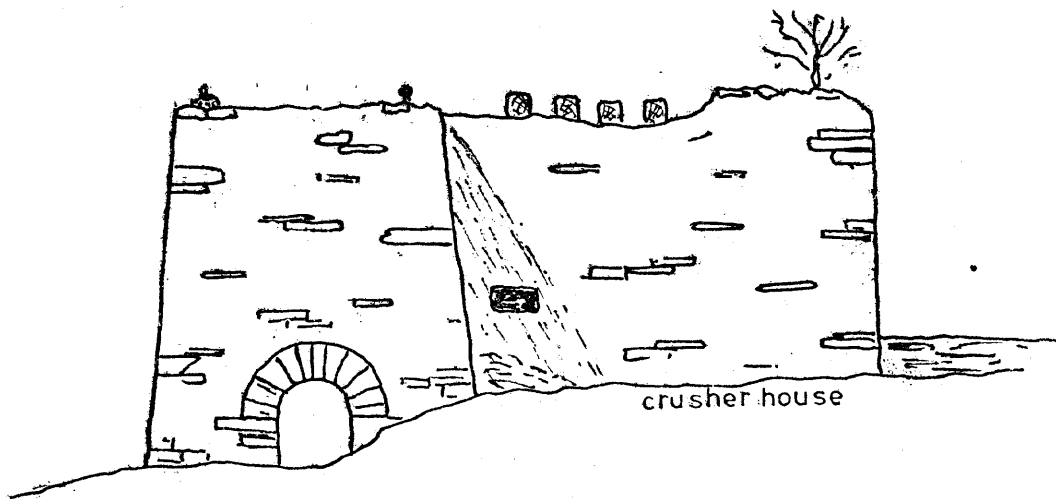

CWM ELAN MINE

J. B. GROUCOTT



SURFACE REMAINS 1976

————— A SURVEY —————

THE CWM ELAN MINE

INTRODUCTION

This essay is concerned with the surviving relics of the Cwm Elan lead and zinc mine, as found during field-work in the mine area. Because of the passage of nearly one hundred years, certain assumptions have had to be made, as to the use and purpose of the remaining features, by drawing parallels with known examples and their method of operation.

The mine site, GR SN 901.651, set in the small cwm of the Nant Methan, a side valley of the Elan Valley itself, is of the form of the classic amphitheatre, one indeed in which the drama of the Cwm Elan mine was played out in its several acts between 1796, when the presence of the lead-bearing lode is said to have been discovered, and the cessation of activity in 1877, when the New Cwm Elan Lead and Zinc Mining Company failed, never to be revived.

Since that time, the buildings, shaft, adits and watercourses have slowly succumbed to the march of time, but due perhaps to the inaccessibility of the site, surrounded on three sides by heights of up to nearly 500 metres, and on the other by the waters of the Garreg Ddu reservoir, have remained in better condition than those situated in less remote places.

While there can be seen plentiful, if ruinous, relics of the buildings, and the water-courses are easy to trace on the ground, there is little of the mine machinery still to be seen, apart from parts of the surface pumping machinery in the form of various lengths of round rod, and in the shaft itself, the top of the wooden pump-rod still stands with some metalwork still attached to its upper end.

It has been thought preferable to describe each feature separately, but reference to the plan of the site will indicate where each part fitted into the whole. The photographs will, it is hoped, supplement the ground plans in showing what the buildings and other features, look like today.

For those who may wish to see for themselves, it should be borne in mind that the area is part of an active agricultural holding, upon which it would be courteous to ask permission to enter. Also, in common with all mines and similar sites of industrial archaeological interest, it is not a place to use as a playground, in the presence of shafts, adits and old, insecure, buildings, presenting a potential danger if approached carelessly.

Further work remains to be done at the mine site, in respect of more detailed measurements of certain of the buildings and other features, and of the various pieces of metalwork still in evidence, and which are listed in Appendix F. Additionally, the underground workings would be a fruitful study if ever they became accessible. These notes therefore can only be regarded as a preliminary exercise, a basic framework upon which a more complete story of the Cwm Elan Lead Mine may be written.

The survey was carried out during the first few months of 1976, in weather conditions ranging from arctic, with the ground completely frozen and rock-hard, through rain and wind to several ideally warm and dry days, with the bleat of lambs and the sound of running water a constant accompaniment to a study of Industrial Archaeology which can seldom be carried out in such idyllic surroundings, far from the madding crowd and Dark Satanic Mill.

Much remains to be done at Cwm Elan and at other sites in the Mid-Wales area, before a complete picture can be painted, but I felt that it was essential to do something before it became too late; so often, it is a case of 'here today, gone tomorrow', with so many important sites being bulldozed into oblivion, to make way for 'improvements'.

My thanks are due firstly to Mr. Richard Davies, Henfrom Farm, without whose ready co-operation, it would have been impossible to carry out the survey at all, to Mr. J.S. Bishop, Area Land Agent, Elan Valley Estate, to whom I am indebted for providing much useful information, including a copy of the 1871 Cwm Elan Lead Mining Company's Prospectus of which part is reproduced in Appendices A and B; to members of the Mid Wales Geological Society and other friends who assisted in various ways, to Messrs. Setten and Durward Ltd., Llandrindod Wells for permission to use certain photocopying facilities, and last but not least to my wife, who, when not accompanying me to the mine, put up with my long absences and mud-covered return home. Errors of typing, fact and figure, are mine alone.

37 Trefonen Way,
Llandrindod Wells,
Powys

August 1976

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- NOTE (1) List of contents at back of report.
(2) METRIC dimensions use throughout.



CWM ELAN MINE

A general view from the north-east, with the slopes of Graig Ddu behind.

CWM ELAN MINE

THE BACKGROUND

In the British Isles, lead has been worked by quarrying and mining for over 2,000 years. Only during the past few decades, has the extractive side of the industry declined and ceased, due to the increased competition from Overseas. However, the processing of lead, its smelting, refining and the manufacture of lead products, using imported ores and metal continues, for example, at Avonmouth, Bristol.

In Wales, mining activity was spread over a wide area, and associated with it, smelting was carried on in certain areas, notably South Wales (Swansea), and in North Wales near Wrexham, and in Flintshire.

The most famous of the Mid Wales mines was of course the Van Mines near Llanidloes, but in Radnorshire and North Breconshire there are a number of places where mining was carried on, but on a less-ambitious scale. This activity is represented by mines near Rhayader in the Rhiwnant, Claerwen and Elan Valleys.

It is in the latter valley that the Cwm Elan mine is located, in the small side-valley of Nant Methan. This mine is said (see footnote) to have been discovered in 1796 while drain-cutting was in progress. There was sporadic working for many years, until in 1871 the Cwm Elan Lead Mining Co. was formed, but due to poor management and perhaps over-enthusiasm engendered by the glowing prospectus, this venture quickly failed having raised very little payable ore. The Company did however, install machinery, and raised buildings, the remains of which can still be seen, and are the subject of this present study. After the Cwm Elan Lead Mining Co., the New Cwm Elan Lead Mining Co., took over, in 1875, but this too, failed, so by 1877 all activity of the mine ceased.

The future of the mine was decided for ever, when at the turn of the century, the present reservoir system was completed and all further mining activity precluded because of the risk of pollution from lead.

Note: The Cwm Elan House leat (see later) crosses the site - was this the 'drain' referred to?

CHRONOLOGY

- 1796 The presence of lead is discovered. Mr. Thomas Grove*** worked the mine, with a profit of £500 before trouble with water in the workings forced him to give it up to Sir Thomas Bonsall, who leased the mine and cut the drainage level.
- 1808 Sir Thomas Bonsall died. A Cornish company took over the mine, but mine fell idle after some years, quoted as being 'for thirty years', from ??
- 1830 - c.1871 Mine unworked.
- 1871 The Cwm Elan Lead Mining Company formed, and the mine machinery installed, together with the buildings the remains of which can still be seen.
- 1872 The Shallow and deep adits, and the 10 fm. level, were all at work.
- 1873 The mill (i.e., the crushing mill) was started, with the Engine Shaft at the 20 fm. level.
- 1874 Severe drought which stopped all work during the summer.
- 1875 The New Cwm Elan Lead Mining Company formed.
- 1877 All work ceased, with the shaft at the 40 fm. level.
- 1896 - 1904 Elan Valley reservoir system constructed.

It was during the 1871 - 1877 period, that most of the lead ore and zinc blende, were raised. 175 tons of lead, and 160 tons of blende, are recorded from that time.

*** Grove was related to Shelley, who courted ardently but unsuccessfully Grove's daughter Elizabeth, his cousin! So far as is known, none of Shelley's works refer to the mine.

LLYNOEDD CERRIGLLWYDION

ISAF

UCHAF

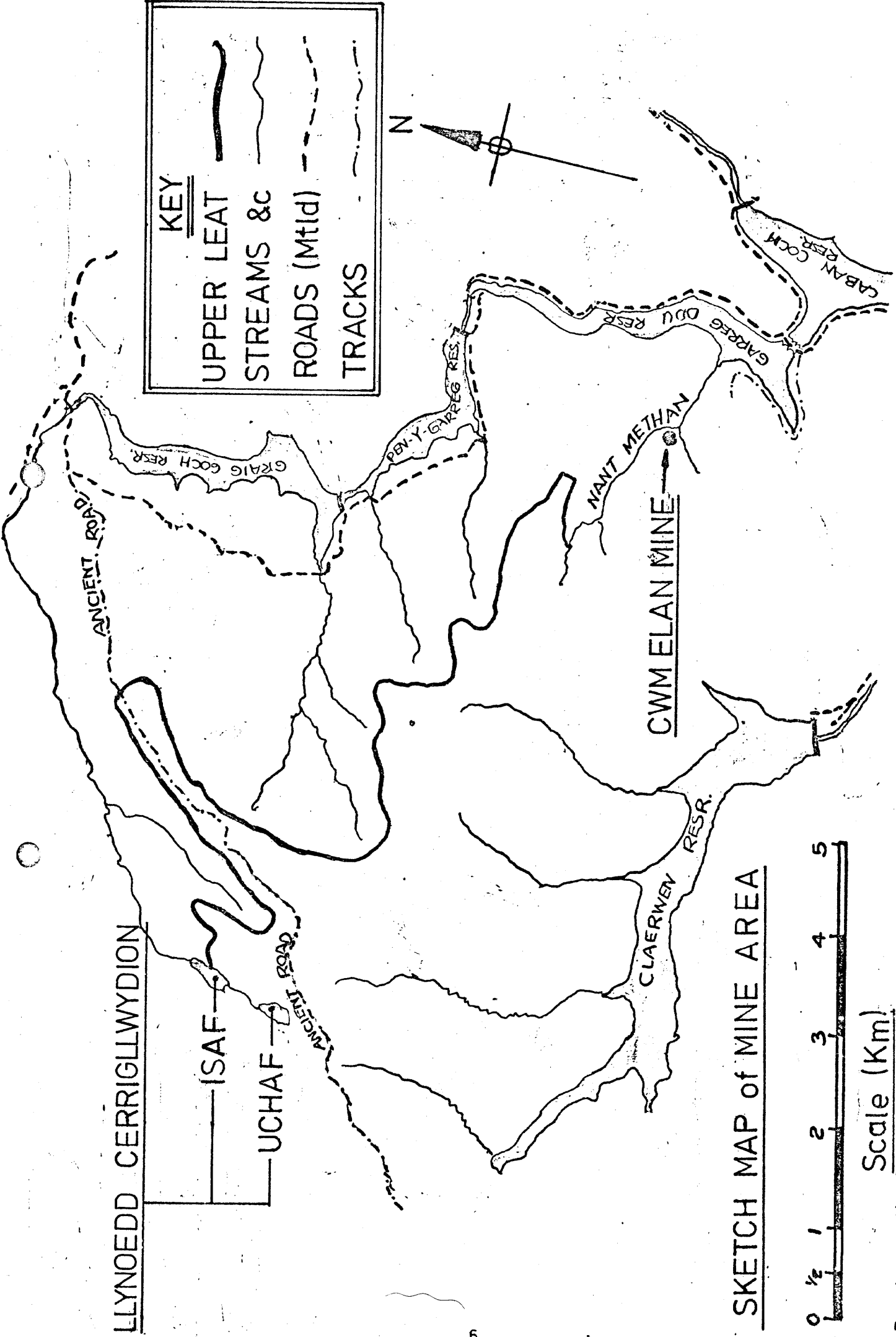
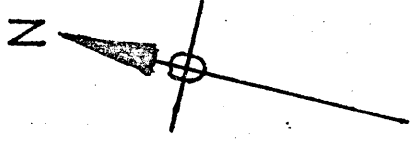
KEY

UPPER LEAT ———

STREAMS & C ———

ROADS (Mtd) - - -

TRACKS - - -



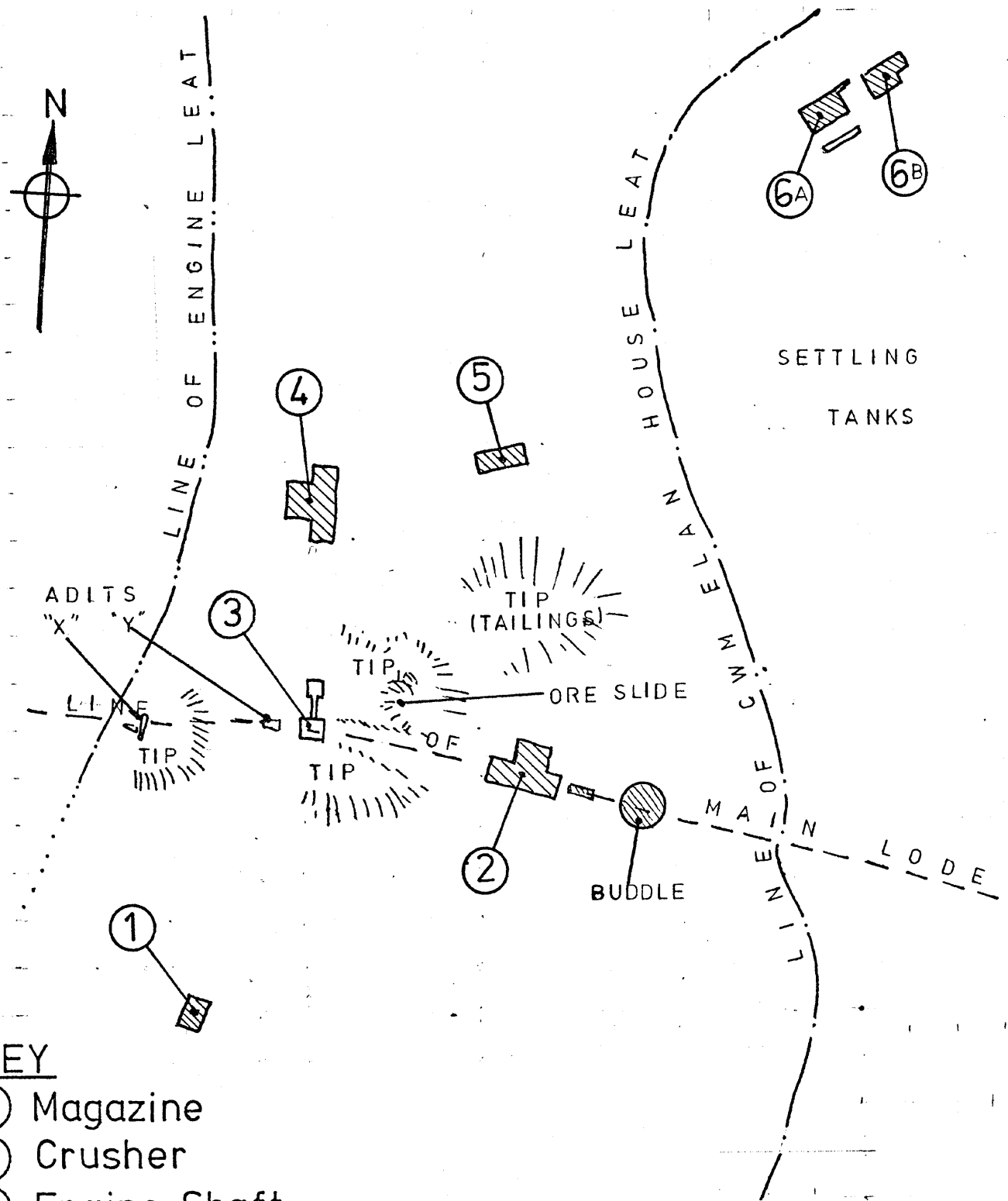
SKETCH MAP of MINE AREA



Scale (Km)

Based upon the Ordnance Survey Map with the sanction of the Controller of Her Majesty's Stationery Office, Crown copyright reserved. Printed by J.B. Groucott, 37 Trefonen Way, Llandrindod Wells.

PLAN OF MINE SITE SHOWING BUILDINGS & MAJOR SURFACE FEATURES



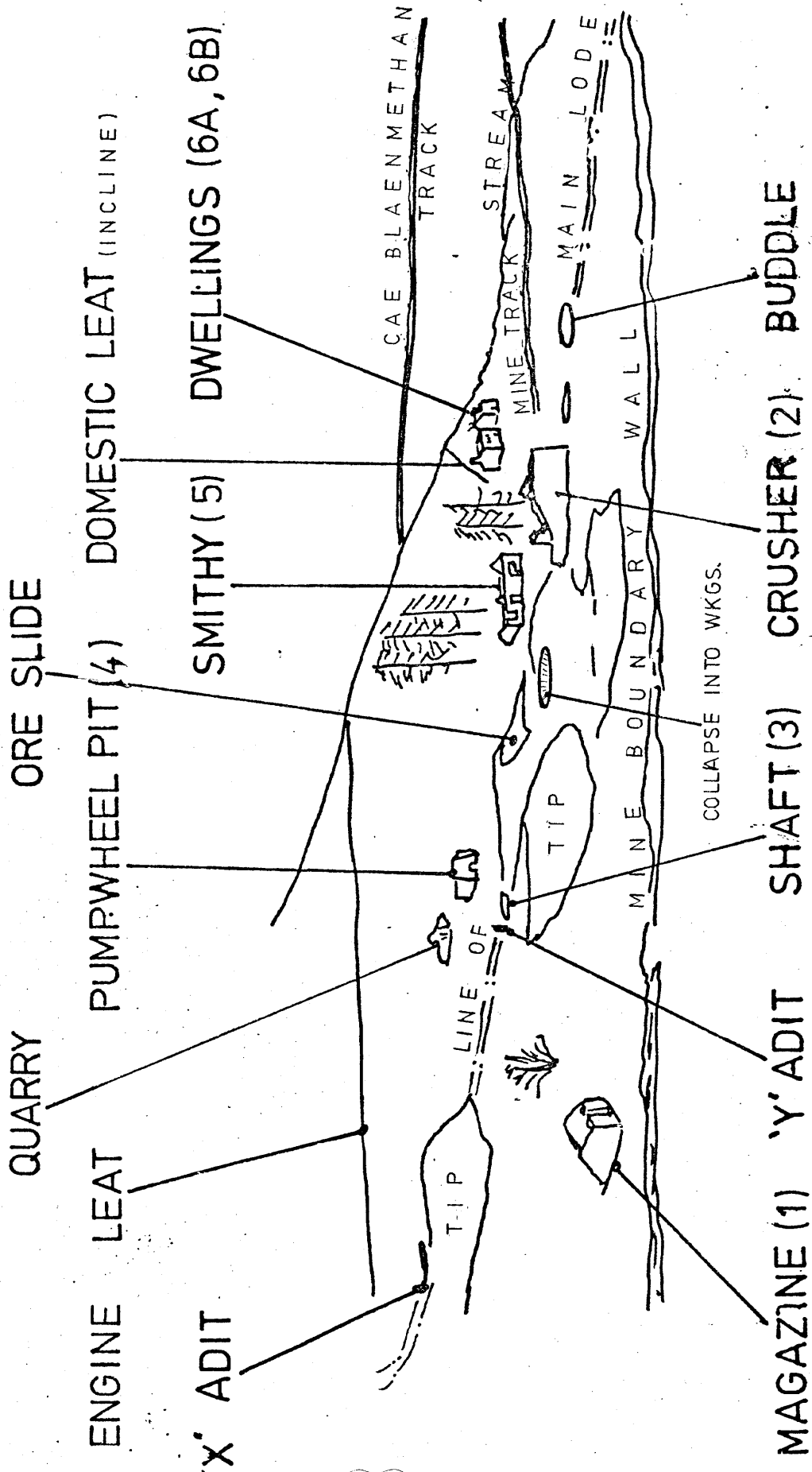
KEY

- ① Magazine
- ② Crusher
- ③ Engine Shaft
- ④ Pump Wheelpit
- ⑤ Smithy
- ⑥A ⑥B Dwellings

0 10 20 30 40 50 100

scale

(about 1:1250)



DIAGRAMMATIC SKETCH OF THE MINE SHOWING
DISPOSITION OF THE MAJOR FEATURES.

(VIEW LOOKING TO NORTH)
 (FIGURES REFER TO NUMBERED ITEMS IN TEXT)

THE MINE TODAY

This short section outlines briefly the main existing features to be seen at the mine today, with suggestions as to their origin. The buildings and certain other items, are more fully described in later pages.

The several buildings are, with one exception, roofless shells. The dwelling (6B) is probably nothing to do with the mine proper, being one of several similar houses erected by the Birmingham Corporation Waterworks at the turn of the present century to house some of its staff: it is not therefore described here in detail.

The Magazine (1) is a type of building found in one form or another at most mines, for the safe storage of explosives. The Cwm Elan building is a small, squarish building, set apart from the remainder of the work, and well-constructed of random dry stone.

The Waterwheel Pit (2) once contained the wheel driving the crushing machinery in the conjoined Crusher House. The whole of this is once again of stout random drystone construction, a feature of which is a well-turned tailrace arch. Within the crusher house portion of the structure, there are four stout wooden beams, now thrown down, which would have carried the crushing machine itself. Also within this building, is a short iron shaft, possibly part of the machinery.

Another wheelpit (4), slightly above the Crusher House, was once the location of the waterwheel operating the water-pumping gear, the rod of which still stands in the Engine Shaft nearby, with certain rods still attached to its upper end. At the side of the pump wheel pit, are the stout walls of what may have been the winding drum, for it is known that it was the practice to drive the shaft winding gear and drum off the pumping wheel shaft, with some sort of clutch to engage and disengage the drive. Such an arrangement, with intermittent winding, would not have greatly interfered with the pumping which may have been carried on more or less continuously while the mine was in work. Along the top of the pumpwheel pit, are various holding-down bolts, with remains of timbers baulks. At the back of the pit, are more rods and the site of the balance-bob pit. Within the 'winding drum annexe' is an iron shaft, possibly the wheelshaft.

Slightly below, set on a platform cut into the hillside, is the Smithy (5), again of substantial dry-stone construction.

The ruined dwelling at the bottom of the buildings area (6A) is again of substantial drystone construction, and may have been the

mine "Captain's" house. It is more than just another house, having fireplaces in each end wall, on both floors. The second dwelling (6B) is not contemporary with the mine, as has been indicated above, but it appears to have been uninhabited for many years - not very surprising in the view of its remoteness!

Of the mine-workings 'proper', the Engine Shaft (3) still has, as has been noted, the pumprod still standing in it. Evidence in the form of mortices in the wooden shaft collar, may indicate the former existence of a headframe or shears connected with the winding-gear. The shaft is blocked by fallen debris at a depth of some 15 metres.

From the shaft downwards to the Nant Methan stream, the lead lode appears to have been worked opencut, certainly prior to the 1871-77 period of activity, as the tips and crusher house of this period, are superimposed upon it. Immediately behind the Engine Shaft, is a shallow adit. (Adit 'Y'). Adit 'X' is driven some 20 metres into the hillside, and has a deep cut immediately before it. This adit can be entered with care, having regard to the presence of the deep cut at its entrance.

Elsewhere on the site, can be seen evidence of other surface workings or trials, with associated tips.

The end of the main drainage adit, possibly cut during the period of operation by Sir Thomas Bonsall, can be found below the crusher, on the lode at the edge of the Nant Methan stream. In wet weather, a stream of water can be seen welling up to flow into the main stream. Curious growths of moss on material in the bed of the outflow can be seen.

The various tips about the area, are: near the Engine Shaft, development rock; adjacent to the Crusher House, tailings, while before the 'X' Adit, further development rock is to be seen, though small in size. Along the Nant Methan stream are other tips, which may be relics of the earlier period of mining activity. Lower down still, both above and below the Bottom Ford, are other tips from the drainage level, and what looks like another surface working, or attempt at one. Above the Magazine, is another very small tip, possibly the result of a trial in that area, on the line of another lode thought to exist.

A small quarry above the Engine Shaft, may have been that worked for building stone for the mine buildings.

There are four watercourses or leats traceable in the mine area, but one of these may be unconnected with the mine. It may have been cut prior to the 1871-77 period, as its course across the mine site, is in part obliterated by the tips. This leat, well-marked elsewhere, may have been connected with the water-supply arrangements for Cwm Elan House, now submerged (the poet Shelley is reputed to have stayed there).

Of the leats connected with the mine, the longer of the three, the main or Upper Leat from Llyn Cerrigllwydion Isaf, meanders for 15 km. across the upland moors, debouching eventually in the upper waters of Nant Methan. It is tentatively assumed to have been cut in the 1871-77 period, when the machinery was installed requiring quantities of water not available from Nant Methan's flow alone. Possibly its most

notable engineering feature, is the shallow cutting across the ridge of Moelfryn. Elsewhere, the leat is but a barely-discernable ditch cut along the contour. It is marked 'Old Water Course' on the 1:25,000 map. It is known that a favourite gradient for this type of leat, was 1 in 720, but the gradient for the Cwm Elan example, is not known. In any case, it must have been a problem keeping it open, during winter or at other times from deceased sheep! Nevertheless, it is a major feat, comparable with the better-known examples such as that at Llwyernog. Its water, flowing down the Nant Methan stream, may have collected behind a small clay and rock dam, for which there is some evidence at the point of junction of the Engine Leat.

The Engine Leat, carried on along the contour, above the mine site to supply the pump and crusher wheels, the former via a wooden launder, from what can be seen today on the site. It is not known how the water passed from one point to another at the mine itself, but possibly by wooden launder as was practice at other mines. This leat would have not only served the needs of both wheels, but possibly that of the ore-treatment plant as well. In the absence of this plant, it is not possible to tell this now.

Below the Engine Leat, is what may be termed the 'Domestic' leat, which seems to have supplied the needs of the 'Captain's' house, as well as the later dwelling, as there is a modern galvanised tank behind them.

Even further down, is the remaining evidence of the Cwm Elan House leat. It is a well-marked feature traceable from the mine site to its termination in a field near Henfron Farm, and possibly associated with it, is a brick-lined tank below its lower end.

Of the various pieces of iron work found at the site, they are in the main, relics of the pumping apparatus, and are thought to be of wrought iron, from the lack of corrosion present. This materials' resistance to the onslaught of the sledgehammer, may account for its survival in the almost total absence of cast-iron on the site. Cast iron would have been used in the make-up of the crushing plant.

Several lengths of iron bridge-rail of light section, and two pairs of wheels on axles, suggest the former existence of a mine tramway system. In view of the limited extent of mining activity, and bearing in mind the area of the mine itself, such a system would have been of limited extent. It cannot be known at the moment if there was an underground system. In the absence of other evidence, we must assume that the rails and wheels are of the 1871 - 77 period. The second of the two wheel-sets discovered, possibly both from the same vehicle, appear to have been adapted for horse or pony haulage with traces.

Timberwork, being perishable and certainly useable, is little in evidence. Only the pumprod itself, the four beams in the crusher-house, and a few short baulks elsewhere, can still be seen.

Below the line of the Cwm Elan House leat, is a series of rectangular banked hollows in the ground, containing fine material suggestive of a washing process. These may be the remains of the ore-processing system of the earlier period of activity; it is possible that water from the Cwm Elan House leat may have been utilised to serve them; the leat itself crosses the site immediately above these features, and it possible to see a conceivable downward flow-line through the series of tanks, finally discharging into the Nant Methan stream, immediately west of the mine boundary wall.

Elsewhere are other relics of the ore processing plant; at the rear of the crusher house, and at a higher level, are the remains of two ore slides, into which the raised ore would be tipped prior to dressing, before being crushed. It may be that the broken ore-bearing rock was then taken by hand barrow or tram waggon, across a gantry to the crushing rolls. The dressing floor below the ore slides, is about on a level with the one-time crusher, and although there is now little evidence of a connecting bridge or gantry, this is the most likely conjecture.

In front of the crusher house, the major feature is the remains of a circular buddle, about 6m. in diameter. The area of the buddle is now filled in, but a trial excavation from centre to perimeter, brought to light the original wooden floor, about 30cm below present ground level. In the sector excavated, were what appeared to be the last remains of the final ore processed. The wood appeared in good condition, considered one hundred years' disuse and burial. Perhaps the short period of activity may account for this. It looks as though water from the crusher waterwheel, was carried in a wooden launder, the trestle posts of which may still be seen, sawn off about 50cm above ground. It looks as though the perimeter of the buddle, was formed of flat stones, set on edge.

Between the crusher house and the buddle, is a rectangular hollow, with parts of a wooden frame, and long bolts projecting therefrom; this might have been the site of a small waterwheel, supplied by the tailrace from the crusher wheel, and used to drive the buddle sweeps. Excavation here may reveal more as to the true purpose of this feature.

To one side of this area, are rectangular 'floors', purpose at the moment unknown, but which may have been the sites of other parts of the ore-processing plant, perhaps the 'jiggers'. All traces of these have gone, so it is not possible to do otherwise than guess at their origin. There are tips of fine material adjacent, which may have been deposited from the supposed jiggers. They are likely to have been of wooden construction.

The carriage of ore from, and the bringing of materials to the mine, seems likely to have been along the track from the ford just below the dwellings, crossing the Nant Methan brook, before rising to join the old Cae Blaenmethan track on the north slope of the valley. This track, a well engineered feature in itself, ascends the valley, crosses a stout masonry bridge over the Nant Methan stream, then zig-zags to gain height above the mine site, before disappearing among the moors. Lower down the cwm, it passes across the rear of the old Cwm Elan house site, before dipping beneath the waters of Garreg Ddu reservoir; it must have crossed Afon Elan and then risen to the other side of the valley, to gain access to the main route to Rhayader.

Also on the north side of the stream, and in the mine area, are some indications of further searches for ore, along the line of the main lode. There are also signs of a short leat, but the purpose of this cannot be deduced at the moment. Further exploration may bring to light more evidence of what went on in this area.

The general impression gained from a study of the mine site, is that certainly during the last period of activity was, in this rather remote place, unlikely to have been very profitable, with a long haul to the railway at Rhayader, at a time when the price of lead was in any case falling. The limited extent of the rock and other tips suggest also, a limited output. One is very tempted to conclude that this mine, in the end, may have been carried on solely as a 'share - pushing' exercise, such as is known to have happened at other mines in the Principality.

Whatever may be the origins of the mine, the survival of so much on the site, in such an excellent state of preservation, must be attributed to the remoteness of the mine, coupled with the fact that since the turn of the century, the waters of Garreg Ddu Reservoir have effectively 'sealed off' the area, making access except on foot, difficult.

The condition of the mine remains, and the compactness of the site, are commended as being worthy of some attempt at conservation, preservation, and possibly some sort of restoration, such as is being carried out at the Bryntail Mine, Llanidloes. Certainly, it is more complete than any other site in the mid-Powys area.

It is to be hoped that if a small museum at Rhayader comes to fruition, some of the artefacts from the mine, may find a permanent home therein.



ORE - SLIDE & DRESSING FLOOR

Pump wheelpit at top right.



REMAINS OF CIRCULAR BUDDLE

Centrepost stump & sawn-off launder trestle visible.

NOTES ON MACHINERY

G.W. Hall, in his book 'Metal Mines of Southern Wales,' notes that the machinery for the mine was supplied by the Railway Foundry, Llanidloes.

This firm, still in being as John Mills & Co. (Llanidloes) Ltd., Railway Foundry, is known to have supplied ironwork of various sorts throughout the Mid-Wales area; for instance, there survives at Brynwynn, near Newbridge-on-wye, a three-span lattice bridge, on cast-iron columns, crossing the Wye. This was erected in 1885. At Knighton, the railings and a lamp post over the stream at the foot of Broad Street, bears the legend 'W. Thomas Llanidloes', unfortunately undated. There may be other survivals. The firm now produces hydraulic presses.

Unfortunately, the firm has now no record of any machinery supplied to Cwm Elan - one hundred years is a long time for records of this sort to survive. There is no evidence on site, of the origin of the existing remains, but it would have been quite feasible to manufacture the machinery at Llanidloes, and transport it to a railhead at Rhayader (the Mid Wales Railway opened in the 1860's). Thence by horse-drawn cart or waggon up the Elan Valley, a distance of some six miles to the mine. Most machinery of that period was made in small, fairly easily transportable pieces - even the waterwheel rims of cast iron were often within the capabilities of two strong men's lifting by hand, being made in segments.

Hall states that one of the Cwm Elan waterwheels was '34 feet diameter by 4 feet breast'. This fits in very well with the dimensions of both waterwheel pits, and was about an average size of wheel of that time.

The Llwyernog Mining Museum at Ponterwyd, has examples of the sort of machinery and equipment to be found at lead mines in Wales - those at Cwm Elan would not have differed significantly, it may be supposed. A visit to this museum, will give a very good idea of the sort of thing likely to have existed formerly at Cwm Elan.

It is thought unlikely that any smelting was carried out at the mine itself, there being 3 possible reasons for this (1) lack of suitable fuel, coupled with distance from railhead, (2) small output from the mine, and (3) lack of evidence on site today, of any smelting activity. This latter seems to offer the most conclusive evidence of all. A lead pig bearing the legend 'CWM ELAN LEAD AND ZINC MINING COMPANY LIMITED' would be a find indeed!!

The various metal remains illustrated, are, apart from the tram wheels and rails, likely to have remained where they are now, since the destruction of the machinery at some presently unknown date. The reason for the survival of these remains, has been commented on elsewhere.

MINE

The underground workings are, at the present time, completely inaccessible, with the drainage level and Engine Shaft having collapsed. The only known plan, that accompanying the 1871 Prospectus, shows only the extent of the mine at that time; but by 1877, the Engine Shaft was down to 40 fathoms (one fathom = six feet or nearly two metres), but nothing is known of the system of galleries or headings down to that level.

From what is known from other mine works, it is reasonable to suppose that Cwm Elan would have been worked in the customary manner, that is, by driving headings from the shaft at different levels, along the line of the lode, and stoping the ore from these headings. Ore would then be taken to the shaft, and raised to the surface. How this was done at Cwm Elan, we can only guess; the existence of the rails at the surface, together with the two pairs of wheels, may not necessarily imply an underground rail haulage system. Equally, we do not know how the ore was raised to the surface; larger mines used the cage as in colliery practice, with tubs wheeled on and off, but the use of the kibble was general in metal mines. (The kibble is a stout iron bucket, shaped so as to prevent it becoming stuck in an irregularly-cut shaft). Further research may shed light on this and other questions.

It may be assumed fairly certainly that the issue of the stream of water from the end of the old drainage level, even though this collapsed as has been mentioned above, indicates that the old levels are completely drowned out up to the drainage level.

& MINERS

Of the men who worked the mine, we know nothing - who they were, where they came from, their numbers; the greatest period of activity took place between the two census years of 1871 and 1881. In view of the scale of activity, the workforce could never have been very great, and if it can be supposed that the room adjoining the smithy was used as a barrack, then this might accommodate around a dozen or so, quite in accord with the standards of the time. It is not likely that any would be lodged in the 'Captain's' house (dwelling 6A).

It is possible that sufficient labour was forthcoming from nearby, certainly there are a number of now-ruinous dwellings within easy reach, whilst Rhayader and Cwmdeuddwr are neither an impossible distance away, bearing in mind the distances walked each day to work, during those times. The practice of trudging off to work on a Monday morning, bearing on the back, in a sack, the week's food supply, is well known. Some further research here, may shed some light here too. Whatever happened, the enterprise could not have been a provider of stable employment, what with the varying fortunes noted elsewhere!

We must suppose also, that the miners had to climb up and down the shaft on ladders, unless they had the blessing of some form of man-riding in the shaft, apart from a perilous clinging ride, hanging on the winding rope. Here again, there is a lack of any sort of evidence.

MAGAZINE

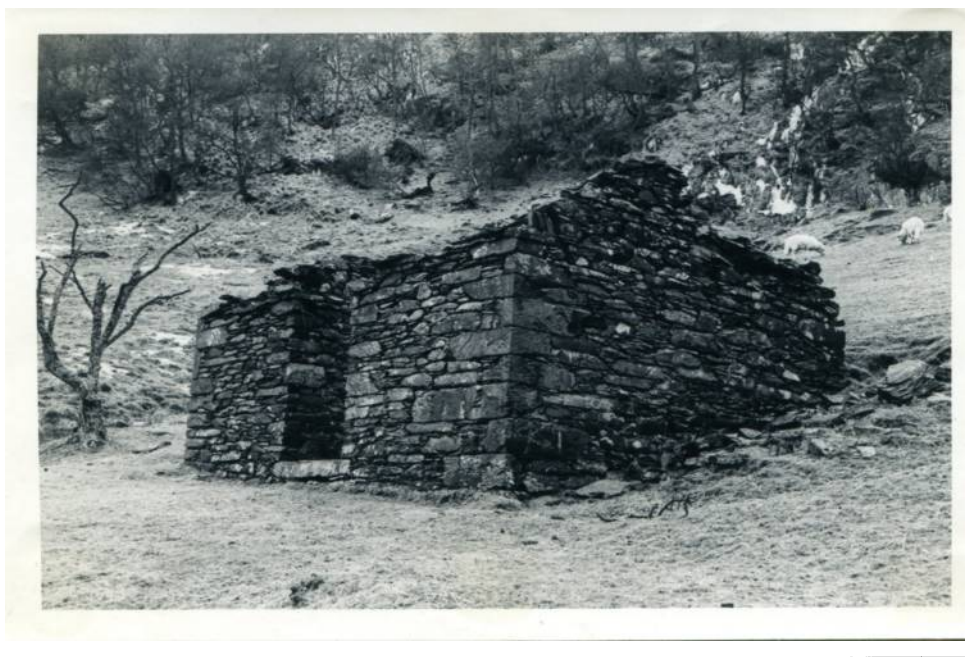
(BLDG. I)

The building most probably the Magazine, is of dry-stone construction, strongly-built, and once having, from evidence on site, a slated roof with fired-clay ridge tiles. It is set back into the hillside, and is remote from the remaining buildings of the mine - a common practice to ensure some degree of safety in the event of an accidental explosion. The front corners of the walls, are strongly quoined, and the whole is very well built. There is evidence of internal plastering, but none of an internal lining of wood, such as is reported elsewhere, and was a precaution against chance sparks igniting the contents.

There is no window opening, which strengthens the theory of the building having been in fact, the magazine. There is now no other building on site which would have obviously performed this function, so we may safely assume that this was in fact, the said magazine or explosives store. This type of building generally has a roof designed to give way easily, so to deflect any explosion harmlessly upwards, apart from the ensuing rain of tiles!

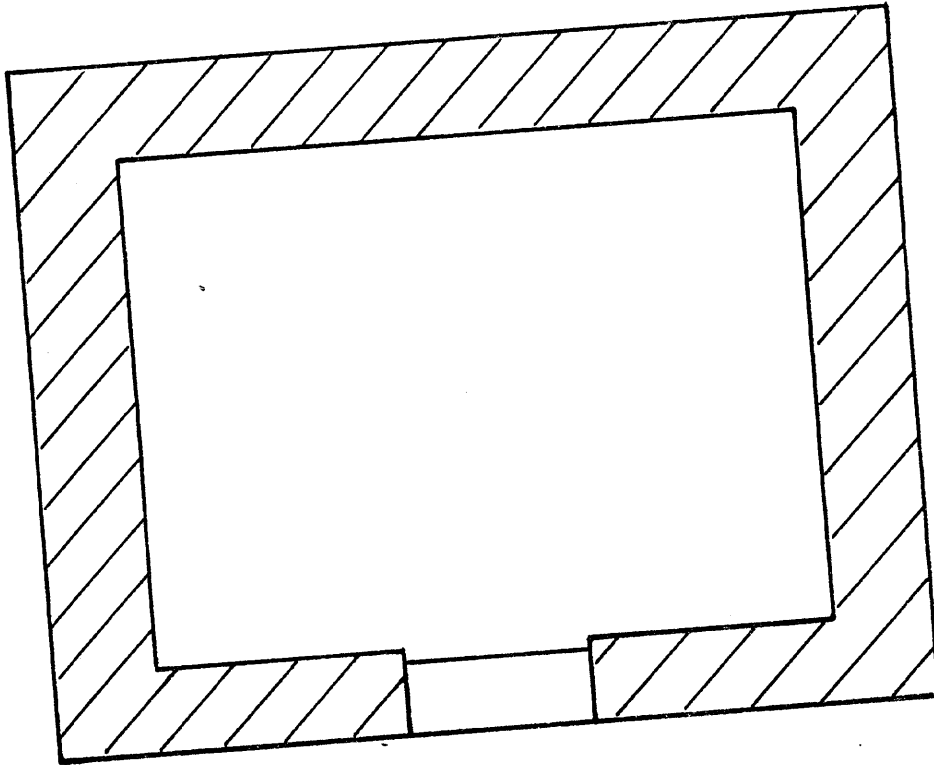
We have here the remains of a well-built structure, most probably contemporary with the 1871 - 1877 activity, and certainly with the Smithy, which has similar slates and ridge tiles in evidence.

It is approached by a track, along from the Engine Shaft, with which it is approximately on a level.

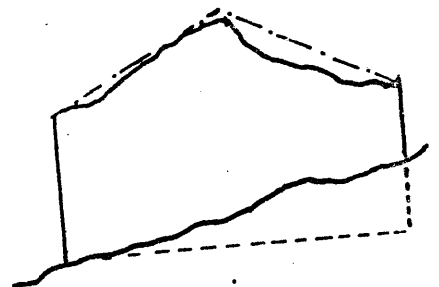
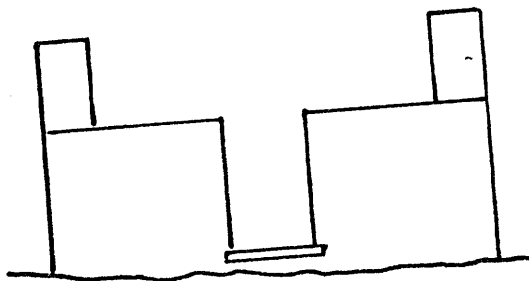


MAGAZINE

(BLDG. I)



PLAN



ELEVATIONS

JBG © 2/76

CRUSHER HOUSE (2)

The Crusher House and its associated wheelpit, are, in common with other mine buildings, of good random drystone construction. The general appearance is very similar to the Pumpwheel pit.

Rectangular in plan, the two walls of the crusher house proper are set at right angles to the wheelpit. Within the crusher house are four heavy wooden beams, about 0.3 metre square, 8 metres or so long; they now rest with one end on the north wall of the crusher house, the other on the one-time floor. It is entirely likely that they once bore the crushing machine itself, and their present position is due their being pulled down, the better to break-up the machine. A short but heavy metal shaft may be the only existing part of this now in existence - its survival being due to its weight and indestructibility, being probably of wrought iron with only the double crank at its end being of cast iron. On the beams and on the wheelpit walls, are holding-down bolts of various lengths; along the tops of the wheelpit walls, are the decayed remains of the bearing beams. There are three or four square cast-iron pads, probably used as load-spreaders under the holding-down bolts at various points.

The wheelpit walls are battered within and without, at an angle of about 5° , in a similar manner to those of the Pumpwheel pit. The tailrace arch of the pit, is an exceedingly well-built feature, and remains in sound condition to this day.

The waterwheel itself, has been entirely removed.

The rear end of the wheelpit, is much broken down, in a manner similar to the Pumpwheel pit, and possibly for the same reason, namely, to give access to the waterwheel for its breaking-up for scrap.

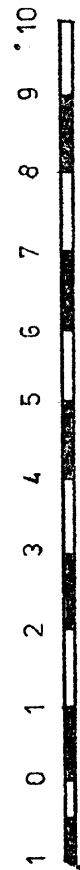
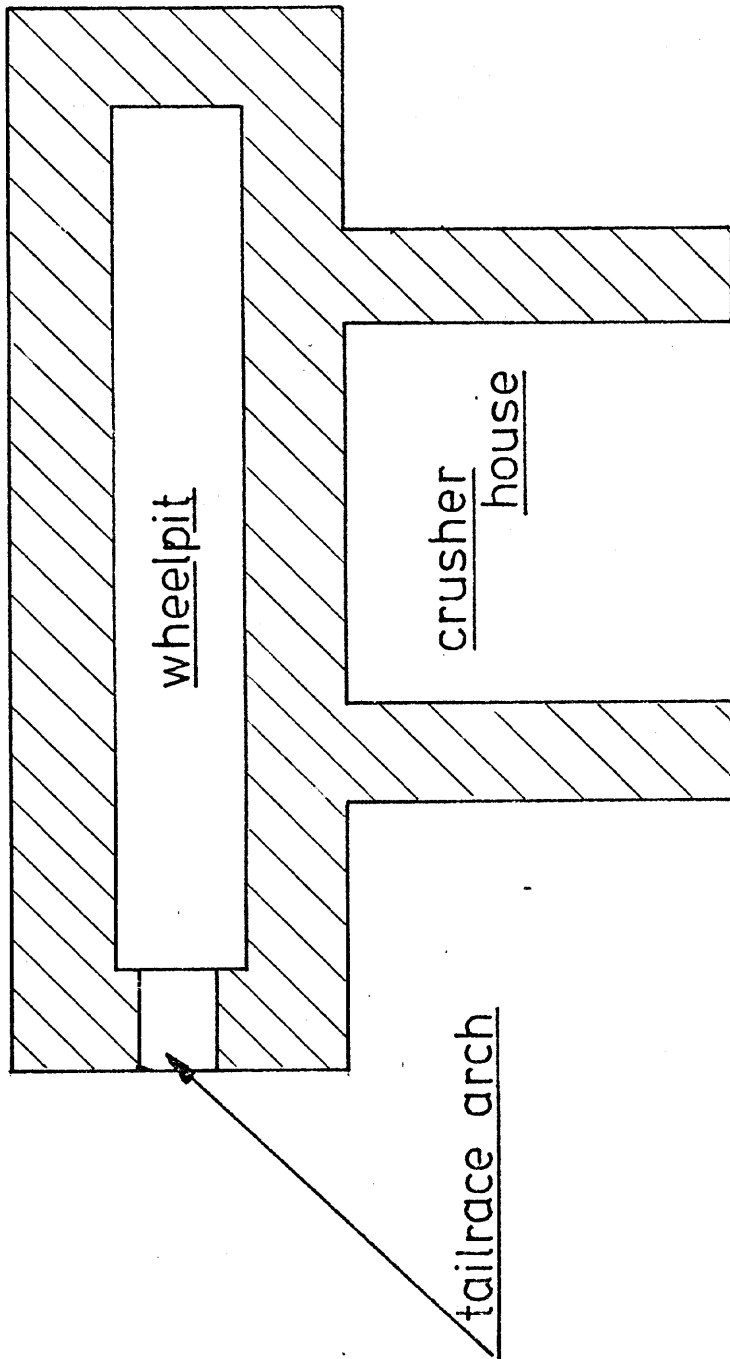
The water supply may have been brought by wooden launder direct from the Engine Leat, but is more likely to have been directed from the Pumpwheel, in view of the limited amount of water apparently available. After use for driving the crusher, it seems as though the water was again used to supply the ore-washing apparatus, once located below the building; from what can be seen today, a line of cut-off wooden posts, this seems more than likely. After that, waste water looks to have flowed as it might, back into the Nant Methan stream, there now being no obvious channel.

Dressed ore is likely to have been wheeled, either in barrows or in tram waggon, across a (now non-existent) gantry from the floors at the back of the building, where an ore-slide is located. A ramp from the area below the crushing rolls, would have enabled the crushed ore to be taken for further processing including washing in the one circular buddle; the precise arrangements cannot now be deduced.

As elsewhere at the mine, the building's excellent state, after nearly one hundred years' disuse, is a tribute to the masons who built so well a lasting structure which alas saw little use. Let it be hoped that it may remain long a monument to their care and skill.

CRUSHER HOUSE (2) & WHEELPIT

GROUND PLAN



scale



CRUSHER HOUSE & WATERWHEEL PIT

View from dressing floor. Wooden bearing beams in crusher-house.



SMITHY

Hearth and flue visible in right-hand portion; store / barrack to left.

SHAFT (3) & ADITS

The main or Engine Shaft is the only known shaft at the mine, but there are several adits, two of which are accessible.

The extent of the underground workings is unknown at present; the only plan of these presently known, is that from the 1871 Prospectus (see appendix 'B'), which shows among other items, a plan and section of the mine at that time. The workings then are said to have derelict for 'about thirty years'. Because of the collapse of all entrances to the workings, it may never be possible to explore them, in view of the likely flooding at least to the level of the drainage adit.

The Engine Shaft now to be seen, has the remains of a wooden shaft collar still in place on three sides; on the remaining side, it has gone entirely, with the shaft at that side caved in and the debris fallen within and blocking the shaft. The shaft is only lined on one side, to a depth of about 3 metres - otherwise, it is cut down unlined, so far as can be seen today. It appears to have been driven on the main lode. Within the shaft, stands the pump rod, with part of the angle bob tie-rods still attached to its upper end, which carries a substantial iron casting forming the swivel or pivot. It is very possible that the pit work still remains in the shaft, this being a feature noted in similar circumstances elsewhere. Most probably, the water would only have been lifted as far as the Drainage Level, then being allowed to run by gravity to discharge into the Nant Methan stream. The flow can still be seen in wet weather, welling up from a fissure at the conjectural end of the Drainage Level, now collapsed.

At the back of the shaft mouth, there is a shallow cut or adit (Adit 'Y') which is very small in extent, and cut apparently on the main lode. Farther up the mine site, almost in the rocks of Craig Ddu, is a larger adit (adit 'X') which is again cut on the main lode, and going in some 20 or more metres, with a branch along a crosscut, about two-thirds of the way in. Two shovels and a powder keg(?) were discovered in this adit in March 1976, by members of the Mid Wales Geological Society. Before the mouth of this adit, is a deep crosscut, which makes access somewhat hazardous. It is not possible to date any of these works at present, but they are unlikely to have been carried on after the general cessation of activity in 1877.

At one or two other places, can be seen evidence of further work; on the north side of the main stream, are various features suggestive of some exploratory work being carried on at some time, while some distance further down the stream, is what appears to be a further opencut or perhaps adit; this has fallen in to such an extent as to make any precise observations out of the question. However, once again, a stream of water welling up does suggest an adit at this point.

The old opencut of the original workings, can be traced right down the mine site, while on the tips at the back of the crusher, a conical hole indicates a probable collapse into the old workings.



ENGINE SHAFT

Showing pumprod
still standing within,
and having part of
angle-beam & tie-
rods attached.



"X" ADIT

PUMP WHEELPIT (4)

The Pumpwheel pit is built on a shelf parallel to the mountain side, and like other buildings at the mine, is well-built of random stone, dry-laid.

Generally rectangular in plan, it has at one side two stout and parallel walls set at right-angles to the main structure, and which are likely to have carried the winding drum. A heavy metal shaft rests within this 'winding drum annexe'. At the rear of the pit, are low walls which probably surrounded the balance-bob pit. The tailrace arch is set in the fore-end of the wheelpit; the arch has cracked and deformed due to settlement of the platform upon which the wheelpit is built. The whole structure is generally very similar to the crusher house wheelpit, the pit walls of both structures being battered at an angle of about 5° to the vertical.

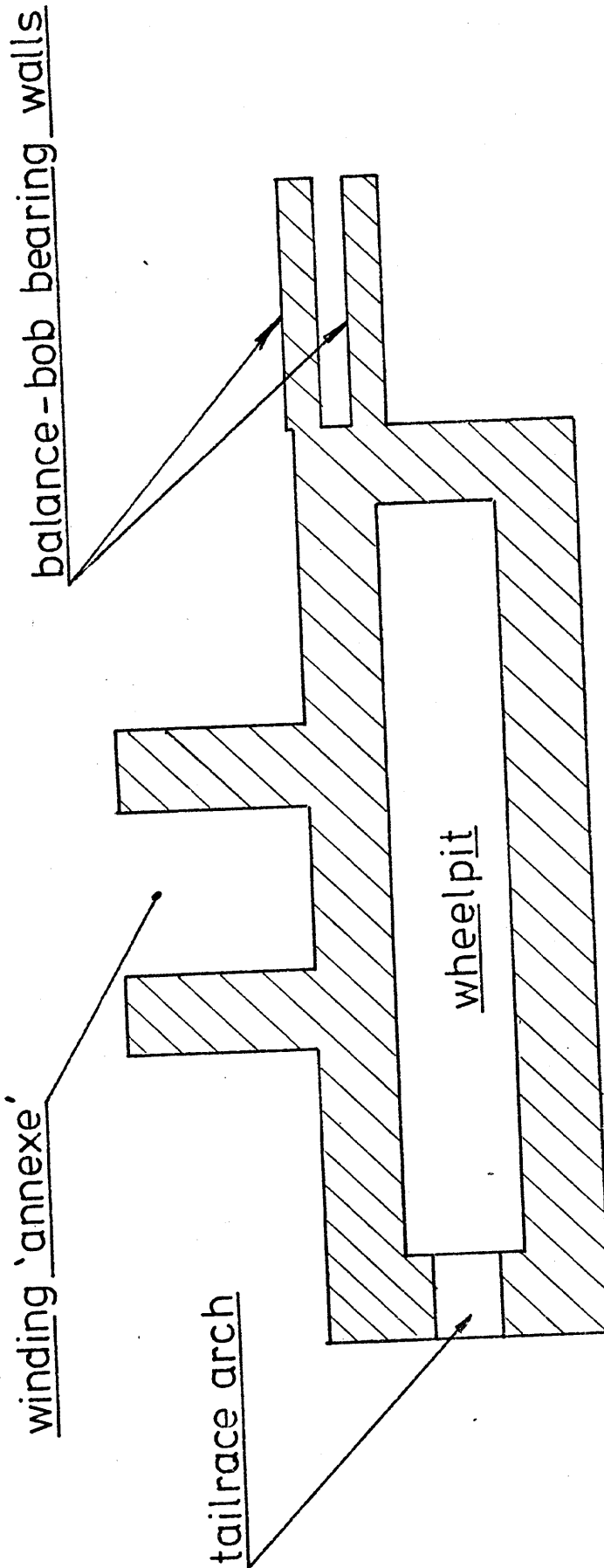
Today, while the fore-end of the pit is in a reasonable state of repair, the back end from about the centre of the pit, is much broken down and decayed. This may be the result of demolition for the purpose of removal of the waterwheel itself for scrap; a similar state of affairs exists at the crusher wheelpit. No remains of the wheel are still in evidence, nor any other machinery apart from a couple of rods (from the balance-bob), and various holding-down bolts along the tops of the walls. On the walls, and also down the slope below the pit, are various wooden baulks about 35cm square, probably bearings for the plummer-blocks.

The water supply came via a wooden launder from the Engine Leat above the site, and power was used to pump the mine, and also most probably to operate the winding drum. Pumping would have been via wooden flat-rods, which have disappeared. Thrown down the tip nearby, is a metal fabrication, possibly part of a vertical rocking beam associated with the pumprods. Although there is only a short distance between the wheelpit and the shaft top, it is thought to be too far for a single reach of flatrods.

It is likely that the winding drum was carried on the two walls at right angles to the wheelpit, the winding drum being driven via a simple clutch of the wheelshaft. Possibly associated with this gear, an eyebolt embedded in a rock at the back of the site, together with a loose fork-end which looks as though it was once attached to a wooden beam, may have been a 'tieback' to prevent the drum being pulled off its bearings when winding the shaft. This is the only interpretation that seems valid for this object.

PUMP WHEELPIT (4)

GROUND PLAN



scale



PUMP & WINDING
WATERWHEEL PIT

Showing tailrace arch;
view from shaft top,
with part of wooden
shaft collar, iron bob-
rods & anglebob pit, also
visible.



PUMP & WINDING WATERWHEEL PIT

View from rear of structure, showing bobpit
walls & bobrods (flat & round).

SMITHY

(BLDG. 5)

The Smithy building is of dry-stone construction, now roofless but from remains on site, a slated roof with fired clay ridge-tiles, such as found elsewhere on the mine site, both at the Magazine (Building 1), and at the Dwelling (Building 6A). The slates are small, not more than 200 mm x 300 mm at most. There are wooden lintels over the smithy door, and over that of the room to the left. It seems as though there was once an 'annexe', possibly a store for fuel and materials, to the right of the building; this has now entirely gone, but in the end wall of the smithy, at about 2 $\frac{1}{2}$ m., there are three square recesses, such as would be associated with roof timbers. It could be inferred that this 'annexe' may have been of timber construction, in the absence of any identifiable stonework, apart from certain slabs laid in some sort of order, possibly wall-plates.

Within the Smithy proper, there is a substantial stone-built hearth, some .2 metres square and 800 mm in height. At its back, there is a hole to the back of the building, purpose unknown, while the flue is inset in the thickness of the wall. There is evidence of a chimney also, but if this existed, it has fallen down to eaves level. There are a few pieces of metalwork to be seen; parts of an old iron bedstead, an L-shaped piece of iron with a rod set at right angles, purpose not known, and a few other unidentifiable objects.

To the left is a room, purpose unknown, but which could have been perhaps a stable, or a store, or conceivably a barrack-room, such as are known from other mine-sites. It would have a fairly cosy place, situated next to the warmth of the smithy! This room contains no article to help in identifying a possible use, but in the absence of any other similar building at the site, one favours the barrack-room theory.

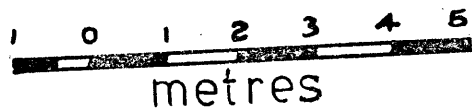
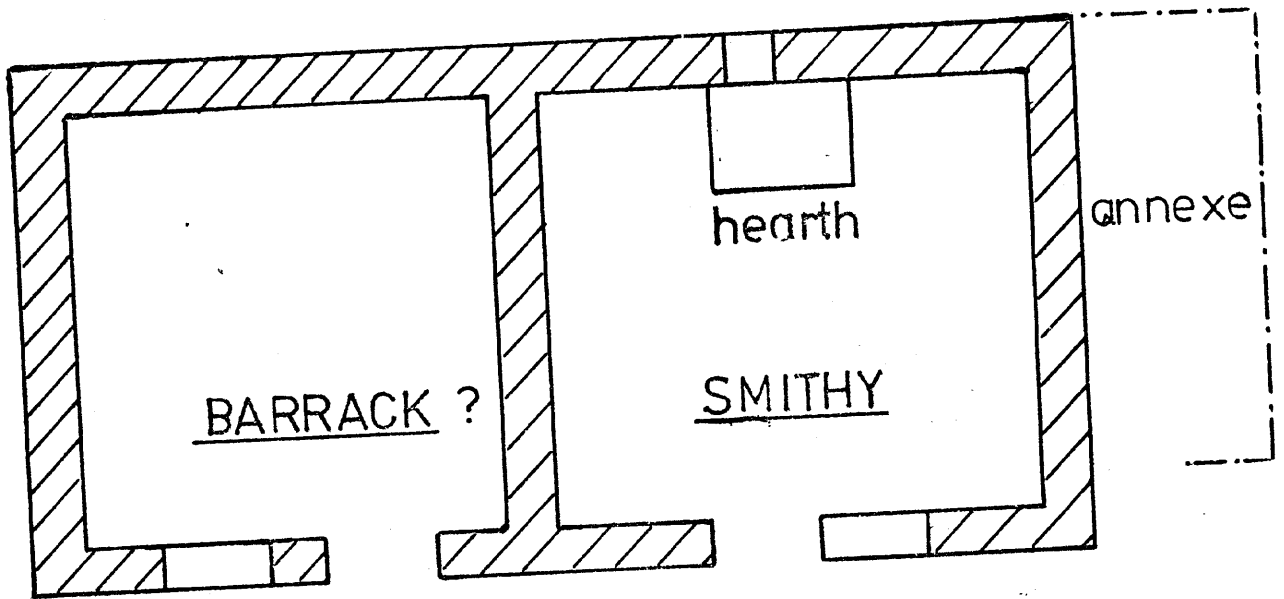
There is some evidence of both the smithy and the barrack-room having been plastered internally. Heating in the latter room could have been by an iron 'pot-belly' stove, as there is no evidence of a hearth or chimney.

Apart from the door lintels mentioned above, there is now no evidence of door or window frames, but fragments of window-thickness glass may indicate some of civilisation's comforts being applied!

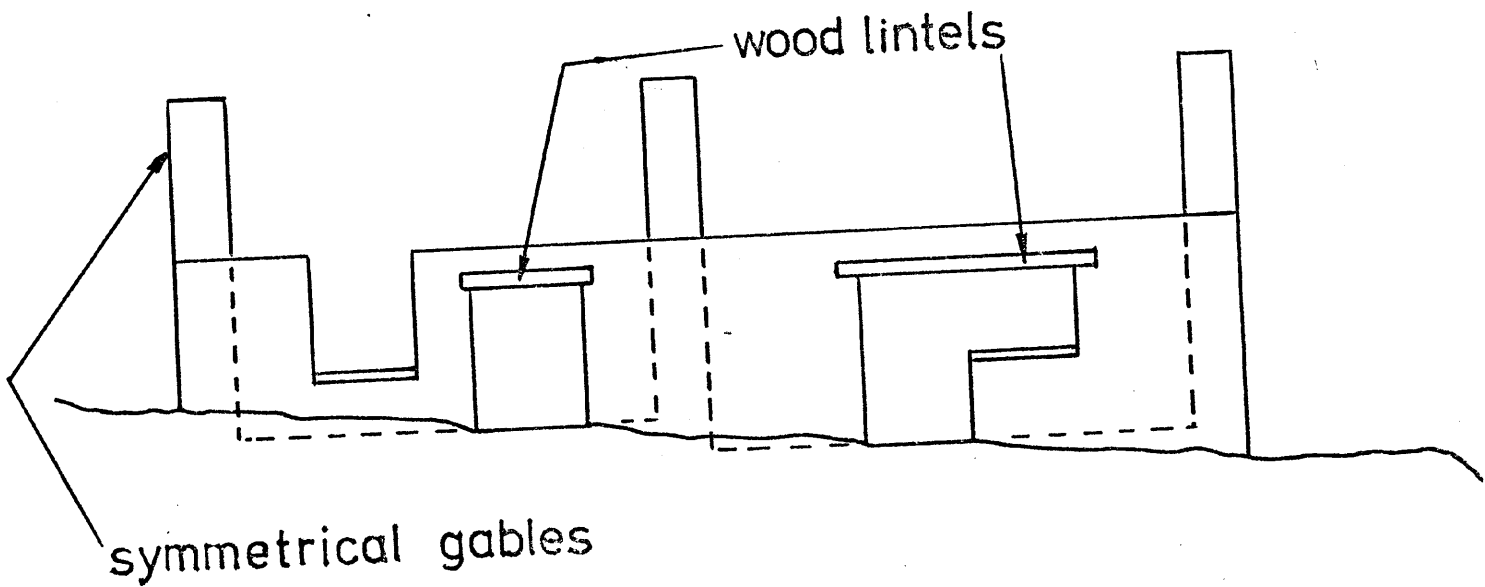
Here are the remains of a well-constructed stone building, erected with perhaps an eye to the future, which however failed to materialise. One must assume it to be contemporary with the other structures at the site, that is, of the 1871 - 1877 period.

SMITHY

(BLDG. 5)



PLAN



ELEVATION

DWELLINGS (6A & 6B)

Of the two houses at the mine, only one, the stone-built dwelling, (6A) can be thought to be contemporary with the rest of the mine buildings. The brick-built house (6B) with the slate roof still on, dates from the creation of the reservoir system, being one of several within the catchment area erected to house estate staff. It is said that this house was intended for a shepherd, but was never in fact occupied. Legend also has it that the ghost of an engineer haunts it from time to time.

Alongside the brick house, the larger stone dwelling is now a roofless, ruinous shell. Quite well-constructed of random stone, it does appear from comparison with the other mine buildings, to be dateable to the 1871-77 period; it looks very impressive even now, when seen from the mine approach, and may well have been intended for, if not actually occupied by, the mine 'captain'.

Externally, it appears a fairly conventional double-fronted two-storey house, with a chimney-stack at each end wall - one stack has now fallen down to gable level. There are shallow brick arches over each window opening, with timber lintels behind. A curiosity is the lack of a back door, although the back gives onto the steep slope of the mountain side.

Internally, there is now little to suggest the exact internal layout, apart from part of one internal wall, to first-floor level only. This would have divided the lower rooms. The arrangement of fireplaces (one on each floor in both stacks) supposes a basic four-room house, with a very vestigial cross passage. In none of the hearths, is there now any evidence that a cooking-range was ever installed. Each hearth opening is bridged by a shallow brick arch, supported upon old waggon-strakes. There are no markings on the bricks examined, to suggest their origin.

Apart from the wooden wallplates set into the stone work to support the first-floor joists (now entirely gone), no internal timberwork remains; it may be that internal room divisions in the upper floor, were of lath-and-plaster only, which of course has long since decayed.

A small stack of roofing-slates at the back of the house, and a few broken ridge-tiles, are similar in pattern to those found at the magazine and smithy, so that it may be reasonable to conclude the house's contemporaneity with those buildings.

It is said that this house (6A) was deliberately burnt following an outbreak of smallpox amongst the family then living there, but the absence of charring on what woodwork remains, does not substantiate this. A similar incident nearby, may have given rise to this story.

Between the two dwellings, is an area which may have been the site of a lean-to outhouse, the decayed back-wall of which only still remains.

The water supply most probably was derived from the Domestic Leat, which passes across the back of the site - certainly, there is good evidence that this was utilised to supply the later, brick, dwelling, via a stone settling tank and iron cistern adjacent, at the rear of the houses and at the foot of the incline.

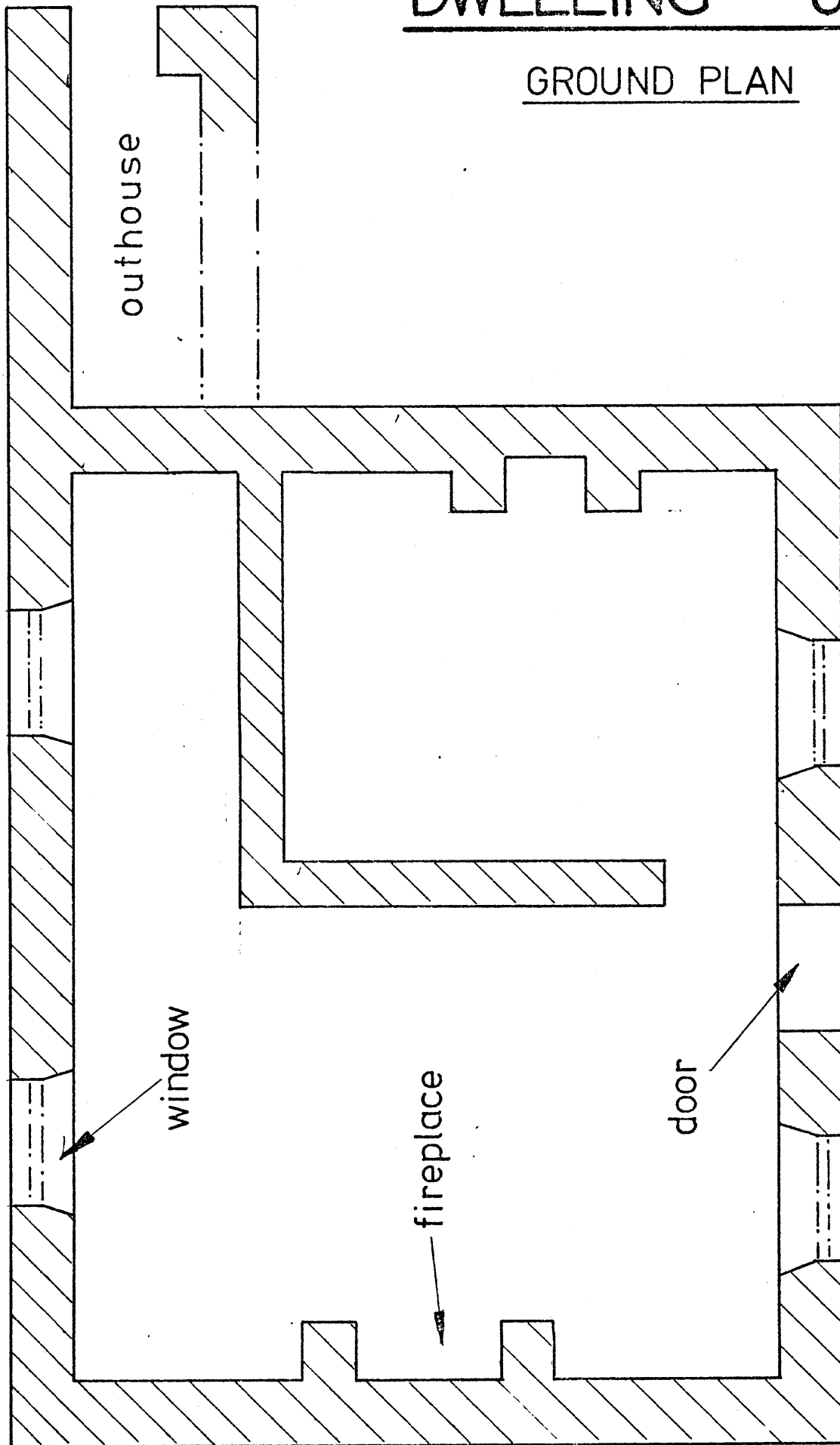
Sewage, certainly insofar as the brick house was concerned, seems to have drained into a cesspit the remains of which are on the slope below the site. The overflow from this pit, looks as though it drained back into the Nant Methan stream, via a shallow open channel. The 'arrangements' at the stone house, are no longer in evidence, but at the brick house, a brick privy is attached at the side of the dwelling.

One is rather led to suppose that, grand though the 'Captains' House' may have seemed from the outside, it could not have been a particularly congenial or convenient house to live in, from what can be seen today - was it, in fact, merely built to impress gullible shareholders, one wonders? (It is said that a certain amount of jiggery-pokery took place subsequent to the formation of the 1871 company, when access was refused, and the sharebooks were 'not available')

Nowadays, both houses look very forlorn, with the windows of both peering glass-less and eerily, down Nant Methan. The two houses are the most distinctive feature of the mine site - to be seen from the road alongside Garreg Ddu Reservoir, and from that road would hardly lead one to suppose the presence of the rest of the mine.

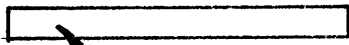
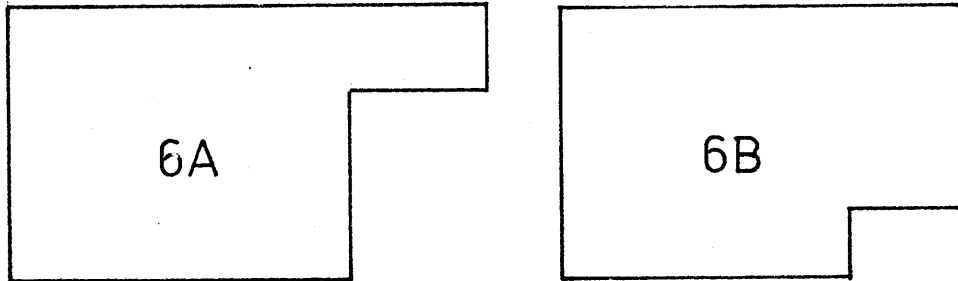
DWELLING 6A

GROUND PLAN



DWELLINGS

BLOCK PLAN



wall

0 1 2 3 4 5 6 7 8 9 10

scale

© JBG 7/76



General View of the Dwellings

LLYNOEDD CERRIGLLWYDION

These two lakes, set high on the watershed between the Elan and Claerwen valleys, are likely to be of glacial origin, with their waters filling hollows gouged out during the last Ice Age, and with morainic material damming their lower ends.

Two spillways, probably formed by glacial melt-water, are marked features of the upper lake, which receives its water from the immediate peaty bog area surrounding it. This lake's overflow passes via a small channel to the lower lake, which has in fact been ponded by the building of two shallow rock-and-earth dams. One of these regulates to Nant Hirin and the Elan itself, the present-day water flow, while the other, rather larger one, contains the remains of the intake to the Upper Leat. This dam is formed of a double row of slabs, with an earth fill; its width is 2 m., length some 30 m. The intake is of wooden construction, about 30cm square, and is set into the wall of the dam; a metal rod some 2.5 m long, with at one end a wooden crossbar, at the other a metal fork, was most probably the sluice-gate operating gear. No trace of the paddle was found, but since this was in all probability of wood, this may be expected after a hundred years' disuse. This metal rod, was found lying in the water, adjacent to the dam.

The water to the Upper Leat, having debouched from a tunnel beneath the dam, carried on along the contour in the open leat which is still such a well-marked feature all along its 15km to the Nant Methan. In view of the shallow depth at which the waters were tapped, it could not have been possible to draw upon a very great quantity of water at any time - one wonders in fact whether it was all part of a sort of 'spoof' to tempt the investor, by showing that Cwm Elan mine had all the attributes of larger enterprises elsewhere in the Principality? Perhaps we shall now never know.

Perhaps the best approach on foot to these lakes is by the Ancient Trackway from a point above the small quarry (SN 897716) near Pont ar Elan. The lower lake first appears as a thin bright line soon after leaving Carn Ricet, and to the right of the rocks of Blaen Rhestr. (Immediately before reaching Carn Ricet, the leat is crossed on its long journey around Clawddu Bach)

As sites for the study of industrial archaeology, these two lakes, set jewel-like in an area even more remote than Cwm Elan Mine itself, must surely represent the ultimate, while topographically the area offers great scenic beauty, and is worth visiting for that reason alone. One hesitates to think what it must have been like, those hundred years ago, trying to keep the water flowing in the depths of winter!

MAP REFERENCES AND ALTITUDES:

Llyn Cerrigllwydion Uchaf	SN 840693	502metres
Llyn Cerrigllwydion Isaf	SN 843699	495metres
Outlet to Upper Leat	SN 84576995	—————

UPPER LEAT

The Upper Leat is a remarkable and distinct feature of the landscape of the upland area surrounding the Elan V alley. Of some 1.5km length, it is marked on the 2½" maps as 'Old Water Course'. It is constructed on the contour principle, as is usual, and is consequently a rather meandering channel with no major engineering work along its whole length, apart from the shallow cutting at the point of crossing of Moelfryn. From the end of this cutting, the channel descends quite steeply into the upper waters of the Nant Methan stream.

In the absence of any documentary evidence, it is not possible to give a firm date for the construction of this leat, but there are two possibilities; it could have been cut in conjunction with the Cwm Elan House leat (utilised as the 'Domestic' leat at the mine), or else it was made when the main machinery and pumping wheels etc., were installed, that is, 1871 - 77. In view of the small amount of water naturally available from Nant Methan, except in times of heavy rain, it is conceivable that the latter period is the correct one, the extra water being required for the machinery; if the leat was cut in conjunction with the Cwm Elan House water supply, it is difficult to visualise such lengths being gone to, merely to secure a domestic water supply. In any case, it would have been a problem keeping this open channel clear at any time, situated as it is in a remote and exposed upland area.

Whatever may have been the origins of the work, it was no mean feat to cut such a small channel, of such length, in a very inhospitable terrain - we can only admire the optimism of its builders, and marvel at lengths to which it was prepared to go, to secure additional water supplies.

The cutting referred to above, is about 150 metres long, and at its maximum depth, about 2 metres. Width at maximum, is about 3 to 4 metres; it is merely a channel hewn out and the spoil thrown up to the side, in a manner reminiscent of the early canal navigations.

A favourite gradient for this type of leat, was about 1 in 720; this would give a favourable if not headlong water-flow; it is estimated that a roughly comparable fall was incorporated here, apart from the final fall into Nant Methan, where the fall is around 1 in 30-40 or so.

ENGINE LEAT

This leat was constructed to carry water from the Nant Methan stream, to drive the mine machinery, and may be tentatively dated to the 1871-77 period, when the machinery and buildings, the remains of which can be seen today, were installed. The water supply could have been supplemented by the flow brought along the 15km Upper Leat, from Llyn Cerrigllwydion Isaf; this debouches into the upper waters of Nant Methan.

The Engine leat is cut along the contour for a distance of some 700 - 800 metres, commencing at what may have been the site of a small gravity dam of earthen construction, and terminating on the hillside above the main minesite. At the point of crossing of the Caeblaenmethan track, the leat was culverted by a simple stone slab bridge, which has now collapsed into the bed of the leat.

It (the leat) is a well-marked feature even today, and although partly carried in what was probably a puddled channel, it is in places carried in cutting through rock spurs. At its lower end, it could have been carried in a wooden launder, but this is now difficult to determine owing to ground movements.

At a point above the Pumpwheel pit, the few remains of metal- and woodwork suggest a sluice in the side of the channel, admitting water as required to what would have been a very steeply-graded launder carrying the flow to the Pump Wheel, which wheel seems to have been utilised both for pumping and winding. The leat carries on from the sluice-gate, to terminate rather indistinctly at a point in the region of the 'X' Adit; it is not now clear how the water flow was then directed, but it possible that any overflow may have discharged into the small stream cascading steeply down the rocks of Griag Ddu, to the east of the mine site.

There is now very little evidence to show how water was carried from one point to another in the actual mine work area, but it is very likely to have been by wooden launder, all remains of which have by now have decayed. It is probable that the water supply was used in succession for several different purposes, the slope of the whole mine site tending to facilitate this. In any case, the probable limitations of supply would have necessitated re-use as far as possible. whatever purpose the water was put to, it would in any case have ended up being discharged back into the Nant Methan stream, but again the precise flow-channel cannot be readily discerned today.



ENGINE LEAT

An unexcavated rock-cut section, at
a point above the Dwellings

DOMESTIC LEAT

Although this leat appears to have been utilised to supply water to the dwellings 'A' and 'B', it seems as though it may have been originally cut as part of a system of water supply for the house Cwm Elan, now demolished and its site submerged beneath the waters of Garreg Ddu reservoir.

A short section, lined with stone and with a slate-floored bottom, carried the water from the Nant Methan stream, in which a small stone dam is located at this point, to the top of a short but rather steep incline, to the back of the dwellings. At the incline foot, is a brick-lined tank and an associated galvanised iron tank, probably contemporary with dwelling 'B'

Beyond the incline foot, the cut crosses the mine site (and the main lead lode) before continuing along the hillside, passing through the forestry plantation, and terminating some distance beyond, in a field above the site of Cwm Elan House ('Shelley's House'). Below the point of terminus, is a brick-lined, stone-covered, cistern, possibly connected with the Cwm Elan supply, and fed from the leat.

It is possible that the water from the leat was then or later utilised at the mine for ore-washing purposes, for which use it was led off through a series of tanks mentioned elsewhere, before finally discharging (much polluted!) back into the stream, above the main Drainage Level of the mine.

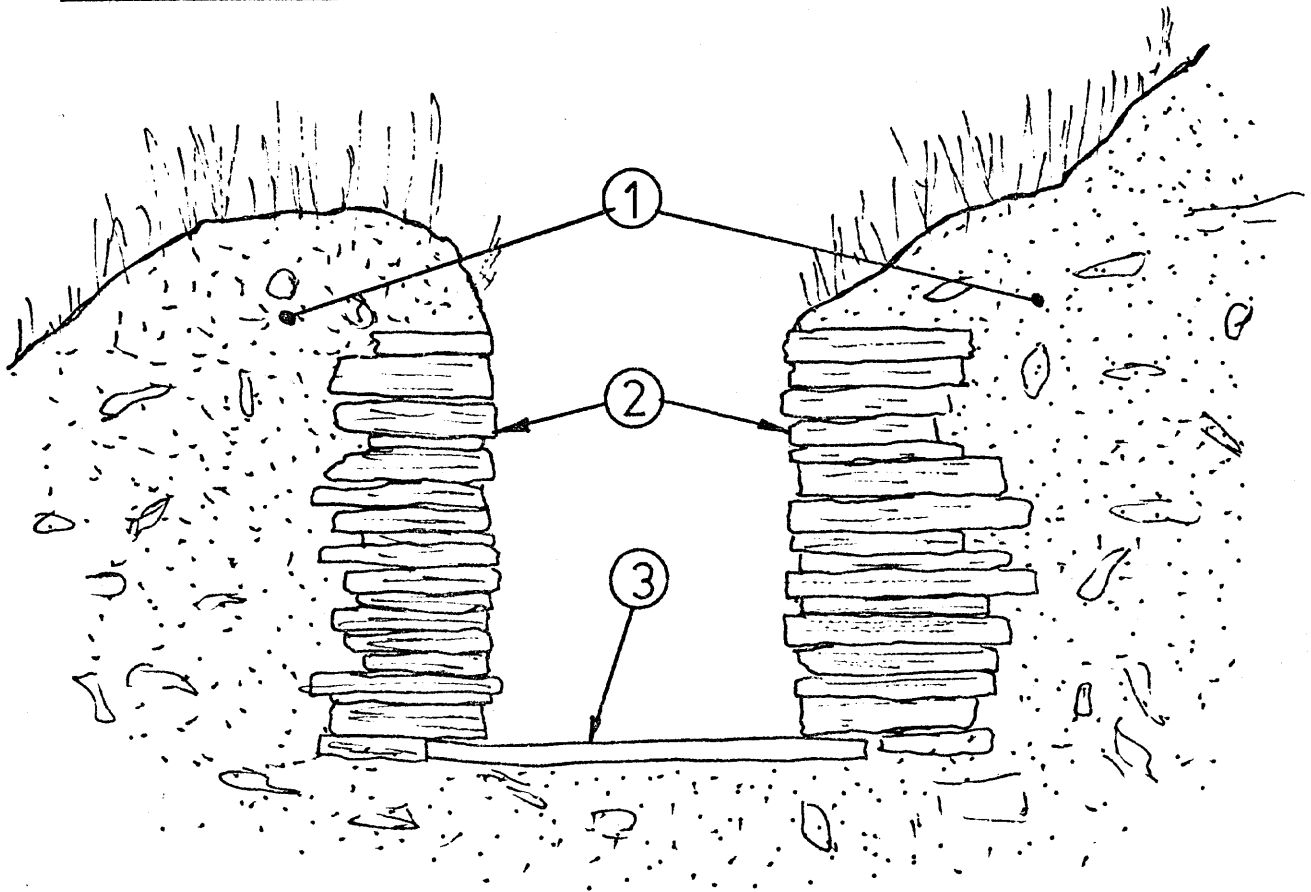
It may be conjectured that the leat was cut to supply Cwm Elan House after the mine was started, in order to eliminate the massive pollution resulting from the mine working. Its adaptation for the use of the mine may or may not have been connected with its Cwm Elan House function. It may have been the 'drain', during the cutting of which by Mr. Thomas Grove, farming on the 'Wiltshire System' of husbandry, the main lead lode was discovered, leading to the exploitation of the mine. The use of the leat to supply the mine with washing water, may or may not have been concurrent with its other use.

Its subsequent adaptation as a convenient water supply for the dwellings 'A' and 'B' is probably dateable to the 1871-77 period, for the stone house was most likely to have been built then.

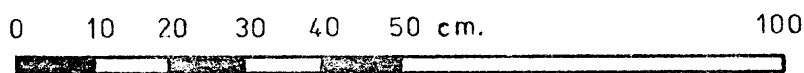
The whole of the course remains in a good state of preservation, with the upper, stone-lined section, remaining largely in place, though silted badly. The actual point of junction with the stream is now difficult to determine, owing to many years' water-flow, and consequent changes in the ground surface, at that point. The dam mentioned above is, although small, well-built and probably much as it was constructed, probably around the 1800's.

It seems as though the majority of the leat may have fallen out of use, apart from the 'domestic' use for both dwellings already alluded to, prior to the 1871-77 period of activity, for the course at the mine site is partly covered by the tips of that period. Elsewhere, it remains as a very well-marked feature. (See section diagrams etc.)

DOMESTIC LEAT (SECTION)



A typical cross-section showing type of construction. As found, was silted to a depth of about 0.15 metre.



one metre scale

KEY

- ① Earth and rubble
- ② Dry-laid slabs
- ③ Slate

MAPS & REFERENCES

ORDNANCE SURVEY	1 : 10,560	SN 86 NE
		SN 96 NW
	1 : 25,000	SN 86 (CLAERWEN)
		SN 87 (AFON ELAN)
		SN 96 (RHAYADER)
	1 : 50,000	147 (ELAN VALLEY & BUILTH WELLS)

MINE SITE:	SN 901 652
DAM SITE (CONJECTURAL)	SN 899 656
UPPER LEAT JUNCTION	SN 889 663
MOELFRYN CUTTING	SN 894 664
UPPER LEAT - ANCIENT ROAD CROSSING	SN 873 710
LLYN CERRIGLLWYDION ISAF (LEAT OUTFALL)	SN 845 699

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APPENDIX A

COPY OF PART OF THE CWM ELAN LEAD MINING COMPANY LIMITED; PROSPECTUS, ISSUED ON
WEDNESDAY 20TH SEPTEMBER, 1871.

PROSPECTUS.

THIS Company is formed for the purpose of acquiring the lease of the valuable mineral property known as "Cwm Elan," and situated in Radnorshire, North Wales. Its position is south of the celebrated "Van Mine," of recent discovery, and is in the same formation, or lead-bearing strata, the lower Silurian slate rocks.

The Cwmystwith and Lisburne mines, which have yielded such vast quantities of lead ore, and paid immense profits during the last forty or fifty years, are only seven miles distant on the north-west of Cwm Elan.

The property is held under a 21 years' lease from the 25th of March, 1870, at 1½th Royalty and £5 a-year dead rent; this compares most favourably with lead mines in general.

The accompanying plan and section show the workings on the lode. The adit is driven west of the shaft some 16 fathoms, in a large lode containing lead and blende ores of the most promising character.

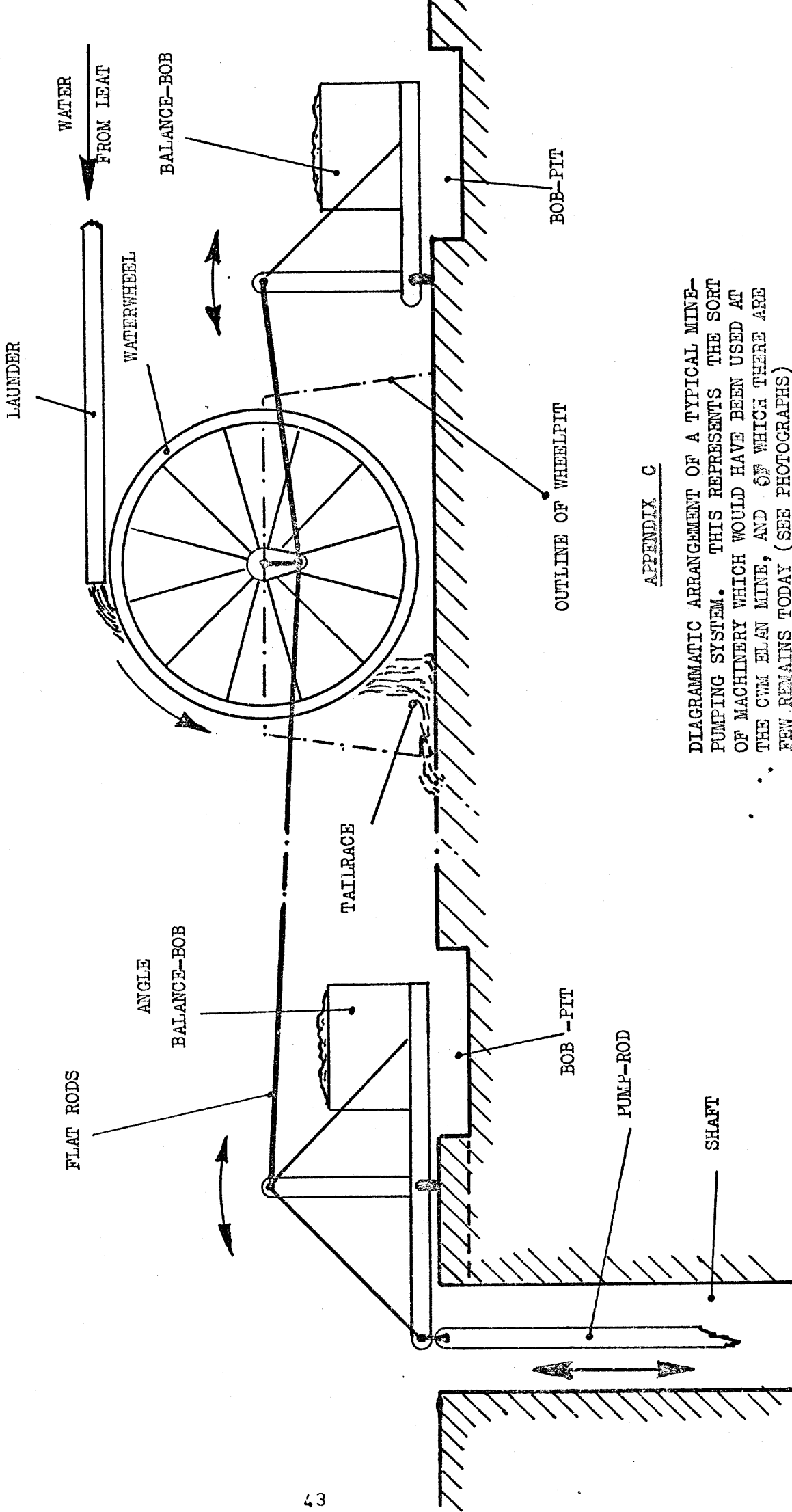
The lead ore of this mine is worth at present £11 10s. to £12 per ton at Rhayader, and the blende £4 10s. to £5 per ton.

The mine is within six miles of Rhayader, on the Mid-Wales Railway, to which station there is a good road from the works. The carriage of the material from Rhayader to the mine and ores back to the railway station would be from 6s. to 7s. per ton, and very light and easy compared with many of the lead mines in Wales, where cartage to and from the mines frequently vary from 10s. to 12s. per ton.

The set or grant is extensive, being about one mile long on the line of the lode east to west, and about the same width from north to south.

There is an abundant supply of water throughout the year running close to the mine, available for working water-wheels for pumping from or draining the mine, winding, crushing, and dressing the ores for market, &c.

A contract, made the 11th day of September, 1871, between Jno. Paull, Esq., the vendor, of the one part, Rowland Webster, Esq., and Richard Condy, Esq., on behalf of themselves, as trustees of the Company, of the other part, can be inspected at the offices of the solicitors, Messrs. Maddox & Green, 9, Waterloo Place, Pall Mall, where copies of the Memorandum and Articles of Association may be obtained. The whole of the purchase-money for this valuable property it is agreed shall be made in paid-up shares.



APPENDIX C

DIAGRAMMATIC ARRANGEMENT OF A TYPICAL MINE-PUMPING SYSTEM. THIS REPRESENTS THE SORT OF MACHINERY WHICH WOULD HAVE BEEN USED AT THE CWM ELAN MINE, AND OF WHICH THERE ARE FEW REMAINS TODAY (SEE PHOTOGRAPHS)

DIAGRAMMATIC ARRANGEMENT OF A TYPICAL MINE-PUMPING ENGINE.

WHEELS & RAILS (Appendices D, D₁, E)

The two pairs of wheels and axles found at the mine site, are likely to be the last relics (on the surface at any rate), of the mine tramway system.

Generally similar in dimensions, and of material, one pair has at some time been adapted by the addition of a bar more or less parallel to the axle, maybe for use in haulage by horse or pony, using traces. The bar is so similar in dimensions, that it seems that a waggon axle was utilised for it. Bent round rods attach it to the axle, with a forged eye-end, formed from the round bar.

All the wheels (four) are similar in dimensions and weight (12.70 kg), and ran loose on the axles, retained most probably, by washers and tapered cotters (one wheel on the 'pony haulage' set still retains the cotter). The gauge was a nominal 686 mm, but on the 'pony haulage' set, this increases to about 770 on account of the eye ends of the trace bars being inserted between the axle ends, and the backs of the wheels.

A conjectural vehicle would have been of wood, very stoutly built, and of a capacity of about, say, 750 kg. (about $\frac{3}{4}$ Imperial ton). It could have had solid ends, but it is more likely to have had either an open end, or a hinged board, suitable for tipping and loading. The remains of the bolts attaching the wooden body to the axles, tend to suggest a wooden body. Nothing now remains of the wooden superstructure.

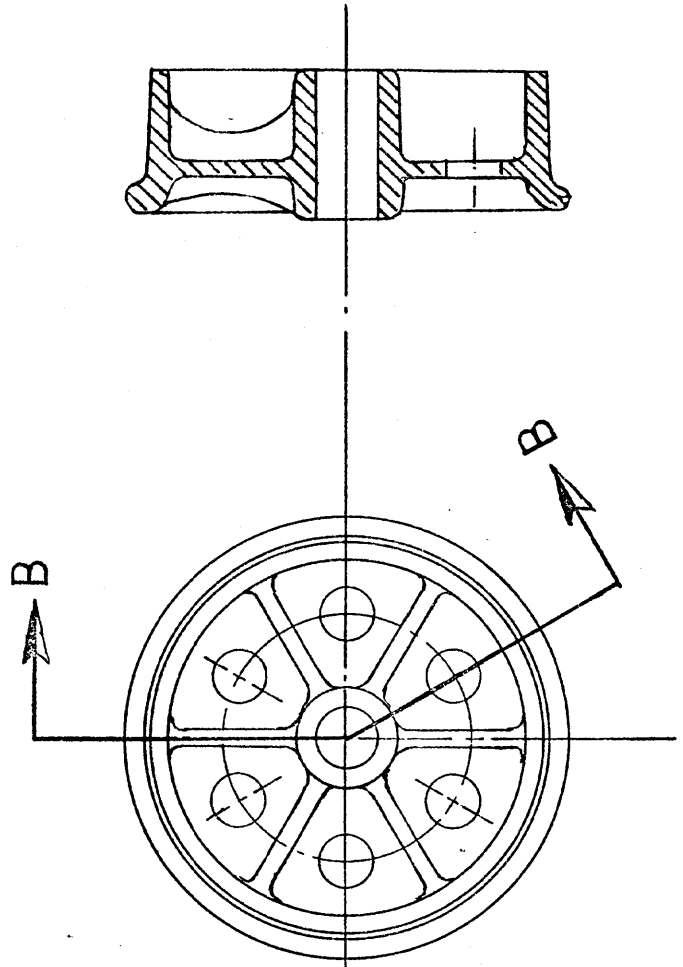
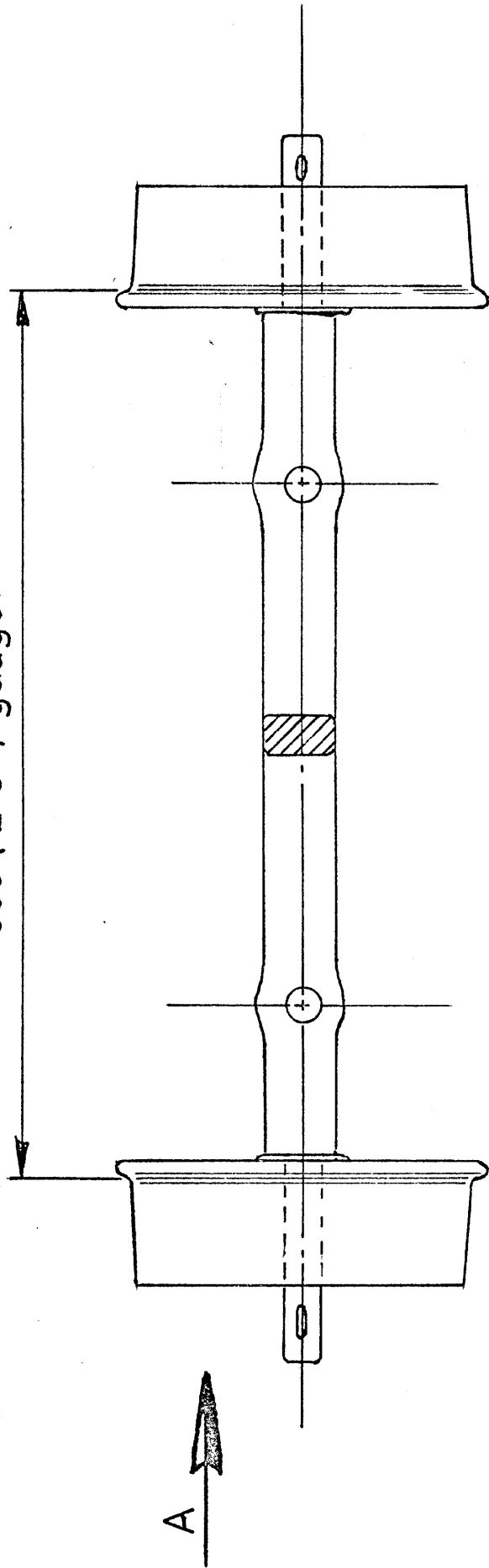
It would be interesting to know if anything still remains underground. The surface of the mine, would not be very suitable for an extensive tramway system in any case, being far from level. In addition, there are no obvious formations.

Several lengths of light bridge-rail at the site, can only be supposed to have come from the mine, and be contemporary with the 1871-77; in view of the subsequent construction of the Elan Valley Reservoir system around the 1900's, they could have migrated to the mine area after the dams were completed. (There are remains of some 'Decauville' type metal sleepers at the South end of Caban Coch Dam.) Two lengths of rail, 4.57 m (15 feet) and 5.49m (18 feet) were found, six lengths all told, two of which seem to have been used as the beams of a footbridge (now no longer in existence) at the mine ford site.

The survival of the two pairs of wheelsets, and the rails, is remarkable, all being 'portable scrap', as it were!

A curiosity was that one wheel on the plain wheelset, was reversed on the axle, flange out. No reason can be put forward for this, unless it was a crude attempt to overcome the problems of gauge encountered when the 'pony bar' was fitted to the other set.

686 (2'3") gauge.

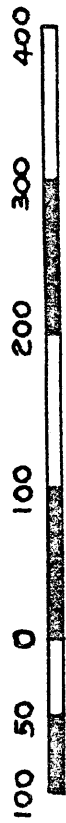


Appendix D

Wheelset from mine car

Wheels — Cast Iron

Axle — Wrought Iron

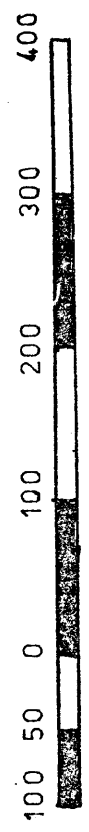
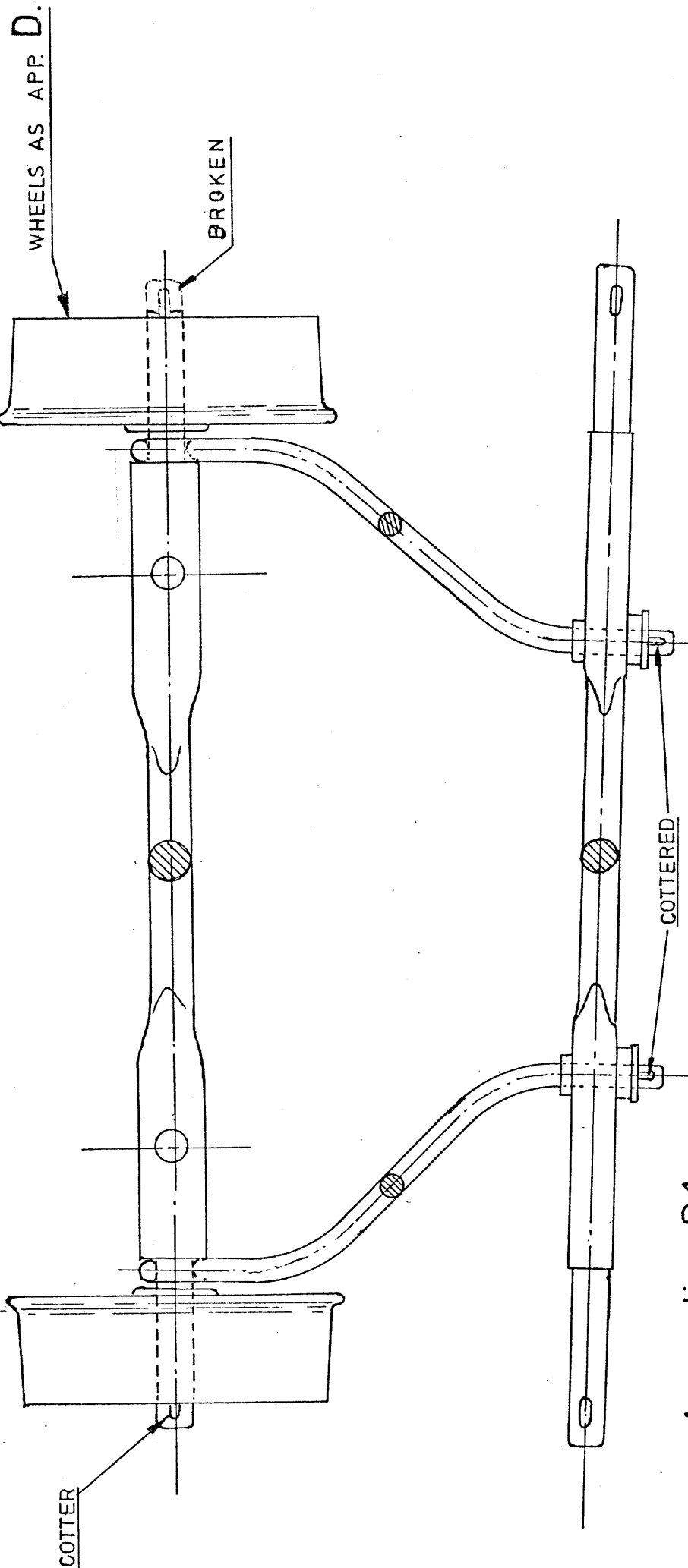


scale - mm.

View A

Section BB

gauge 770 nominal



scale - mm

Appendix D1
Wheelset from mine car
(adapted for pony traction?)

(see appendix D also)



WHEELSETS & RAILS

Shown assembled near ford (mine track / Nant Methan stream) but carried from points on mine site. There is nothing to suggest a former tramway at this point.

The placing of the one wheel "flange out" is curious.

(See Appendices D, D₁ & E)

METALWORK APPENDIX 'F'

DRAWINGS SHOW MAJOR DIMENSIONS ONLY

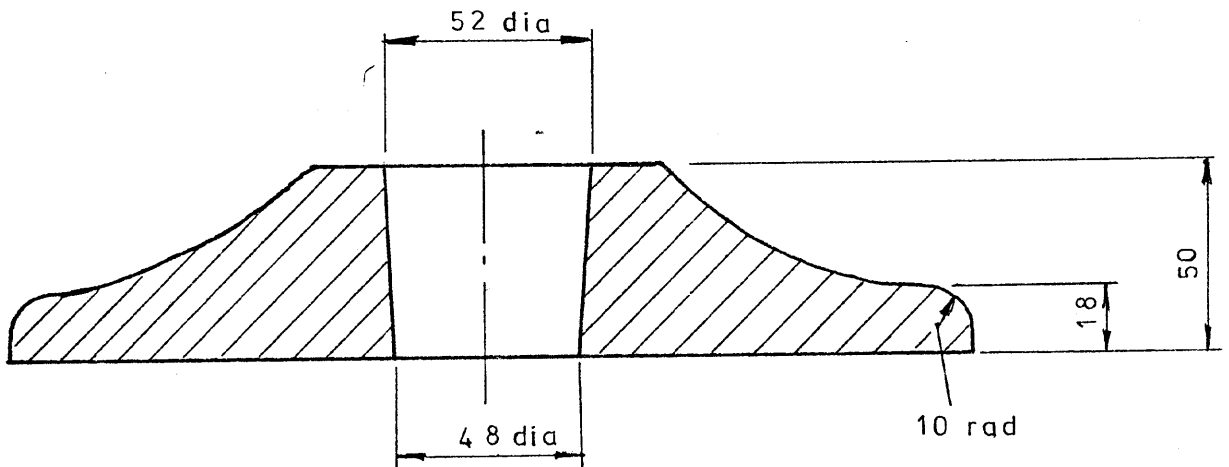
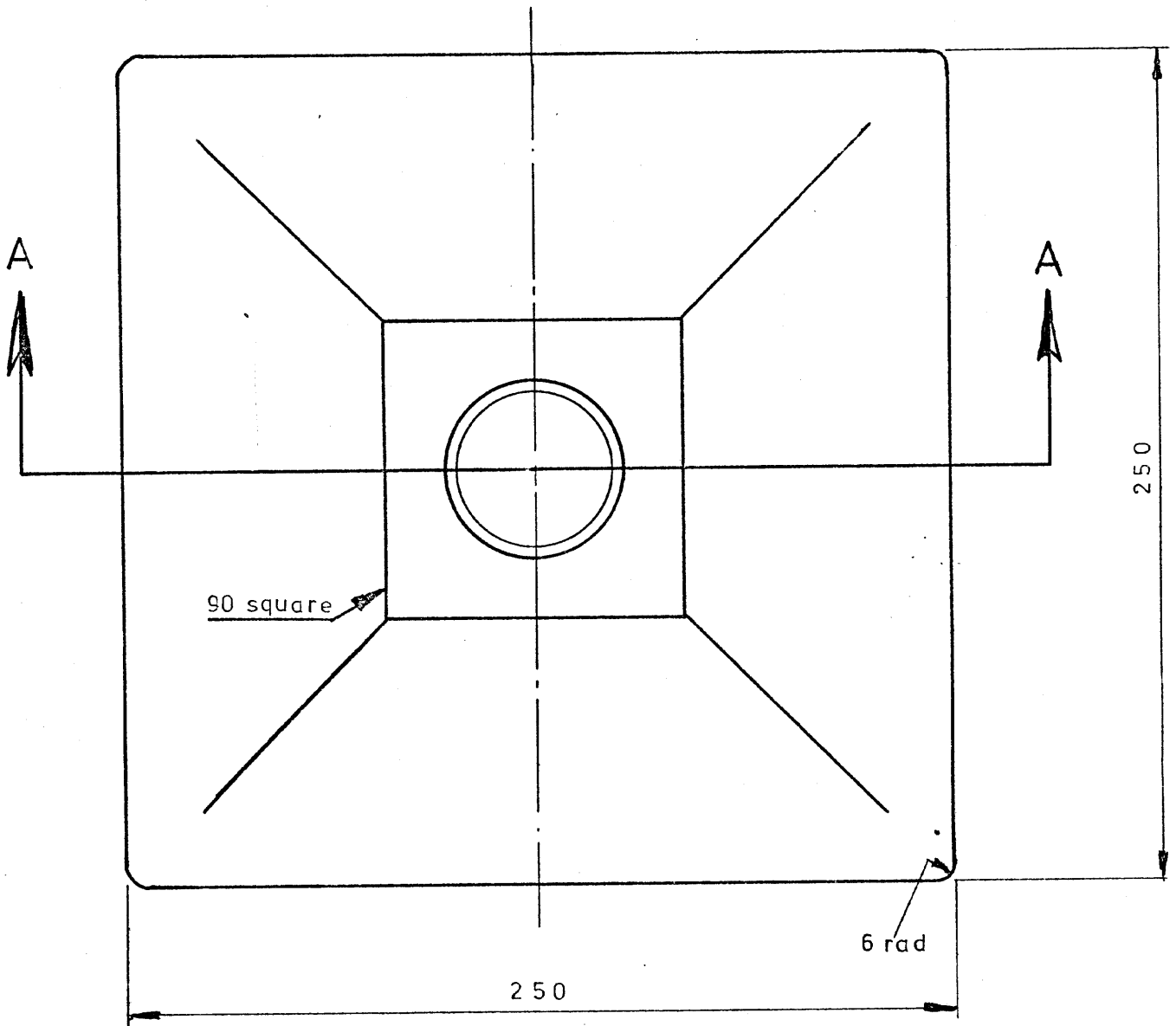
* = ITEMS DRAWN

There is now very little metalwork to be seen at the mine; apart from the items listed, most has probably been removed at some time for scrap. The remaining pieces all appear to be wrought iron, from the small amount of corrosion seen. However, one or two cast iron pieces are still to be seen, but the major part of the cast iron work (water-wheel frames, crushing rolls, machinery parts such as the crusher components, would have readily breakable with blows from a heavy hammer, and were thus recoverable. The remaining bits and pieces, being of the more ductile, would not have so readily succumbed to a few well-aimed blows, and have therefore survived.

- * 1. 2 pairs of cast iron mine car wheels on axles (probably of wrought iron).
- * 2. Several lengths of iron (wrought?) bridge rail of doubtful origin.
- * 3. Metal fabrication, possibly part of the pumping gear, thrown down the tip near the pumpwheel pit. Could have been a vertical rocking shaft, midway along the pump flatrods. (See note below)
- * 4. Various lengths of round bar, parts of the pumping gear, being in the main, components of the connections to balance and angle bobs.
- * 5. Two shafts, one in the 'winding drum annexe', the other, shorter, within the crusher house, with a cast iron double crank (?) attached to one end, possibly part of the crushing machine proper.
- 6. Sundry long and short holding down bolts, both at the pump and crusher buildings.
- 7. In the smithy, an 'L' shaped piece, with a short bar (about 1 metre) round bar set in at right angles, at the angle of the 'L'.
- 8. Outside the smithy, an unidentified metal component of cast iron, thought to be part of a heating stove.
- 9. Several small parts of an iron bedstead, found around the smithy.
- 10. At the dwellings, sundry cast iron rainwater troughs, and an iron sash-weight, from the brick house (6B).
- 11. Driven into a crevice above the deep crosscut before adit 'X', an eyebar, possibly cut from one of the rods part of the angle-bob.
- 12. Two shovels, recovered from adit 'X'.

There was seen a quantity of small metal pieces, which could not be identified; some of these are possibly remains of cotter-pins used in the securing of machine parts.

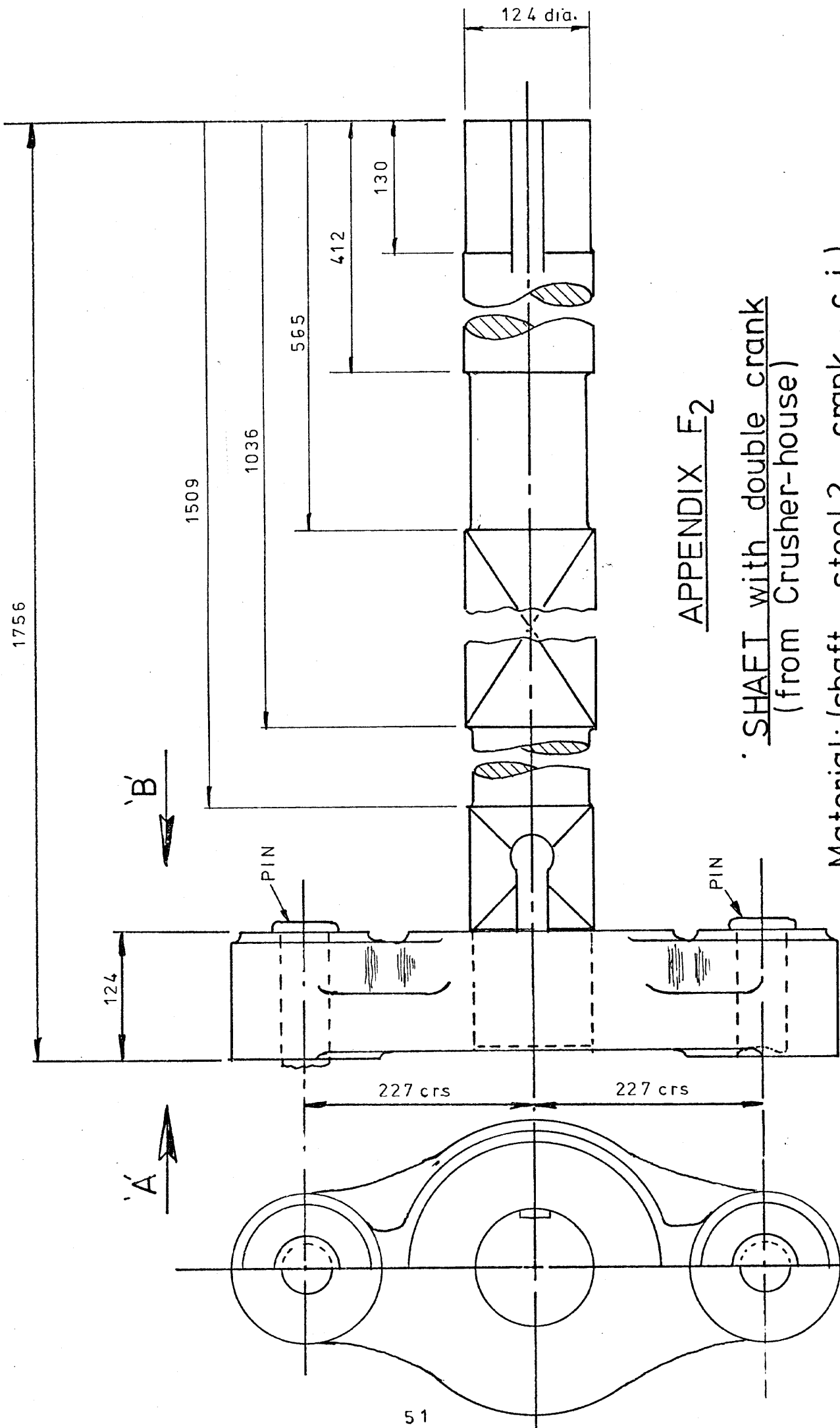
NOTE (para. 3). This item is now thought to be a horizontal component, designed to protect the waterwheel in the event of the pumps jamming.



section AA

Material: CAST IRON

Scale: half full size



APPENDIX F₂

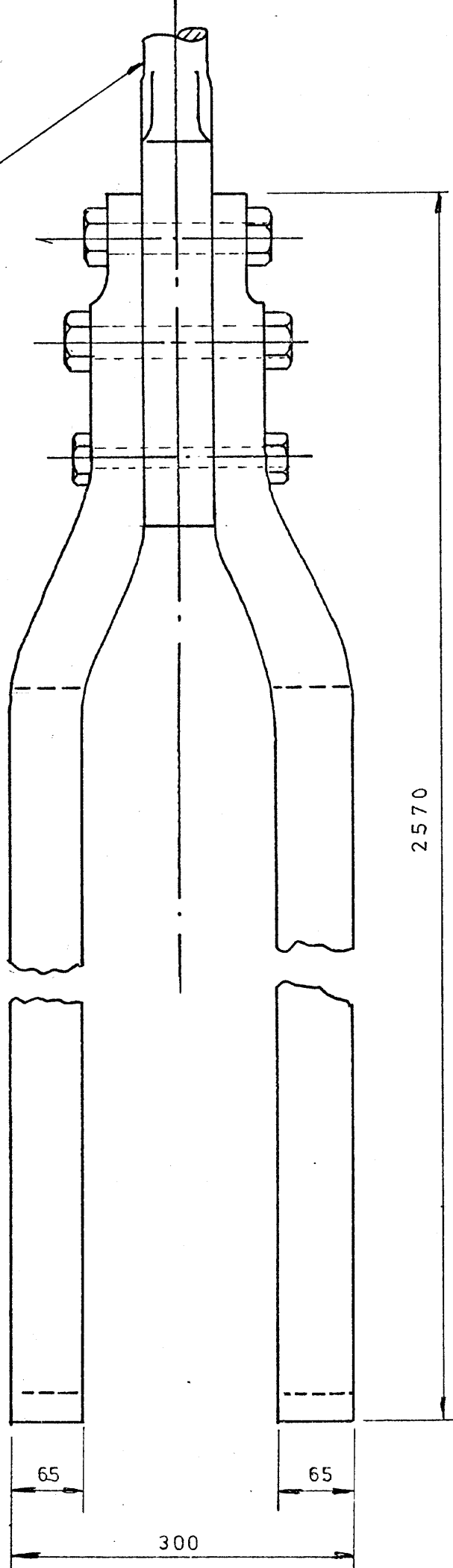
SHAFT with double crank
(from Crusher-house)

Material: (shaft - steel? crank - c.i)

Scale - one fifth full size

'A' 'B'
HALF-VIEWS

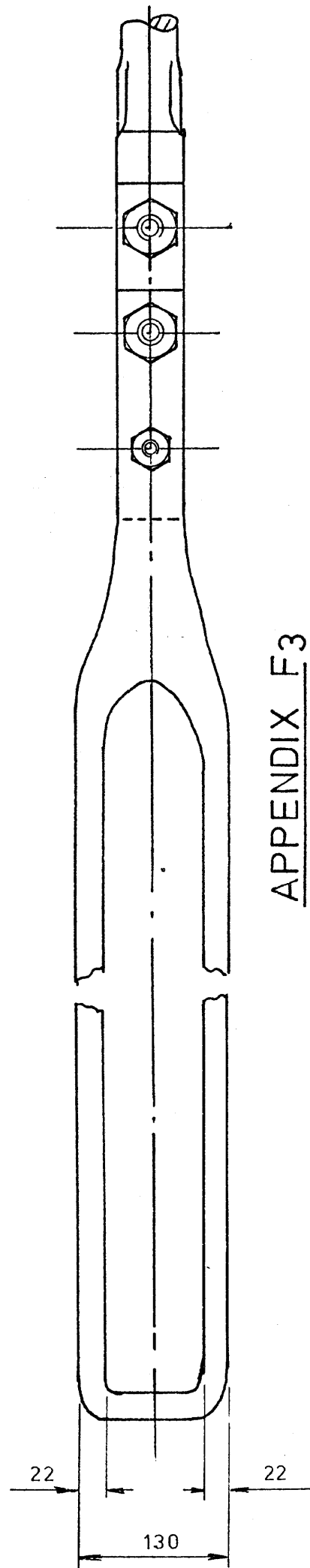
PUMP ROD



52

COMPOSITION:

Two forged arms bolted-up to pump-rod.



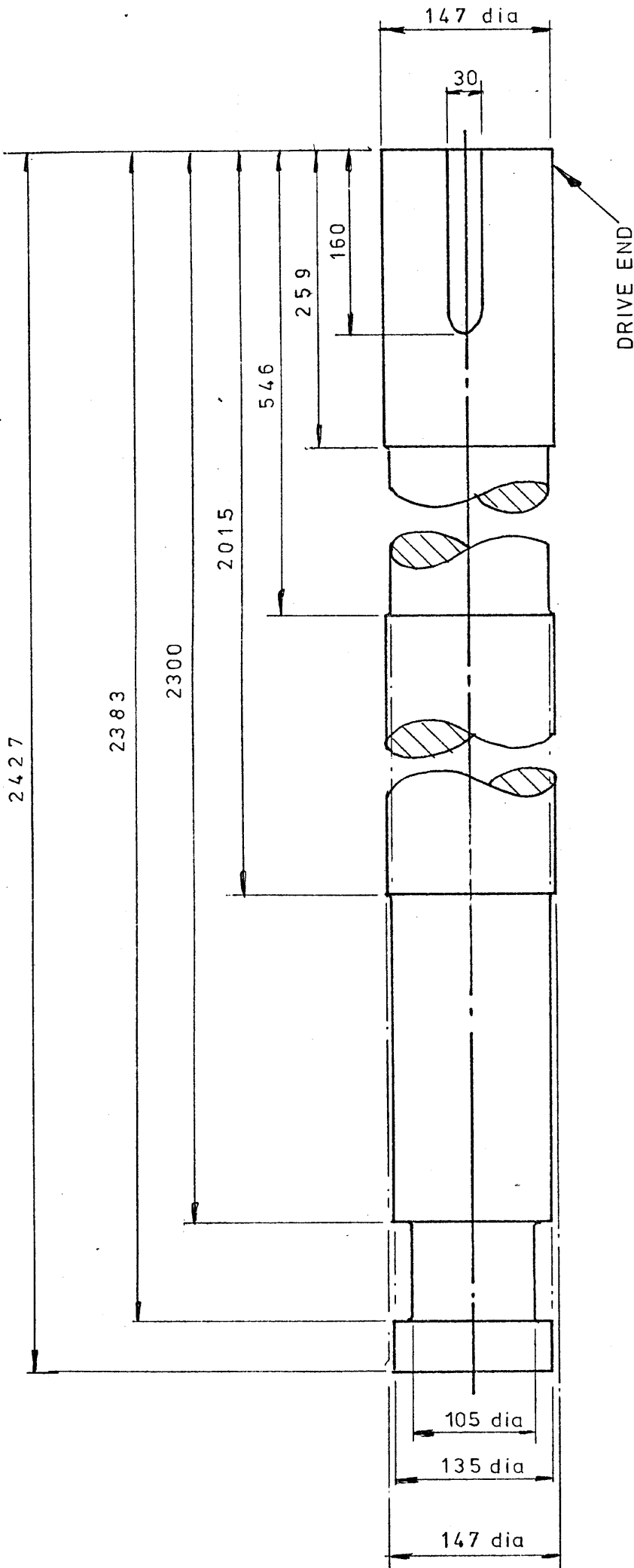
APPENDIX F3

FABRICATION, Component of pump-rods

Material: WROUGHT IRON

SCALE: ONE FIFTH FULL SIZE

JBG 8/76

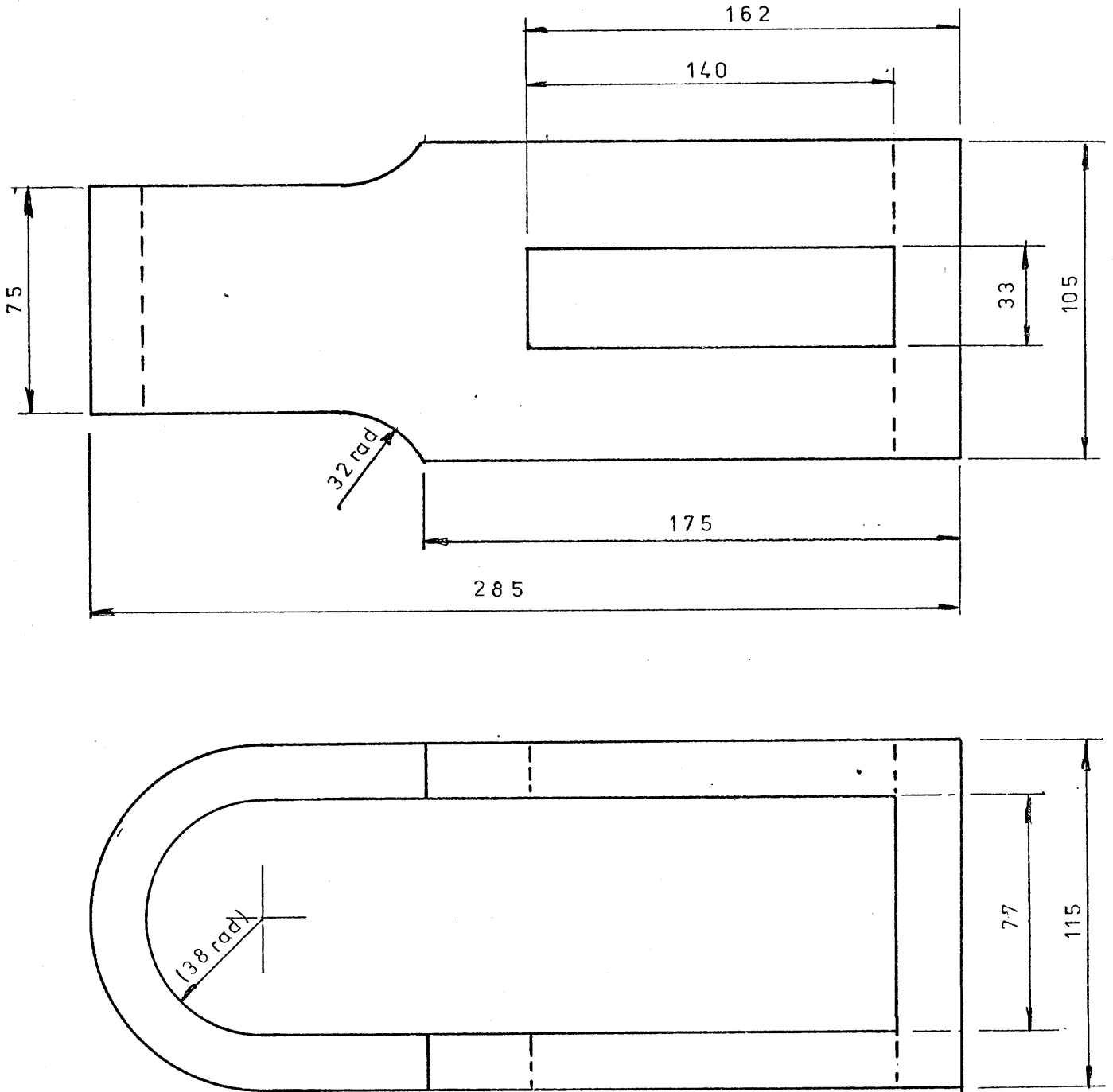


APPENDIX F₄

SHAFT, probably of the winding drum

Material : 'STEEL' (?)

SCALE : ONE FIFTH FULL SIZE

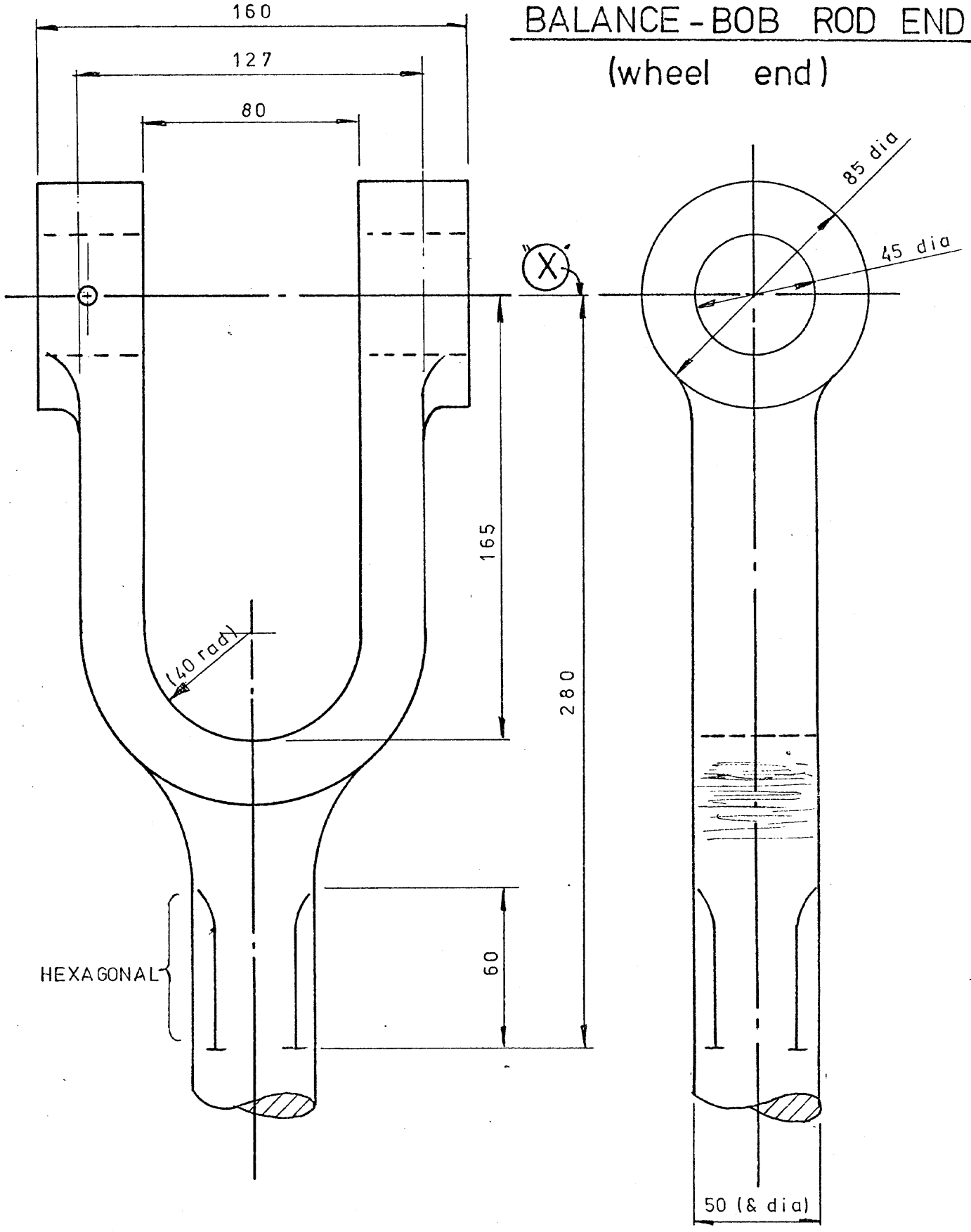


Material: WROUGHT IRON

Found in place on inner end of pumpwheel balance-bob connecting-rod

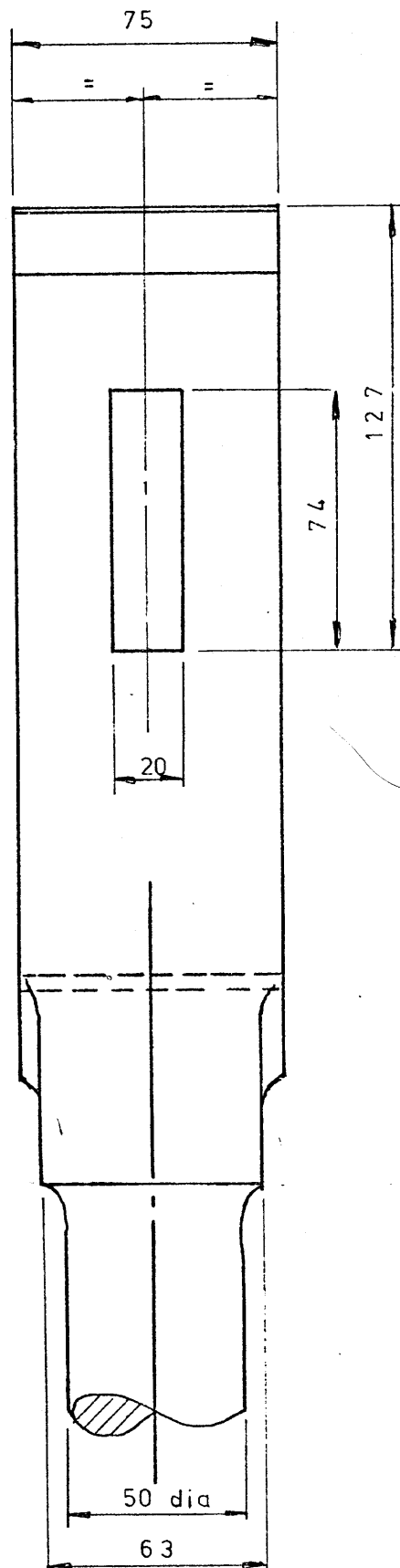
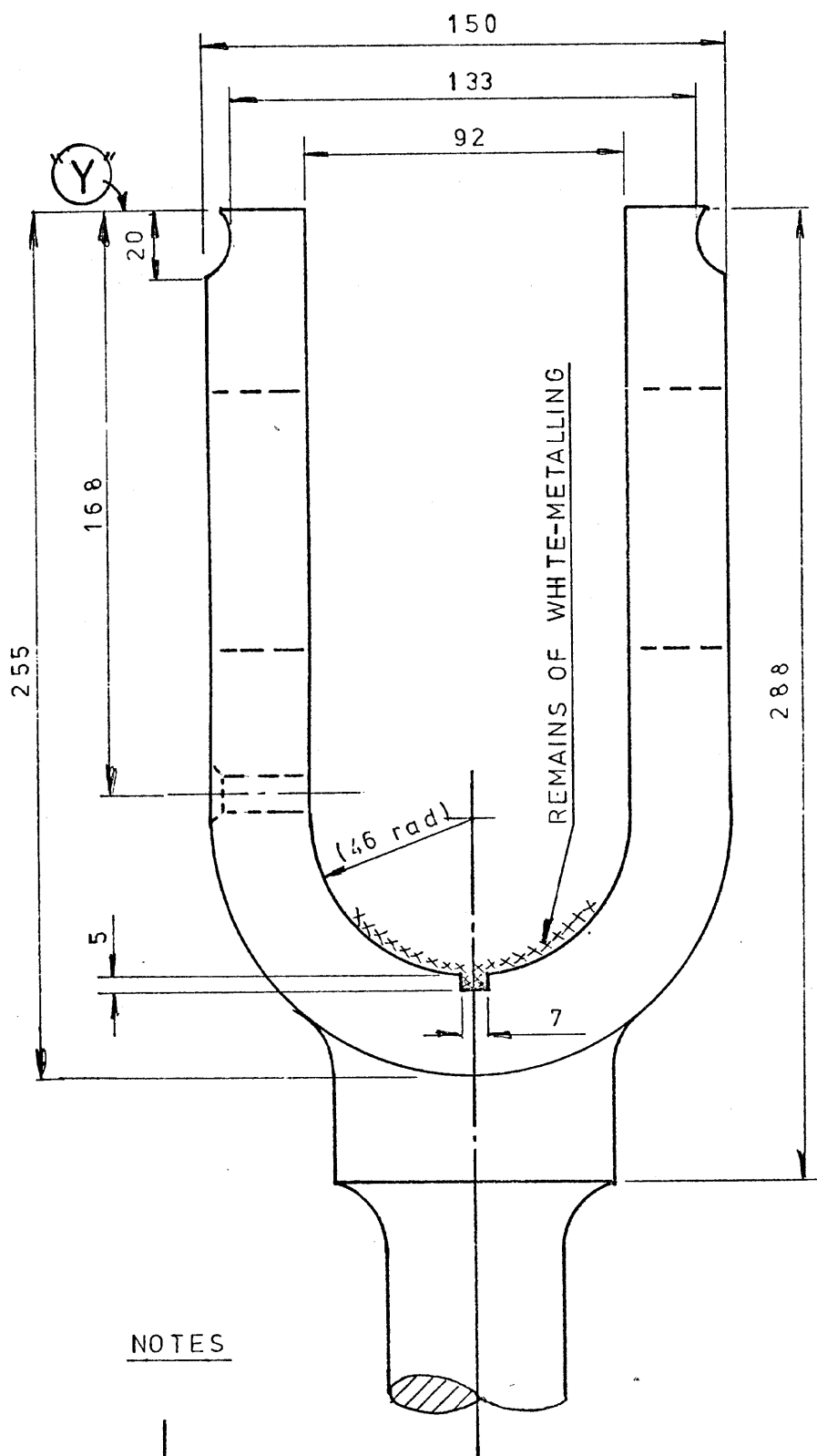
SCALE : ONE HALF FULL SIZE

BALANCE - BOB ROD END
(wheel end)

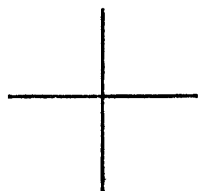


Material : WROT. IRON

SCALE : HALF FULL SIZE



NOTES



① DISPOSITION
OF ROD - ENDS

② ROD 9240 OVER CENTRE (X) APP. F_{6a}
AND FACE (Y) THIS PAGE. ROD WEL-
DED 5000 FROM CENTRE (X)

SCALE: ONE HALF FULL SIZE

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