine emponded lake were maintained by the construction of another "leat" to bring water from the nearby Fraughan Glen into the upper, southeast end of the moraine lake [Fig.18]

The "Old" Crusher House and associated features

The "Old" Crusher House is located in the forestry plantation about 500m northwest and very slightly uphill from the New Crusher House. Remains of the original road up to the site are still visible, though overplanted with trees [Figure 19].



Figure 18. Water supply leat for bringing water from the Fraughan Glen to the Baravore "reservoir" (moraine emponded lake, Figure 16).



Figure 19. Overgrown road to Old Crusher House

Figure 21. Right. Old Crusher House, view of northeast elevation showing partial collapse of northeast corner, unsupported granite lintel, and the two large square openings for the roll crusher balance weight armatures (cf. Figure 22).



Figure 20. Below. Old Crusher House, view of southeast elevation, with water wheel pit in the foreground.



It is uncertain when the building was constructed, though it might reasonably be presumed to have been constructed during the initial phase of operations between 1846 and about 1850. The extant remains are less extensive than the "new" crusher house, and it is in a generally poorer state of preservation [Figures 20, 21].

Chester and Burns (2001) provide a detailed plan and interpretation of this building [Figure 22]. They interpret a pair of prominent square openings in the front wall (and exact counterparts in the rear wall) as the apertures through which armatures projected [Figures 21, 22]. On the exterior, each armature carried a weight which served to maintain pressure on roll crushers, as well as provide a stress release mechanism should an oversize block of rock jam between the rollers [Figure 22].

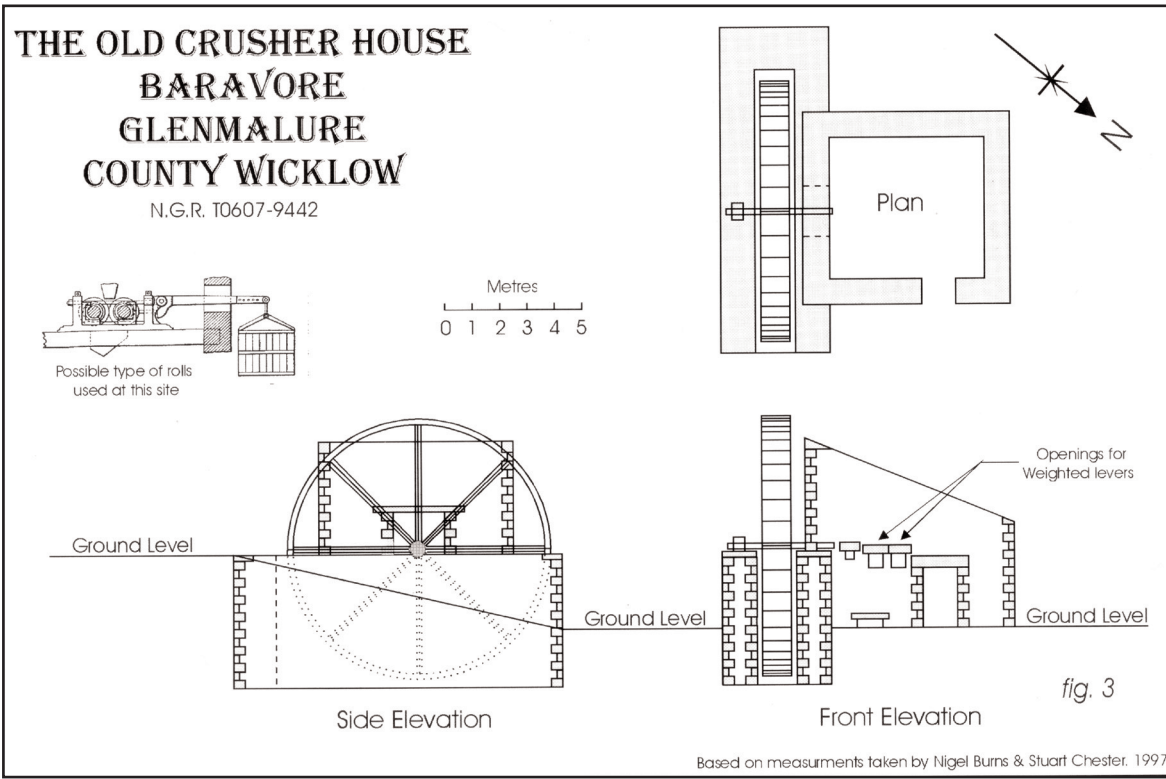


Figure 22. Plan, and elevation views of the Old Crusher House, including interpretation of configuration of the water wheel and ore crushing machinery (from Chester and Burns 2001).



Figure 23. Drive shaft axle block bolts

As in the New Crusher House, water power drove this machinery through a drive shaft opening in the southeast wall. Axle bearing bolts and congealed grease streaks are still readily visible on the inside of this wall [Figure 23; interpretation, Figure 22]. The water wheel, interpreted by Chester and Burns (2001)

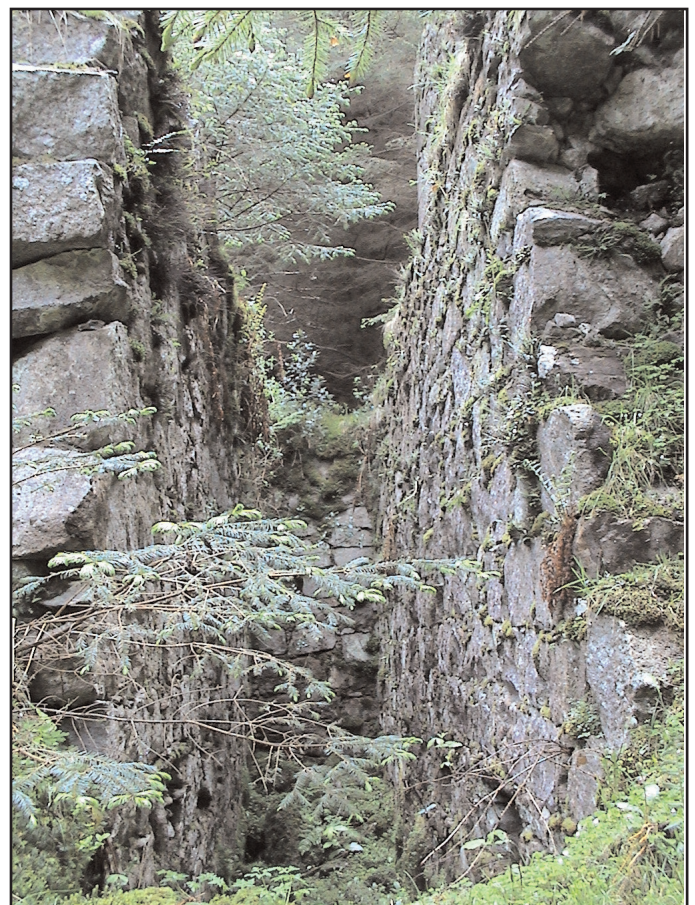


Figure 24. Water wheel pit, view looking southwest

to be c.1m wide, with a diameter of c.9.5m, was located in a still reasonably well preserved pit immediately beside the southeast wall [Figures 22, 24]. The water supply was provided to this wheel [Figure 25], from a point on the River Avonbeg more than 600m to the northwest, by a very steeply inclined leat.



Figure 25. Steeply inclined leat from the River Avonbeg to the Old Crusher House, just visible through the trees on the upper left hand side of the photograph.

WARNING OF DANGER

In common with all historic mining centres, it is stressed that open mine workings, whether vertical ("shafts", "trenches" and "stopes"), or horizontal ("adits"), can be dangerous, as can attempting to walk on loose, uncompacted scree ("spoil heaps") created by mining operations, particularly when the loose debris is wet. Please exercise sensible precaution.

REFERENCES

- Anonymous, 1854. *Catalogue of the several localities in Ireland where mines, or metalliferous indications have hitherto been discovered*. HMSO. Dublin, 4pp.
- Anon, 1856. *The Mines of Wicklow* (Law of London 1856).
- Chester, S. and Burns, N. 2001. The mines of Baravore, Glenmalure, Co. Wicklow. *Journal of the Mining Heritage Trust of Ireland*, **1**, 67-76.
- Cole, G.A.J. 1922. *Memoir of localities of minerals of economic importance and metalliferous mines in Ireland*. Geological Survey of Ireland, Dublin. Reprinted 1998 by the Mining Heritage Society of Ireland. XL + 155pp.
- Kane, R. 1844. *The Industrial Resources of Ireland*. Dublin, Hodges and Smith, 417pp.
- Morris, J.H. 2001. An 1854 catalogue of mines and mineral occurrences in Ireland. *Journal of the Mining Heritage Trust of Ireland*, **1**, 25-37.
- Morris, J.H. 2003. The Battle of the Tokens, 1789-1799: The Hibernian Mining Company v. the Associated Irish Mine Company. *Journal of the Mining Heritage Trust of Ireland*, **3**, 41-54.
- Morris, J.H., Lally, P. and Cowman, D. 2002. A history and survey of mine buildings at the Tassan Mine, Co. Monaghan. *Journal of the Mining Heritage Trust of Ireland*, **2**, 41-49.
- Smyth, W.W. 1853. On the Mines of Wicklow and Wexford. *Records of the School of Mines* **1**,(part 3), 349-412.