

EVIDENCE OF PREHISTORIC MINING ON COPA HILL, CWMYSTWYTH, DYFED

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Abstract: Tips and opencast workings of suspected ancient origin were excavated. Finds included charcoal, antler, and stone hammers. Radiocarbon dating suggests a phase of intensive working for copper during the Early - Middle Bronze Age.

PRELIMINARY

In September 1986 a small excavation was carried out by the author to investigate an area of primitive style mine workings on Copa Hill, Cwmystwyth, in Dyfed (SN 816 756).

A small opencast and several overgrown tips associated with stone pebble hammers are to be found where the copper-rich Comet Lode outcrops on the brow of the hill at an altitude of 420 m. (1380 ft) OD. (Fig. 2). Copa Hill is part of a complex of 17th - 20th century lead mine workings which extends for almost 1200 m. along the north side of the Ystwyth Valley (Fig. 1).

BACKGROUND TO RESEARCH

Numerous references exist within the 18th and 19th century mining literature to discoveries of stone tools and other artefacts within old mineworkings in mid-Wales (Bick 1974-78). Francis (1874) was of the belief that such workings were generally for copper. The presence of stone artefacts in association with early mineworkings on Copa Hill was first recorded by Smythe in 1848. Later commentators were also of the opinion that the tools and workings there were early and that they 'belonged to a time when iron was quite or almost unknown' (Hunt 1884) or were 'probably of high antiquity' (Jones 1922).

In 1936 the British Association for the Advancement of Science set up a committee to investigate the evidence for early mining in Wales. Cwmystwyth, along with Nantyreira, Parys Mountain and the Great Orme, soon came to the attention of its secretary, Oliver Davies, and at all four sites small trenches were cut and the old tips examined.

At Cwmystwyth, three of the tips were partially sectioned and drawn but although numerous hammer stones were found in situ, 'practically no charcoal' was recorded (Davies 1947). Davies correctly distinguished between these stone hammers and the large mortar slabs or 'bucking stones', found elsewhere on Copa Hill and the Graig Fawr, which could it seemed be attributed to an historic period of working. Noting the absence of chalcopyrite within the tips Davies considered that the workings were for lead and in conclusion suggested a period of working 'approximately contemporary with the Roman Period and surviving after it'.

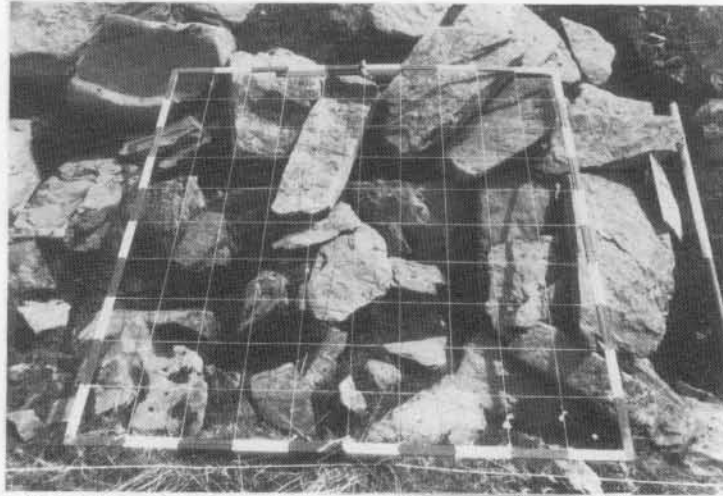
Current examination of early mine sites by Timberlake, Pickin and James is beginning to reveal a consistent pattern of association between copper mineralisation, small opencast workings and primitive stone tools. At least ten such sites have been identified in the mid-Wales area alone.

Of all the sites examined the opencast workings on Copa Hill appear to be one of those least affected by later mining activity and as such have proved an obvious choice for further investigation.

EXCAVATION WORK

The area surrounding the early workings has been surveyed in some detail (Fig. 3). The opencast is now a shallow partially-filled depression 45 m. long x 17 m. wide and probably backfilled at depth. On its southern edge, and for nearly a hundred yards downslope to the southwest, are turf covered tips now partly denuded by sheep grazing. These are composed of shattered waste rock, containing fragments of split and pounded river pebbles. These tips appear to be cut by two large gullies which extend down the length of the hillside and which are in turn cut by large hushing channels of probable 18th century date (Hughes 1981). Three additional 'channel systems' have been mapped out within the vicinity of the opencast. At present both the purpose and age of these are uncertain. Other features on site include the outlines of 3 or 4 pairs of rectangular stone structures to the south of the opencast and several later mineworkings such as a small opencast to the southwest and the Comet Level (A 19th century trial?)

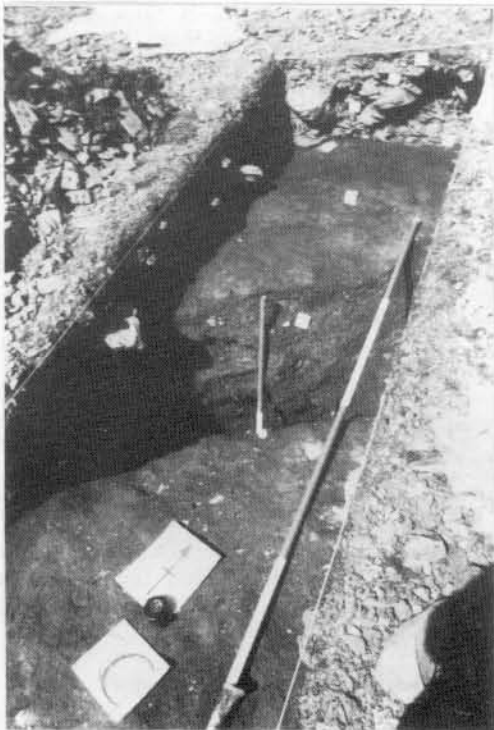
A 6 x 2 m. trench (Site A) that was cut to investigate the edge of one of the surveyed stone structures revealed a collapsed drystone wall foundation. Re-used within the wall was an ore-grinding mortar stone (Plate 1) somewhat different from the type of 'bucking stones' encountered elsewhere at Cwmystwyth and more akin to a saddlequern in appearance. A section through the



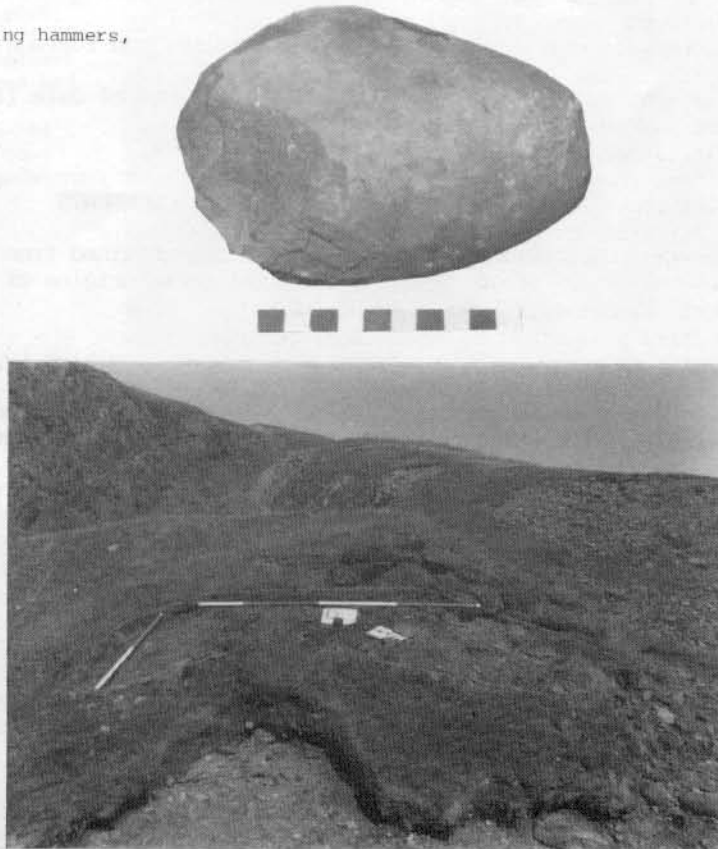
1. Ore-grinding mortar stone or saddle quern (top left) within collapsed wall (Site A).



2. Examples of unmodified stone pebble mining hammers, Copa Hill, Cwmystwyth. (1 cm scale)



3. Buried channel beneath tip (Site C).



4. Crest of central tip (Site D) before excavation commenced. Note thick layer of turf and opencast behind.

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adjacent channel revealed only a shallow peat-filled depression which defined no clear relationship with the structure.

The end of the SE tip was examined at Site C. Broken hammer stones but barely any charcoal were present and the base of the tip was encountered at half a metre. Dissecting the old land surface at this point was a buried channel up to 1 metre deep, filled with stream-washed dump material including hammer stones at its base (Plate 2). The upstream course of this would have taken it in the direction of the opencast. The channel, which appears to be artificial and connected in some way with the early mining activities, clearly pre-dates the deposition of the tip.

At Site D (Plate 3) a trench 12m. long x 1m. wide was cut through the Central Tip at its top end. The crest of the tip at this point is covered with a growth of turf up to 0.2m. thick. Within the tip the detailed stratigraphy is complicated on account of the lensing and slumping of layers and the presence of a thick transgressive iron-manganese pan. The succession of tipping appears to be from north to south. At the south end, a channel corresponding to the present gully dissects the tip and is filled with re-deposited dump material (1a). A steep eroded surface between layers 3 and 4 may represent a break in mining or dumping activity. The texture and composition of the dump material varied between coarse rock (2), sandy and burnt ash material (3) and clay-coated shale (4). Within these an alternation of coarser and finer layering probably indicates the production of sterile waste rock and primary beneficiation material.

All horizons within the tip carried varied but appreciable amounts of charcoal, mostly ash branchwood but also oak and hazel. A few badly decayed fragments of antler, one piece identified as red deer (*Cervus elephas*), were recovered from layer 4. Numerous hammer stones and flakes were recovered from the section (Plate 4). These were mostly un-modified pebble artefacts (Pl.2) although some appear to have been nicked on their sides for grasping or hafting and a few may have had a dual use as hand-held grinding stones. A great deal of discarded galena (lead ore) was observed within the section but only a very small amount of chalcopyrite.

Radiocarbon dates have been obtained from charcoal samples from three different horizons within the section. These were submitted for analysis at the Godwin Laboratories, University of Cambridge.

Layer	Sample	Lab.No.	Date	95% Probability *
DI/2	CH 86/60	Q-3078	3210 ± 50 BP	1590 - 1410 Cal BC
DI/3	CH 86/17	Q-3076	3220 ± 70 BP	1685 - 1370 Cal BC
DI/4	CH 86/46	Q-3077	2990 ± 190 BP	1685 - 810 Cal BC

* Calibration after Stuiver and Pearson. 1986 Radiocarbon 28.

The uncertainty and hence wider calibrated range of date from layer 4 has arisen on account of the small size of the sample submitted.

COMMENTS

Certainly the evidence of the above dates obtained from undisturbed and sealed context within the excavation would seem to confirm the prehistoric origins of these workings. It would appear that the field evidence also supports this view.

At Cwmystwyth the visible remains of the most primitive type of mining technology are restricted to the only easily workable outcrop of copper mineralisation in an otherwise lead mining locality - suggesting an exploitation of copper ores prior to an interest in lead and preceding the availability of wrought iron tools. This juxtaposition of field evidence makes Cwmystwyth a key site in the investigation of early mining in Britain.

Inevitably, more questions have been raised than answered by this work, not the least of which relates to the size of the tips (large by even 19th century standards), the apparently short period of exploitation, and the depth and nature of workings below the opencast.* Quite clearly many of these questions cannot be solved without recourse to further excavation. Nevertheless Copa Hill has currently provided the earliest date for copper mining in Britain.

In all probability it seems that at least one intensive phase of mining activity took place during the Early-Middle Bronze Age, during which time the most accessible part of the Comet Lode was worked for chalcopyrite and perhaps a little galena, by means of fire-setting, stone tools and possibly antler picks or wedges.

Evidence from local field walking suggests the most likely source of pebbles for hammerstones to be the floodplain of the Ystwyth Valley. Recent experimental work by Pickin and Timberlake (1988, in this volume) has shown that such pebbles, either hand-held or hafted on a rope, can effectively be used as mining hammers on a fire-set rockface. Their relative inefficiency, however, may clearly be demonstrated in the face of iron tools.

* Exploration of a 19th century level lower down on Copa Hill has now proved a connection with the backfilled opencast 27 to 30 m. below surface.

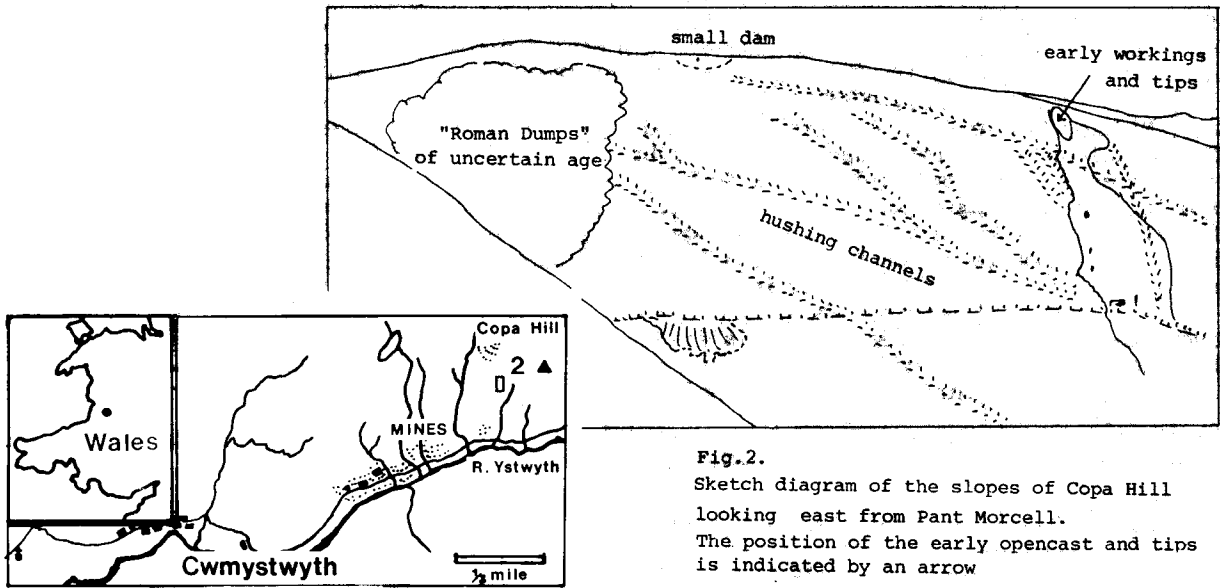


Fig. 1. Location Map.

Fig. 2. Sketch diagram of the slopes of Copa Hill looking east from Pant Morcell. The position of the early opencast and tips is indicated by an arrow

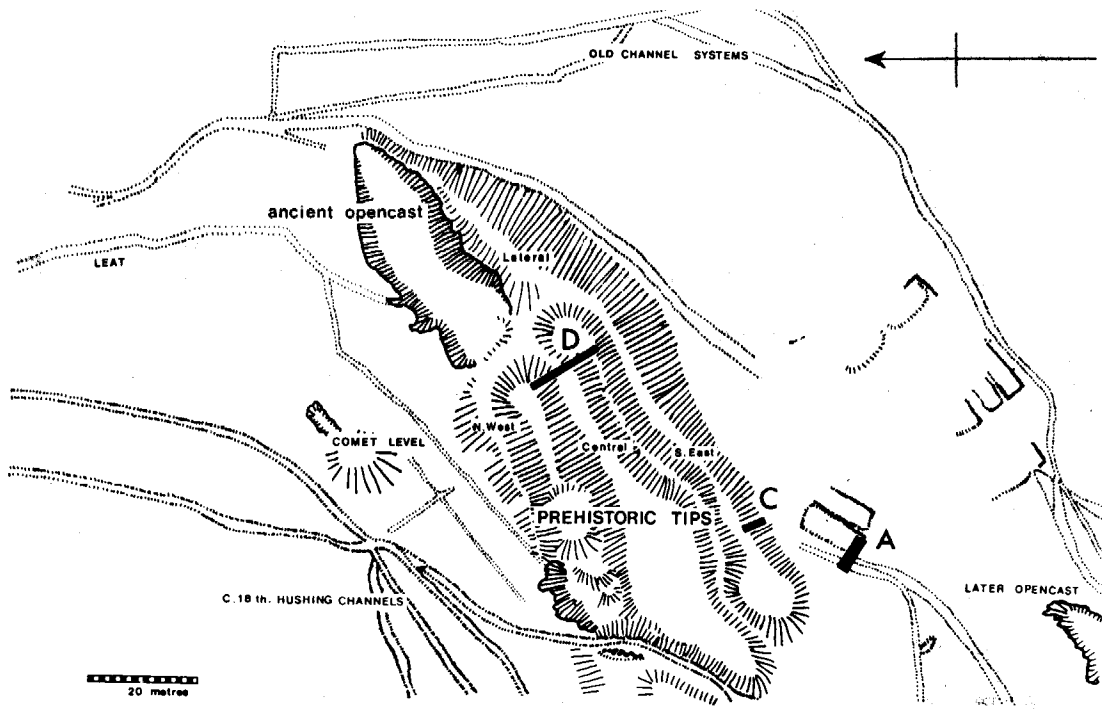


Fig. 3. Detailed site plan of prehistoric workings, Copa Hill.

D EAST SECTION

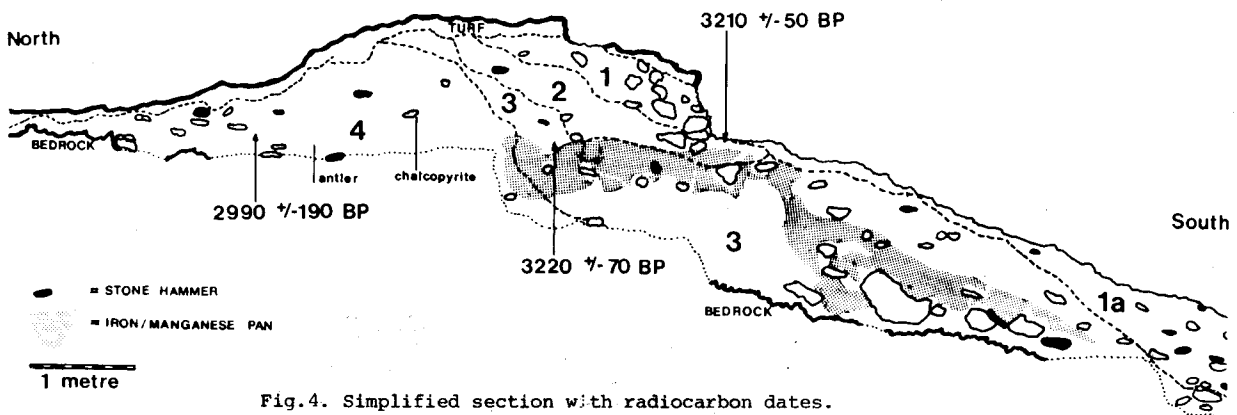


Fig. 4. Simplified section with radiocarbon dates.

Briggs (1983), in reference to the occurrence of similar stone tools at the primitive copper mines on Mount Gabriel, Co. Cork, considered that they were only used for ore-dressing and were probably of 19th century date. A Bronze Age/Chalcolithic context for such tools has however been accepted for a large number of European and near-Eastern mining sites including those of: the Mitterberg, Austria (Pittioni 1951); Chinflon, SW Spain (Rothenberg et al. 1980); Rudna Glava, Yugoslavia (Jovanovic 1980); Aibunar, Bulgaria (Cernych 1978); and Timna in Israel (Rothenberg 1972). An Early-Middle Bronze Age context can now be shown to exist for at least two other sites within the British Isles: Mt. Gabriel (Jackson 1967; O'Brien 1987) and the Great Orme, Llandudno (James 1986). Nevertheless, stone hammers do appear to have a totally utilitarian function, and may well have been used for ore dressing as much as for mining. Their usage is more likely to have been controlled by the limitations of available technology than by any recognisable cultural typology. It would therefore seem quite unwise to assume a Bronze Age date for such sites on the basis of these artefacts alone, without any other independent means of dating available.

Given the paucity of research in this field and the large amount of potential evidence that awaits the researcher, a clear case exists for a renewed marriage of interests between geologists, archaeologists, and mining historians, and a co-ordinated programme of fieldwork and research.

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