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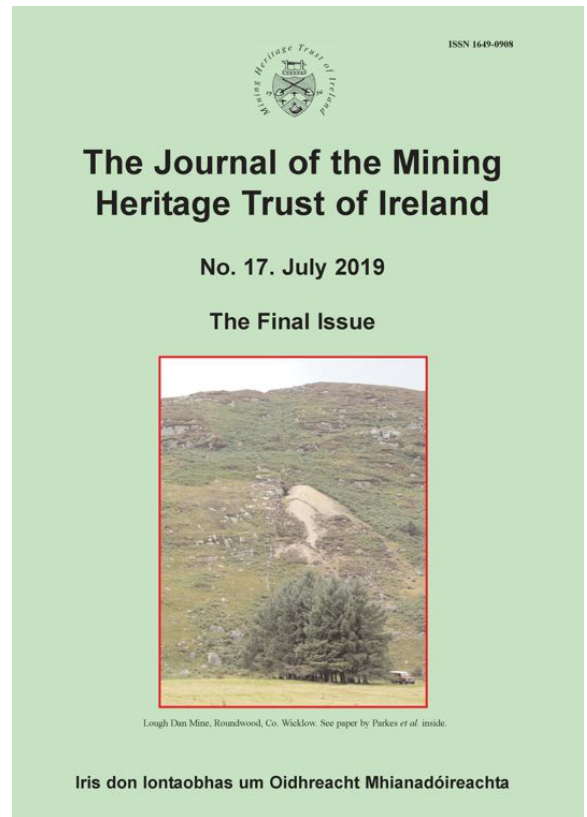
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# LOUGH DAN MINE, ROUNDWOOD, CO. WICKLOW

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**Abstract:** An historic lead and copper mine site at the northern end of Lough Dan, near Roundwood in County Wicklow is described, with both the extant remains on the ground and the available documentary information assessed. The mine was worked around 1819 but faded into relative obscurity in later mining literature. Two adits survive with a stoped working up from the lower level, which is open to the surface in a shaft like fashion, below the entrance to the upper adit. The upper adit has flooded stoped workings which appear not to connect with the other workings. A cluster of now ruined, stone-built dwellings adjacent to the mine are not demonstrably mining-related but are likely to have originally been built to house miners. *Journal of the Mining Heritage Trust of Ireland*, 17, 2019 15-20.

## INTRODUCTION

The historic mine at the northern end of Lough Dan, near Roundwood in Co. Wicklow is poorly documented in standard sources. It is not listed in Cole's 1922 Memoir of localities of minerals of economic importance and metalliferous mines in Ireland. This paper reports on the available archival and documentary sources about the mine and its history, and provides a description of the extant remains on the ground.

## HISTORY OF THE MINE WORKING

The critical record for Lough Dan Mine is Weaver's (1819, p. 199) Memoir on the geological relations of the east of Ireland.

To the west of Lough Dan is a vein which traverses the granite brow of Carriggeenduff... and, ranging across the valley, penetrates Knocknacloughole mountain on the north. It has been opened by two levels near the northern foot of the former mountain, one about fifteen fathoms above the other, and forty-eight and thirty-six fathoms in length respectively. The vein is in general from three to four feet wide, and dips 80° toward the east, consisting of quartz, with a regular sticking or layer of soft tenacious clay (the German besteg) on the western side, and containing galena either in bunches or disseminated, and occasionally also a small quantity of copper pyrites; but the greater part of it, as far as explored, appears to be barren. This vein does not seem to penetrate the mica slate, which to the southward forms the upper part of Carriggeenduff; four trenches cut into that rock in search of it, ten fathoms asunder, and across the direction of the vein, not having been attended with success.

The mine is mentioned, without much detail in some standard sources. Despite official Mineral Production Statistics being collated, in various forms, from 1806 onwards, it is not listed in those. It is surprising that it is not listed at all in Cole's normally comprehensive 1922 Memoir of localities of minerals of economic importance and metalliferous mines in Ireland. It is listed on the 1853 and 1854 versions of Griffith's Catalogue of the

several localities in Ireland where Mines or Metalliferous indications have hitherto been discovered, arranged in Counties, and under their respective Post Towns (Morris 2001; Wyse Jackson 2002).

Smyth (1853; 364) has a mention, echoing Weaver's description:

At the western end of Lough Dan, a lode coursing N.E. by N. and hading 70° S.E., is composed of two parts; first, a 2-foot rib of quartz with spots and strings of copper pyrites, galena, and zinc blende; and secondly, 6 to 10 inches of soft decomposed granite, generally occurring on the hanging side. In the levels which have been driven, without much success, upon the vein, it is remarkable that, as we approach the overlying mica slate, fragments of that rock form the filling matter of the lode instead of the friable granite; notwithstanding which, some trenches cut in the slate at the surface have failed in proving that the fissure has been continued more than a few feet in the latter rock.

In the Griffith catalogues, it is reported as 'Lead with Zinc and Copper'. No other detail is given. However, The Mines of Wicklow (Anon 1856, p.10) has a listing of mines including the Townland Carriggeenduff, but no description. Hunt (1886, p. 469) probably summarised Weaver in British Mining, A Treatise: "To the west of Lough Dan is a vein traversing the granite brow of Carriggeenduff and ranging across the valley. This vein is from 3 to 4 feet wide and dips 80° towards the east. A little galena is found in bunches, and disseminated, with occasionally a small quantity of copper ore".

In Kinahan's Economic Geology of Ireland (1889), the catalogues of Griffith are effectively revised and updated. Lough Dan is listed as follows: "Togher, or Roundwood- Granite-Lead, with at Lough Dan copper and zinc. At Carriggeenduff, Lough Dan, the vein worked out". In the text (p. 120) he claims "Lewis states the lode at Lough Dan is worked out". This presumably refers to Lewis' Topographical Dictionary of Ireland of 1837, where the following description is given of Lough Dan:

"The lake forms a graceful curve in the centre of a wildly romantic district; the lofty mountains which rise precipitously from its waters enwrap it in continual gloom, and add much to the striking solemnity of its appearance. Bog trout, grey trout, and char are found in abundance; in winter its waters overspread the low lands in the neighbourhood, and on returning to their bed leave large trunks of oak trees exposed on the surface of the land. Lead ore is found on the shores of the lake, and mines were formerly worked there".

Kane (1844, p. 195) mentions Lough Dan under lead, as below, but has no further detail.

The granitic district of Dublin and Wicklow is intersected by a great number of veins containing ores of lead; they lie along its eastern boundary, and cross, in an oblique direction, the juncture of the granite with the mica slate. Veins have been worked along this line at Dalkey, and Killiney, on Ballycorus, at Powerscourt, Djouce, Lough Bray, Lough Dan, Glenasane, Glendalough, Glenmalur, and Shillelagh. of these many have been found ultimately unproductive, and the only portions of this district which it is necessary to describe in detail, are those of Glendalough, of Glenmalur, and Ballycorus.

The mention in Lewis 1837 as 'formerly worked' and the lack of mines surveyed or noted on the 1838 Ordnance Survey Ireland six inch maps suggest the working was finished considerably before that time and had become historical, almost lost to memory, even at that time.



**Figure 1.** The mine spoil from Lough Dan Mine is clearly visible from the valley floor.

## THE MINE SITE TODAY

The numerous hill walkers and others passing through the valley should notice the clearly visible spoil heaps of the Lough Dan Mine at around 300m above sea level (Figures 1, 2). The mine site is to the west of an old wall which climbs the rough hillside. The boundary between the Wicklow granite and the schists it was intruded into lies a little east of the minesite, clearly delineated by a change in vegetation and far more rock exposures on the granite side, than on the schist side.



**Figure 2.** Lough Dan Mine is a visible feature from some distance across and down the valley.

The spoil heaps are three coalesced piles, each emanating from one of the three identified mine entrances. They are still mobile with rain gullies visible on the surface, as well as disturbance by visitors climbing up to them. However, it is presumed that the reason they have remained unvegetated in 2 centuries is that there is a high metal content remaining in the spoil, inimical to plant growth and soil fauna (Figure 3).

There are three mine workings; two small and well-hidden adits above and below a larger open hole on the vein, which is almost certainly a stoped working to the surface from the lower level (Figures 4-6). The mineral vein is about a metre wide and is clearly seen in the middle opening.



**Figure 3.** Stephen Callaghan and Eleanor Honan searching for minerals on the unvegetated spoil heap.



**Figure 4. Sharron Schwartz, standing at the outside of the open stope working.**



**Figure 6. Eleanor Honan part way down the open stope, with approximately 6m drop below.**



**Figure 5. The mineral vein seen on the far side of the open stope. Small openings below and above a large collapsed 'flake' can be seen in the lower half.**

The lower adit goes virtually straight in a southwestward direction, at stooping height for 50m until it get slightly taller (Figure 7) and then ends in a rubble pile of mostly large blocks (Figure 8). This would appear to be a filled stope, with extensive rock volumes above. No voice connection could be established from this point to the middle opening, but water seepage and some fresh air circulation is evident.

Information from Brian Jones, who fully descended and mea-

sured the accessible adits has informed our assessment of the middle opening. The open stope between the two levels goes down 14.5m and nearly 2m from the bottom a 7.6m section of adit, heading out to the valley, is possibly a continuation of the lower adit on the other side of the boulder pile as it also ends in a boulder pile. Heading in the opposite direction, into the hillside, a large collapsed block can be passed above and below in small openings, heading downwards. Some 37m total of adit continues into the mountain from the base of the open stope before a forehead is reached.



**Figure 7. Eleanor Honan in the taller section of the lower adit at about 45-50m in.**

The upper adit is initially deeply flooded for some distance, and an estimated total of 83m of passage is found. It is all approximately the width of the vein and has about a metre of headspace until at 48m in it opens into a large flooded stope. This dips steeply to the east and extends below water for 10s of metres and upwards for unknown heights. The flooded stope is 15m long with 20m of narrow but partly stoped passage beyond, until the forehead is reached. Small traces of mineralisation are seen in the adit, and some small secondary copper flows are found on the walls. At 32m in from the entrance there is a curious feature where a hole in the roof has some large blocks of granite poking out. It seems most likely that this may be a very small intersection with a reported (A. Lings pers. comm.) filled shaft or stope above that is not easily seen on the ground above the upper adit.



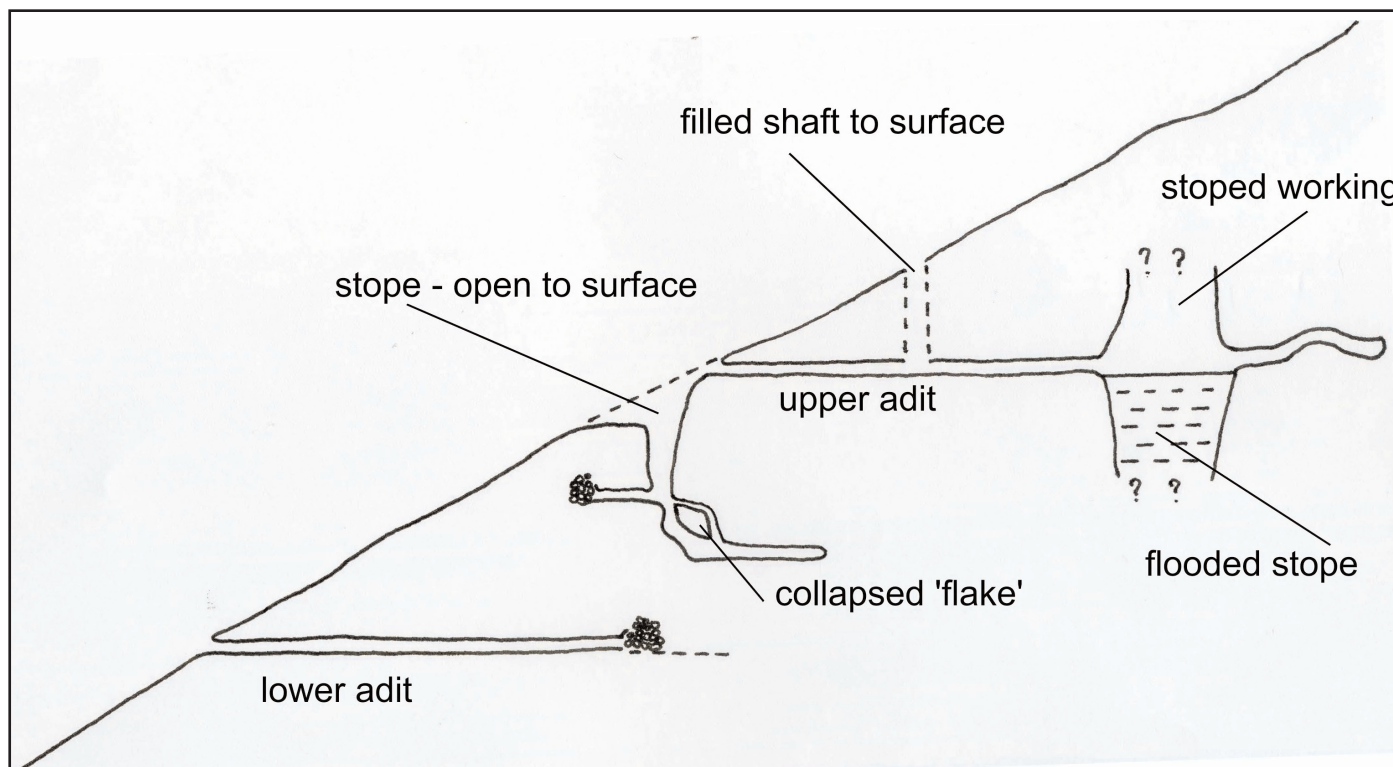
**Figure 8.** Tape measure and gloves resting on the boulder pile descending from the shaft or stope above at 50m in the lower adit.

Since the upper adit with a large flooded stope holds the water it is presumed there is no connection to the lower adit seen in the bottom of the open stope in the middle section, as otherwise the water would drain out. A sketch cross section of the three workings is shown in Figure 9. This is not drawn to scale and is merely indicative of our interpretation and postulated relationships of the different sections of the mine.

If the line of the vein and the fieldwall beside the mine are followed southwestward up the hill for 330m there is a small trial adit, about 25m beyond a distinct right angle in the wall. It is at about 400m above sea level, but is only about 3m long and unconnected to the main mine. However, as noted by George Victor Du Noyer on the GSI fieldsheet the vein dies out fairly quickly in this direction. Weaver (1819) recorded 4 trenches ten fathoms apart, but it is assumed that these were fairly near the adits, and not related to the 3m long trial much higher up the hill. However, such trenches were probably very shallow and superficial, and there is no clear evidence of them today.

### POSSIBLY ASSOCIATED BUILDINGS

At the lower end of the track from the end of the metalled road in the Lough Dan valley, which is the primary access, where it meets the flat valley floor, is a cluster of ruined buildings. These appear on the first edition Ordnance Survey Ireland six inch to the mile map, from 1838 or subsequent years. They have been scrutinised for any indications of a purpose related to the mine or to processing ore, but there is no feature that even speculatively relates to mining. They are essentially the footprint of one or two room dwellings built into the slope, probably with thatched rooves, with associated cowsheds and small enclosures (Figure 11). The landowner, Sean Byrne (pers. comm. May 2019) very generously shared the history of these



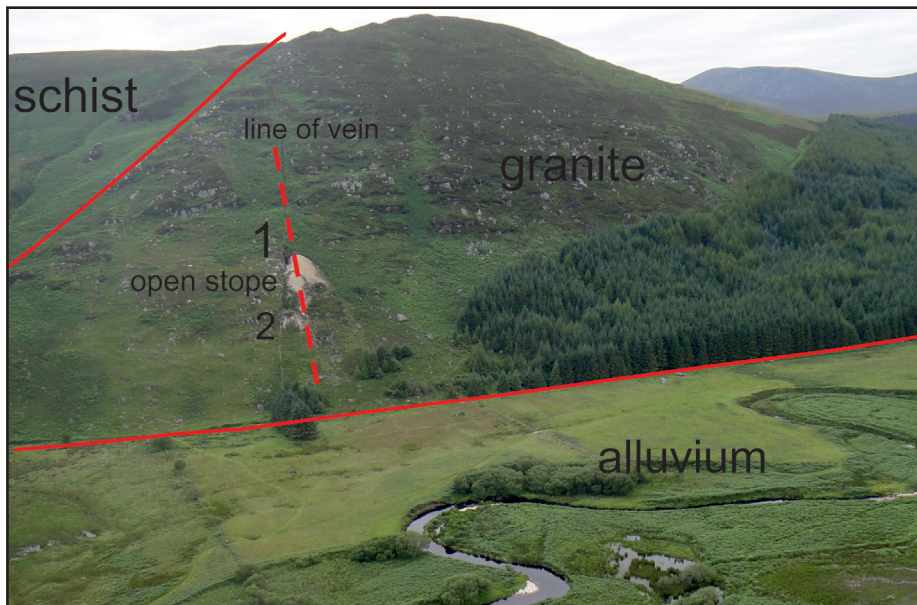
**Figure 9.** A schematic cross section of the hillside with the Lough Dan mine workings and one interpretation. Speculatively, the bottom of the middle open section may be filled with rock waste, in effect a boulder pile, which may have connected with the lower adit, where a boulder pile is now met at 50m in.



**Figure 10.** Some of the two room dwellings remaining as footprint walls.

dwellings with us, and the stories of some of the families that lived in them. The last inhabitant only moved out in around 1965, but a mother and two children are reported to have met their end in the cottages in March 1867. An enormous build-up of snow on the hillside above was triggered into an avalanche by rainfall and the houses were engulfed, with some inhabitants perishing inside their homes.

Nevertheless, given the substantial nature of the stone built structures, compared to many homes of the poor in the countryside, and the remote location in a mountainous valley, it is possible that they may have originally been built to house the miners developing the mine. There are no visible traces of lazy beds on the hillside, often indicative of pre-famine populations in marginal land in mountain districts. The close proximity of this cluster of buildings to a worked mine site seems unlikely to be purely coincidental.



**Figure 11.** The three main elements of granite and schist are annotated, along with the alluvium filling the valley floor. The line of the vein is illustrated and the spoil heaps are clearly visible beside it. Number 1 is beside the upper level and number 2 beside the lower level (courtesy of Shay Foody).

### GEOLOGICAL SETTING

Like most of the Wicklow Mountains mines (Glendalough, Glendasan, Glenmalure, Ballycorus), the Lough Dan Mine is associated with mineral veins that are very close to the margin of the Wicklow Granite plutons (Figures 11, 12). These veins were probably injected into fractures at a late stage of cooling and consolidation of the molten granite as a rock. Metals were concentrated in residual fluids circulating and thus were abundant enough to form a mineral vein in the final stages of the granite intrusion and cooling. The metals were mostly lead and copper, and invariably they are associated and interspersed with a quartz vein (or lode), which becomes the unwanted waste rock for the miner to extract and separate, then discarding the quartz as spoil.



**Figure 12.** Extracts from GSI 6 inch geological fieldsheets showing the trend of the vein. The annotation by George Victor Du Noyer (GVD) reads: "the lode traced no further than at \* March 1865". In pencil: "quartz in granite becomes schistose near junction". Red colour is granite, brown is the metamorphic schist surrounding it.

## MINERALOGY OF LOUGH DAN MINE

The mineral deposit at Lough Dan consists of low temperature hydrothermal veins of the primary minerals galena, sphalerite and chalcopyrite which are hosted in quartz. These are accompanied by several supergene minerals. Using the detailed study of the mineralogy of the Wicklow lead mines by Moreton and Green (2007) and from the examination of the spoil at the mine site the following minerals have been identified.

Brochantite -  $\text{Cu}_4\text{SO}_4(\text{OH})_6$

Sub millimetre translucent to transparent green crystals occur with linarite are likely brochantite.

Cerussite -  $\text{PbCO}_3$

Cerussite is found as small millimetre long crystals on oxidised lumps of galena.

Chalcopyrite -  $\text{CuFeS}_2$

This primary mineral is found weathered and oxidised in the spoil.

Galena -  $\text{PbS}$

Massive galena is found oxidised in quartz vein. Some examples of crystalline quartz have shown that euhedral galena crystals here were 1 or 2cm wide

Linarite -  $\text{PbCu}[(\text{OH})_2 \text{SO}_4]$

This rather uncommon secondary mineral is unusually abundant in the second highest spoil heap. The mineral occurs as electric blue sub millimetre sprays of bladed crystals on vein quartz with oxidising galena.

Malachite -  $\text{CuCO}_3$

Malachite occurs as a secondary mineral at Lough Dan, very small spheres of malachite have been found. These are associated with vein quartz.

Pyromorphite -  $\text{Pb}_5(\text{PO}_4)_3\text{Cl}$

Pyromorphite occurs as small poorly formed coatings on quartz.

Quartz -  $\text{SiO}_2$

The vein hosting the mineral deposit is vuggy in parts and crystalline specimens can occasionally be found in the spoil.

Sphalerite -  $\text{ZnS}$

This primary ore mineral is uncommon in the spoil, and when it is found it tends to be quite oxidised.

Wulfenite -  $\text{Pb}[\text{MoO}_4]$

This rare secondary mineral has only been found in a handful of places in Ireland. Wulfenite has been found here as micro crystals associated with pyromorphite.

## ACKNOWLEDGEMENTS

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