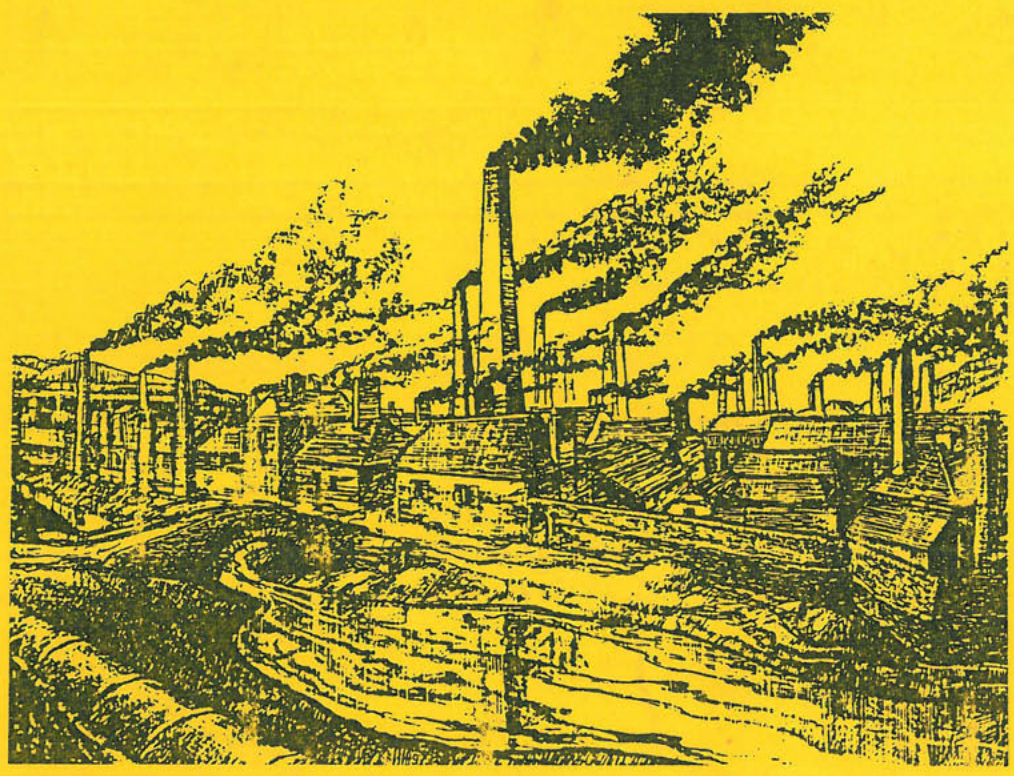
A4067/A4217



AND CROSS VALLEY LINK AT PENTRECHWYTH

The Glamorgan-Gwent
Archaeological
Trust Ltd.

APRIL 1991

THE A4067/A4217 AND CROSS VALLEY LINK

Report on a Watching brief July to September 1990

The cross valley road scheme, together with a bypass for Pentrechwyth, involves traversing land previously occupied by the copper industry, as well as heavily mined areas. In the case of the new cross valley road it crosses the sites of works which were very important during the period when Swansea was the "copper capital" of the world and, in view of this, the West Glamorgan County Council commissioned an Archaeological Assessment along the proposed route. Following submission of the Archaeological Assessment the Glamorgan-Gwent Archaeological Trust were invited to undertake a watching brief during the initial stages of road construction. The watching brief was conducted intensively during the months of July and August and at a much reduced frequency during September. Without the enthusiastic support of site personnel at all levels it is unlikely that the various artifacts etc found during clearance work would have been recovered.

Acknowledgements

The Glamorgan-Gwent Archaeological Trust is indebted to West Glamorgan County Council for providing the funding for this work and the subsequent report. In addition the Trust wishes to thank the West Glamorgan County Council Resident Engineer, Site Engineer and Clerks of Works for their willing assistance and support. The personnel of the main contractors, Edmund Nuttall Ltd, were also helpful and supportive during site inspections.

Site Preparatory Works

As set out in the Archaeological Assessment much of the new road runs over land previously cleared and regraded, with the result that considerable uncertainty existed over the state of any surviving below surface structures. Prior to commencement the portion of the link road running across the site of the Hafod works was expected to have below floor voids. In the event only the minimum of filling below floor level was necessary and elsewhere little disturbance of below surface features occurred (the road level was generally well above the original ground levels).

On the western side of the lower Swansea valley the new section of road (A4067) is routed over land once occupied by the Swansea Canal and the Morriston branch line of the Great Western Railway. The extent to which the original ground was exposed during preparatory excavation was minimal and the canal had been filled in some years earlier, prior to general regrading using industrial tip waste.

The section of the A4217 bypassing Pentrechwyth at its southern end crosses the line of the Swansea Vale railway, the Smith Canal and Middle Bank copper works. After the Upper Bank roundabout it traverses indifferent and made up ground where much mining took place in previous centuries. Approximately half of the route is in cutting and half on embankment. In one 400 metre long section where the road traverses shallow coal workings, ground stabilisation was necessary and this was achieved by drilling and injecting a cement/pfa grout into the voids.

Methodology

Although a watching brief was undertaken by Trust project staff, it was felt that cost savings could be implemented by reducing the amount of time such staff needed to spend on site. This was achieved without loss of archaeological information by involving site staff in the monitoring work, and explaining the reasons which lay behind it. Although this type of monitoring is not appropriate in all cases it was felt that the character of the industrial remains would permit this course of action. Involving the site personnel proved to be of crucial importance as the recovery of artifacts was due to them, rather than archaeological visitation. Site personnel also pointed out items of interest which came to light as work proceeded. The informal exchange of information which took place assisted in understanding some of the problems encountered as work progressed, particularly the possible origin of contaminants met with in certain areas.

Since the road scheme traversed areas of varying archaeological potential it was divided into sections. The degree of attention given to each section was naturally related to the degree of interest anticipated and the extent to which original ground was likely to be exposed. All sections of the new roads were inspected during and after ground clearance, as far as practicable without interfering with on going work.

In order to meet changes in demand and products that, inevitably, took place over the period during which both the Middle Bank and Hafod works were operational, ie about 170 years, changes in site extent and building arrangement are to be expected. Unfortunately without access to works drawings it is almost impossible to assess the implications of below ground features with certainty. In the case of artifacts, however, dating is difficult because working tools are very stable in design over long periods of time.

Archaeological Field Work (Map No 1)

Section A: Length of A4217 above Addis roundabout to Viking Industrial Estate

This length of road traverses an area of hillside landscaped and afforested. Items of archaeological interest were confined to those relating to former mines (items 11, 12, 14, 15, 16 and 20 of Archaeological Assessment), the hamlet Tir Bach (item 17), two farms (items 18 and 19) and a former wagonway (item 13). No obvious evidence of structures associated with items 11 to 20 were seen during site inspections or reported by site staff, apart from some brick and plaster possibly associated with the Tir

Bach hamlet. At various places cutting into previously undisturbed terrain took place but, again, nothing of significance was noticed.

Section B: Length of A4217 between Addis and Middle Bank roundabouts

Considerable removal of hillside was needed at the Addis roundabout site and part of the route towards the Middle Bank road junction. The archaeological interest along this section concerned the Upper and Middle Bank works (items 5 and 10) together with the Smith Canal (item 7). In order to provide a secure foundation the section of Smith Canal situated beneath the future road was filled in and only the minimum demolition of above ground features of indeterminate age took place. It was however necessary to demolish a 22 m long canal tunnel (NGR 6646 9496), presumably constructed as part of the canal works circa 1795. Since the canal lay between the road and the two works, this 'bridge' provided the main works access before the arrival of the railway.

During work on the canal a complete metallurgical works ladle was discovered by site staff and demolition of the bridge revealed a brick arched culvert presumably built as an integral part of the bridge. This four foot wide culvert ran above the canal and from the arch's generally clean appearance it does not seem to have been a flue, but rather a water channel. The function served by this culvert is uncertain as it was quite usual for streams at or above canal level to be used as top-up feeders but this does not seem to have been the case in this instance. Since the water was obviously of use in the works, it could have been either the feed channel for a water wheel within the works or a cistern. Without detailed knowledge of the eighteenth century Middle Bank works this will remain an unanswered question.

Section C: Middle Bank roundabout to present A4217

This section of road followed much of the railway track and involved some cutting into the hillside. Archaeological interest along this section centred on the Smith Canal (item 7), the White Rock works (item 8) and the discovery in 1835 of a Roman coin hoard in the vicinity (item 6). Waste from the White Rock works was taken by an overhead wagonway over the canal, railway and road to a, now cleared, site on the side of Kilvey Hill. Although it was necessary to cut back the surviving remains of the arch, work at the eastern base exposed a massive stone abutment. Nothing of archaeological significance was exposed where previously undisturbed hillside was penetrated.

Section D: Cross Valley Link

Since the cross valley link road crosses the sites of both the Hafod works (items 3 and 4) and the Middle Bank works (item 5) this section of the road scheme merited the greatest degree of attention, archaeologically. Fortunately the road is sited above the ground levels of both works and, as there was a secure base for embanking, only the minimum of ground level disturbance occurred.

While clearing an access way to the river through the Middle Bank works site a shallow stone arch was revealed and lower down a narrow cobbled

road, impregnated with metal salts, was cut through. In view of the differing levels of these structures it is probable that the works was 'terraced' and without works layout drawings it is unwise to attempt an explanation of their function in view of the long period of its use as an industrial undertaking (1755-1929). As could be anticipated at a copper works site the ground was contaminated by traces of non ferrous metals. In one area the concentration of arsenic reached ½%. The origin of this particular contaminant is uncertain because of the way in which the site had been demolished and graded after clearance during the lower Swansea valley project. There had been arsenic works, however within the valley and the 'fill' may have included some waste from these works. It must be appreciated, however, that arsenic was often present in the ores processed in the works. (lead, zinc and copper being examples). Arsenic is also added to both lead and copper in order to meet various material specifications.

The Hafod works site on the western bank of the river Tawe had the largest area of covered buildings of any works in the valley. These buildings extended right up to the river bank at various locations and it is at one of these points that the river crossing is sited. During preparatory works for the bridge abutment it became apparent that the early ground level was well below that of the works floor level. In view of the fact that the various broken artifacts were found during cutting into the bank to make way for the abutment, it is probable that material from the works tip provided the 'fill' behind the retaining walls. Since buildings up to the river's edge are shown on the 1879 OS map of the area it is very probable that the broken ladles, wheel barrow axle and wheel predate 1879.

Section E: Hafod to Cwm Level roundabouts (A4067)

For virtually the whole of its length this portion of new road runs over former railway property ie, the Swansea Canal (item 2) and the Morriston low level line. Previously the ground level had been built up using industrial tip waste. Initially archaeological interest centred on the former Mile End pottery (item 1), Landore Alkali works (item 21), Landore Steel works (item 22) and the pit shaft (item 23). Since the ground clearance remained within the boundaries of the railway property, the sites of the former industrial undertakings flanking the new road remained undisturbed.

During on site inspections, however, unforseen items attracted attention. Site staff reported the existence of an enigmatic pit at the southern end of this road close to the site of the new roundabout. Although initially the pit was thought to be associated with the railway, it was more probably a works railway weighbridge pit. Stonework associated with the Landore low level station appeared during shallow excavation. At the northern end, in the vicinity of the existing Cwm Level roundabout, the mine shaft (item 23) was clearly visible and unexpectedly operations connected with culverting the Nant-Rhyd-y-Filais revealed that its channel has a cobble stone floor. This stream is associated with the former Llangyfelach works, the first copper works in the valley.

FINDS

Below Ground Features

1 Middle Bank Copper works site

a) Brick arched masonry culvert NGR 6646 9496

This 4 feet (1.2 m) wide by 3 feet (0.9 m) culvert of standard design ran across the Smith Canal to the Middle Bank works site. Its function is uncertain and may have been built to carry water to the Middle Bank works. In which case there is a possibility that its origin was prior to the construction of the Smith Canal (c 1788).

b) Shallow masonry arch? NGR 6635 9497

This feature was exposed beside an access way driven down to the riverside. Its function is very difficult to determine since it could as easily be a well cambered road as an arch over a wide culvert or cellar. Extensive exploration would have been required to determine its function.

c) Cobbled road NGR 6636 9498

This section of narrow cobbled road, cut through by the access way, was heavily contaminated with copper? gelts.

2 Hafod works site

a) River bank walls NGR 6632 9502 (fig 2)

When cutting back the river bank in preparation for the bridge abutment three walls were cut through. These walls could either represent successive expansions in works extent or foundations carried down to original ground level. Based upon their position in relation to the covered areas indicated on Map No 2 these walls were in place prior to 1879.

It was from the fill in this vicinity that the Hafod works artifacts were recovered.

b) Weighbridge pit NGR 6608 9536 (fig 1)

This pit was approximately 14 feet (4.3 m) by 6 feet (1.8 m) in plan by 5 feet (1.5 m) deep, entered by a concrete stairway. Behind the concrete facing was a rough masonry wall and the top 2 feet (0.6 m) of the pit was protected by metal plate.

The existence of rails (3 ft 9 in centres) leading to the pit and its relationships to a building shown on OS maps c 1930 suggests that it was a weighbridge pit. Its date is probably early twentieth century.

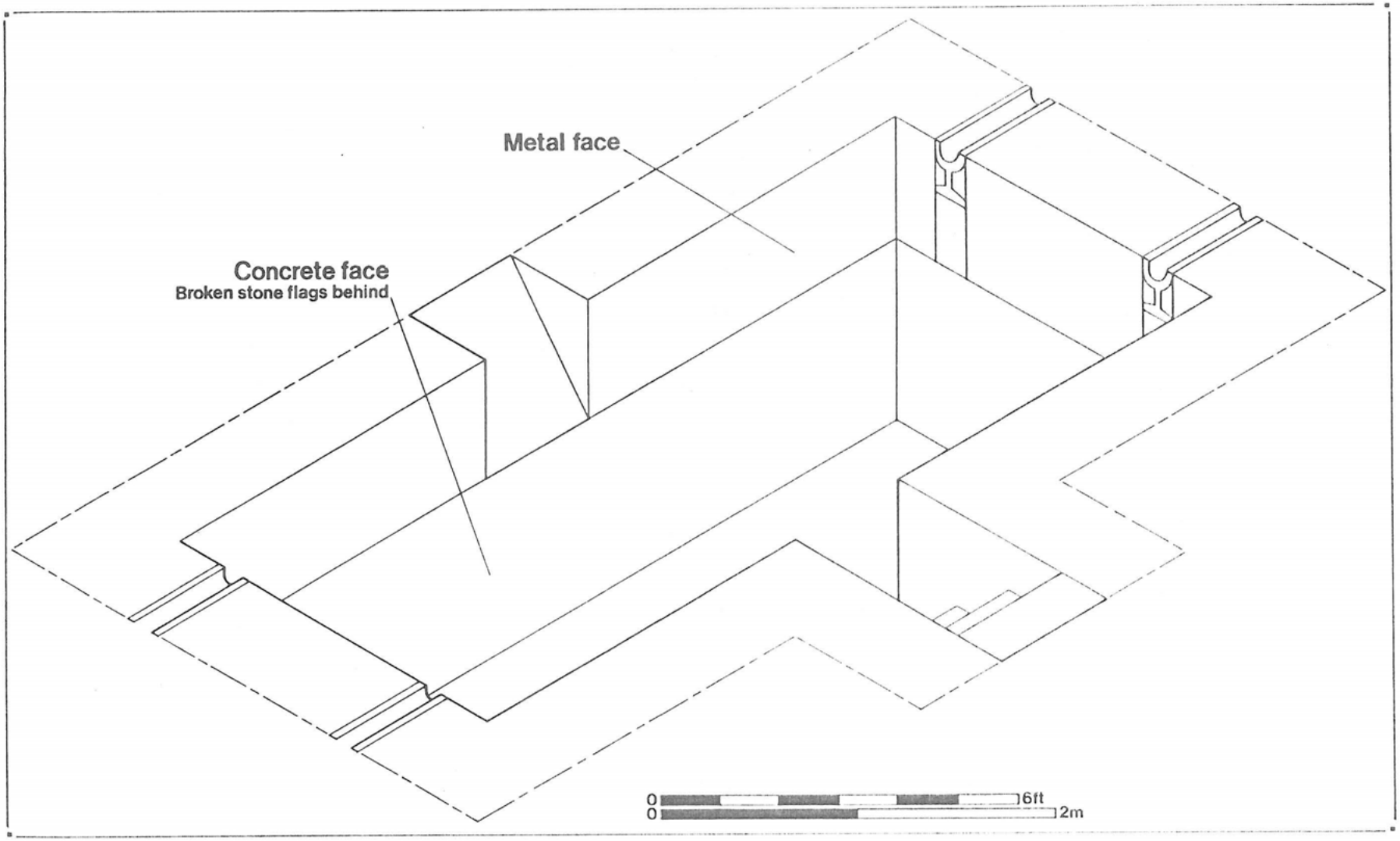
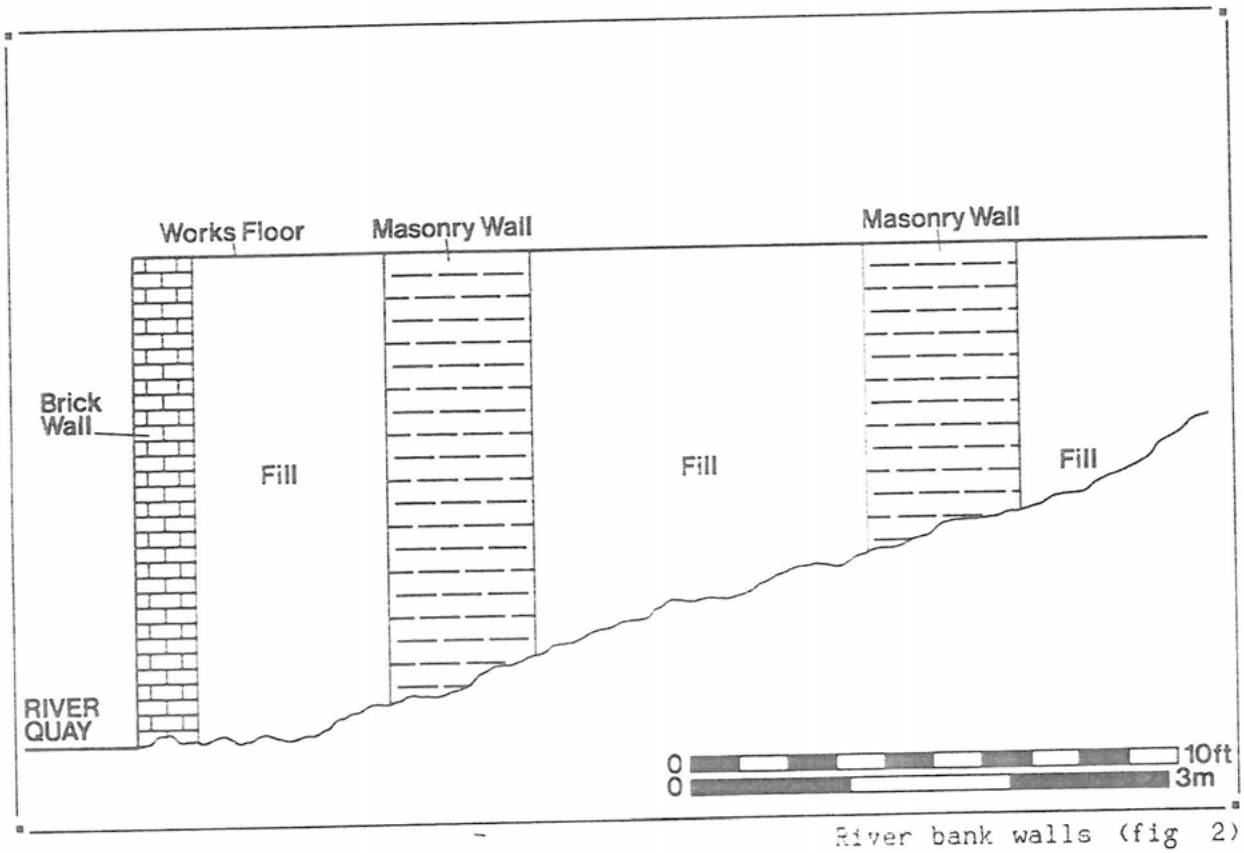


fig 1 Weighbridge pit



River bank walls (fig 2)

3 Cwm Level

a) Culvert carrying stream beneath Swansea Canal NGR 6617 9586

The culvert was exposed and the flow channel floor was in cobble stone.

4 Pit Head Shaft NGR 6617 9583 (2653 w) (fig 9)

This 10 ft (3 m) mine shaft of eliptical cross section was known as the Tir Glyn Dwr or Drews Pit and the date of sinking is unknown.

Artifacts

Once an industry has closed down its special tools and implements rapidly vanish unless deliberate efforts are made to retain them. The unexpected recovery of metal implements used by the copper industry are, therefore, an important result of the archaeological interest displayed by the site staff. Most importantly the context in which they were found places them, with two exceptions, prior to 1879.

a) Hand Ladles (figs 2 and 7)

The final stages of the 'Welsh' copper process were judged on the basis of samples extracted from the furnace. All the four wrought iron ladles could well have been used to extract samples or alternatively still larger ladles used to transport the pure copper product for casting.

The three ladle ends came from the Hafod works and the complete long handled ladle was found in the Smith Canal which ran behind the Middle Bank copper works.

b) Barrow Axle and Wheel (fig 4)

In view of the distance between the axle stubs at each end, together with the narrow iron wheel rim this would appear to have been part of a 'cake' barrow. In the 'wet' processing of chemicals filter presses are used to separate solids from liquids and wide fronted wheelbarrows were used to collect the solid 'cake' scraped from the filter plates.

Since this artifact was found at the same time as the broken ladles it must predate 1879. As 'cake' barrows of similar design were still in use around the middle of this century the difficulty of dating such objects is apparent.

c) Yoke (fig 5)

The two man wrought iron yoke was probably used for transporting the 'hand ladles' which would have contained 56 lb (25 kg) of molten copper from the furnace to the casting moulds.

d) Wrought Iron Handle (fig 5)

This iron handle was found at the same time as the broken ladles, wheel and axle and presumably dates before 1879. In view of the size of the attachment rectangle and the rectangular cranked end, it may have been an actuating lever, otherwise its use is unknown.

e) Torch Lamp (fig 6)

Although this flare lamp was found during preparation work for the bridge abutment beside the Hafod works it is of a much later date than the other finds. This lamp is a Wells unbreakable Torch Lamp No 18a produced by A C Wells and Co. The fuel used was probably naphtha and the lamp's probable date is late nineteenth/early twentieth century.

A4067/A4217 CROSS VALLEY LINK FINDS SUMMARY

Description	Nat Grid Ref		Archaeological References					
	Easting	Northing	Site Details		County Site Record No (PRN)	Illustration Figure No	Site Identification	
			No on assessment	Name			Letter	Map No
Weighbridge? Pit **	6608	9536	3	Morfa Works	841 and 1121 w	1	A	2
River Bank Walls ** Broken Ladles * Hand Barrow Axle and Wheel* Transporting Yoke * Handle? * Torch *	6632	9502	4	Hafod Copper Works	842 w 1583 w	2 3 4 5 6	B	2
Complete Ladle *	6641	9494	7	Smith Canal	~~C16~~ 01073.0w	7	C	2
Wagonway Abutment	6639	9478	8	White Rock Works	829 w		D	2
Bridge Over Smith Canal***	6646	9496		Canal Crossing***	2654 w	8	E	2
Culvert Under Swansea Canal **	6617	9586		Nant Rhyd y Filais Outfall			G	1
Pit Head Shaft **	6617	9583	23	Pit	2653 w	9	F	1

* Deposited in Swansea Industrial and Maritime Museum
** Not Visible
*** Removed Completely

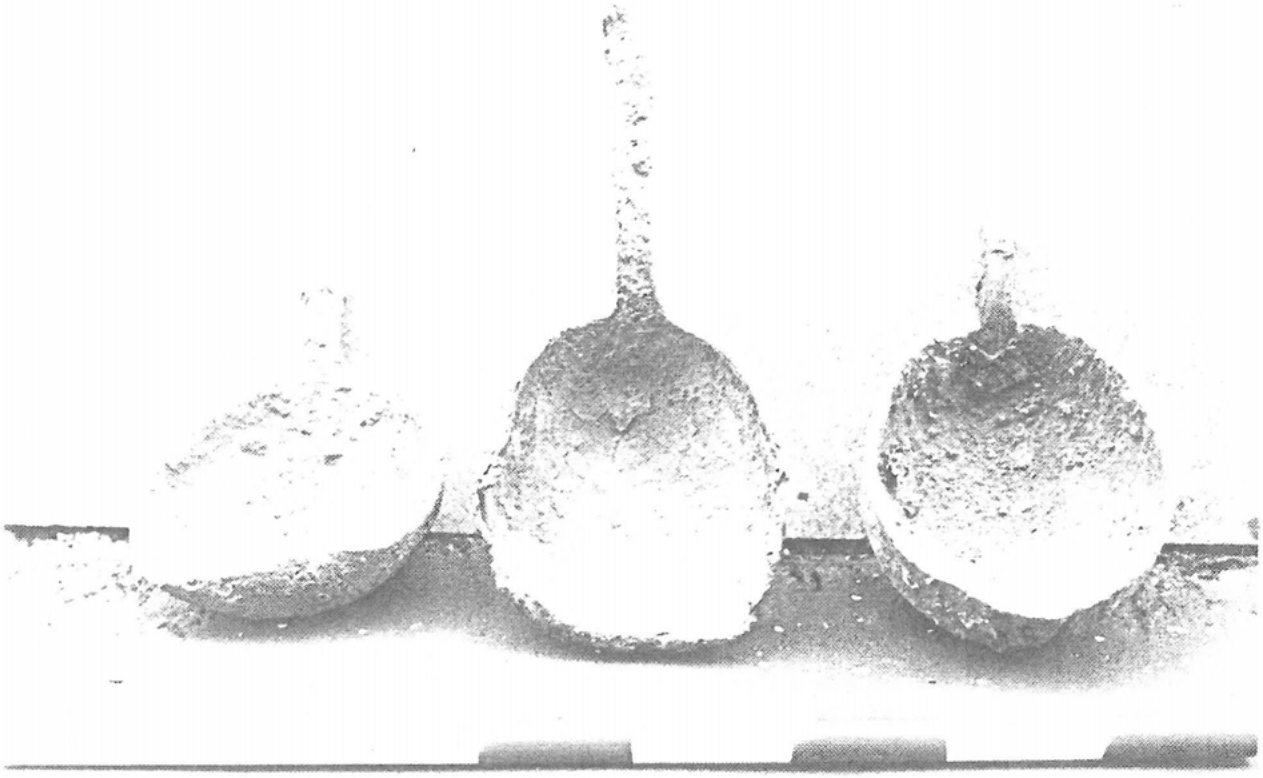


fig 3 Hand Ladles

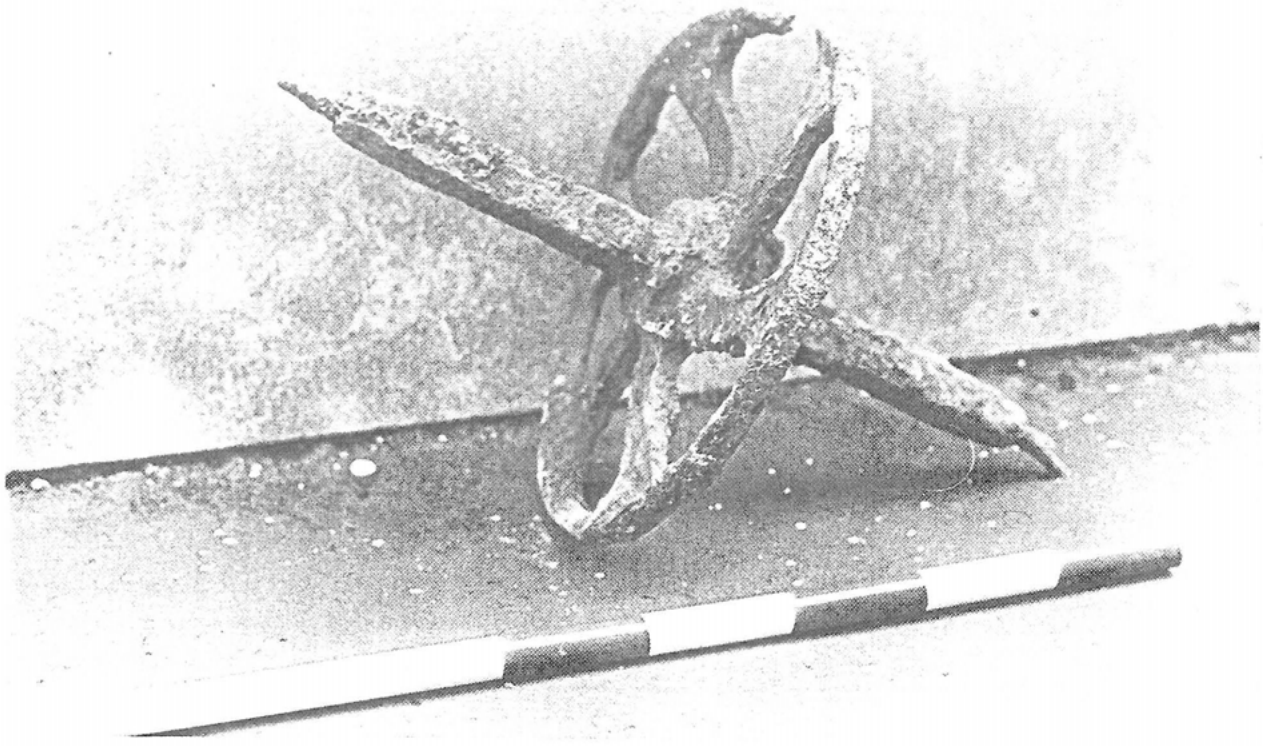
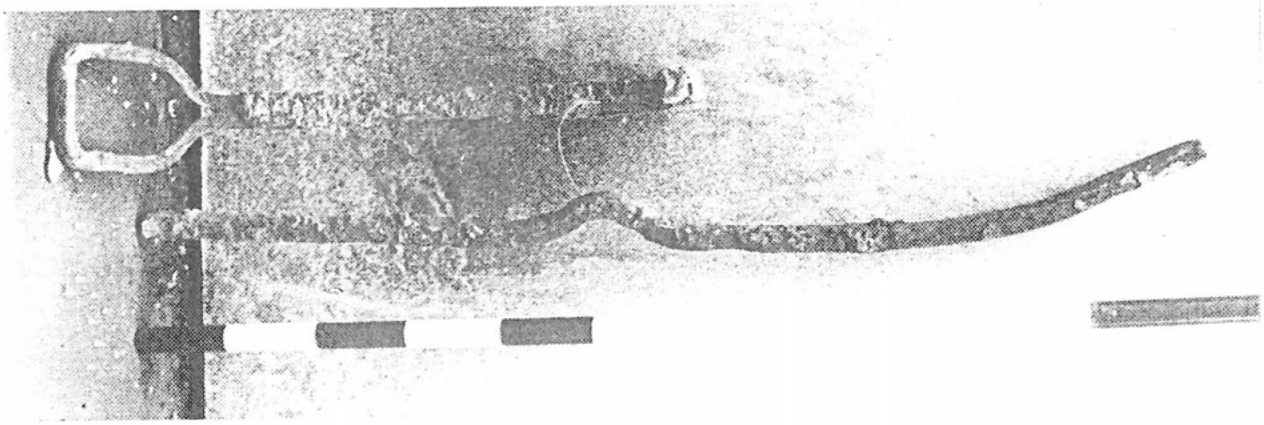
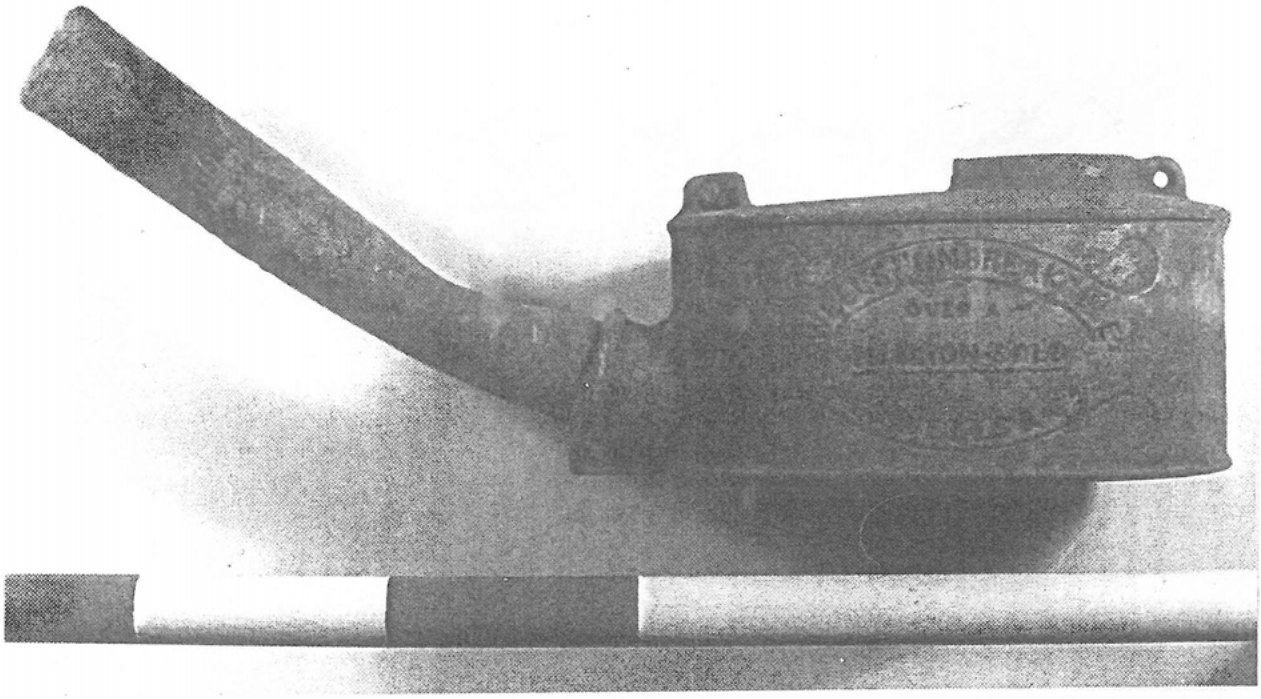


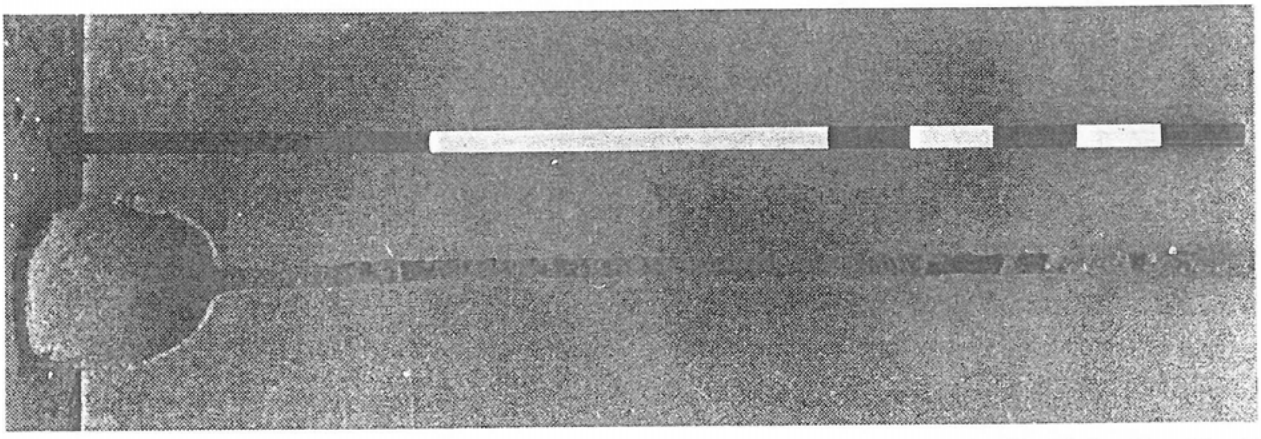
fig 4 Barrow Axle and Wheel



Wrought Iron Handle and Yoke fig 5



Torch Lamp fig 6



Hand Ladle fig 7

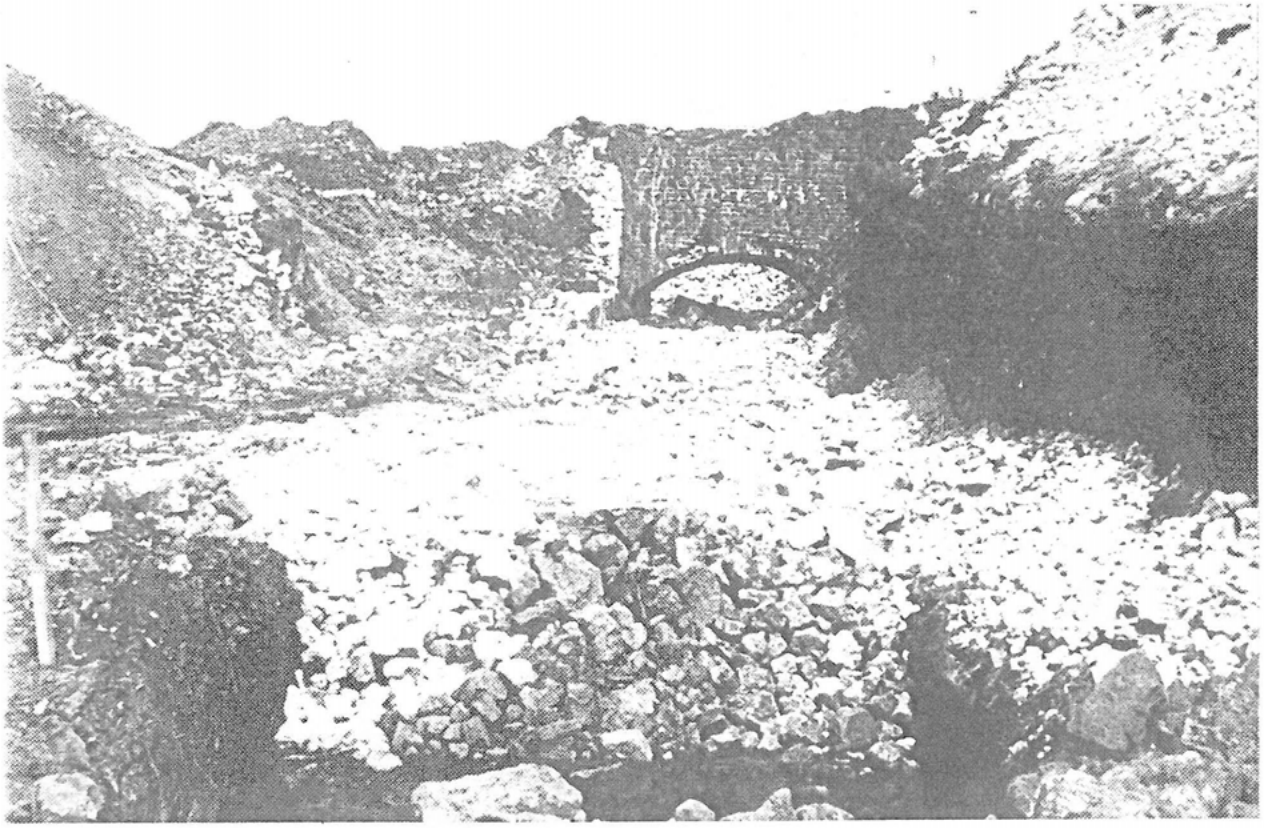
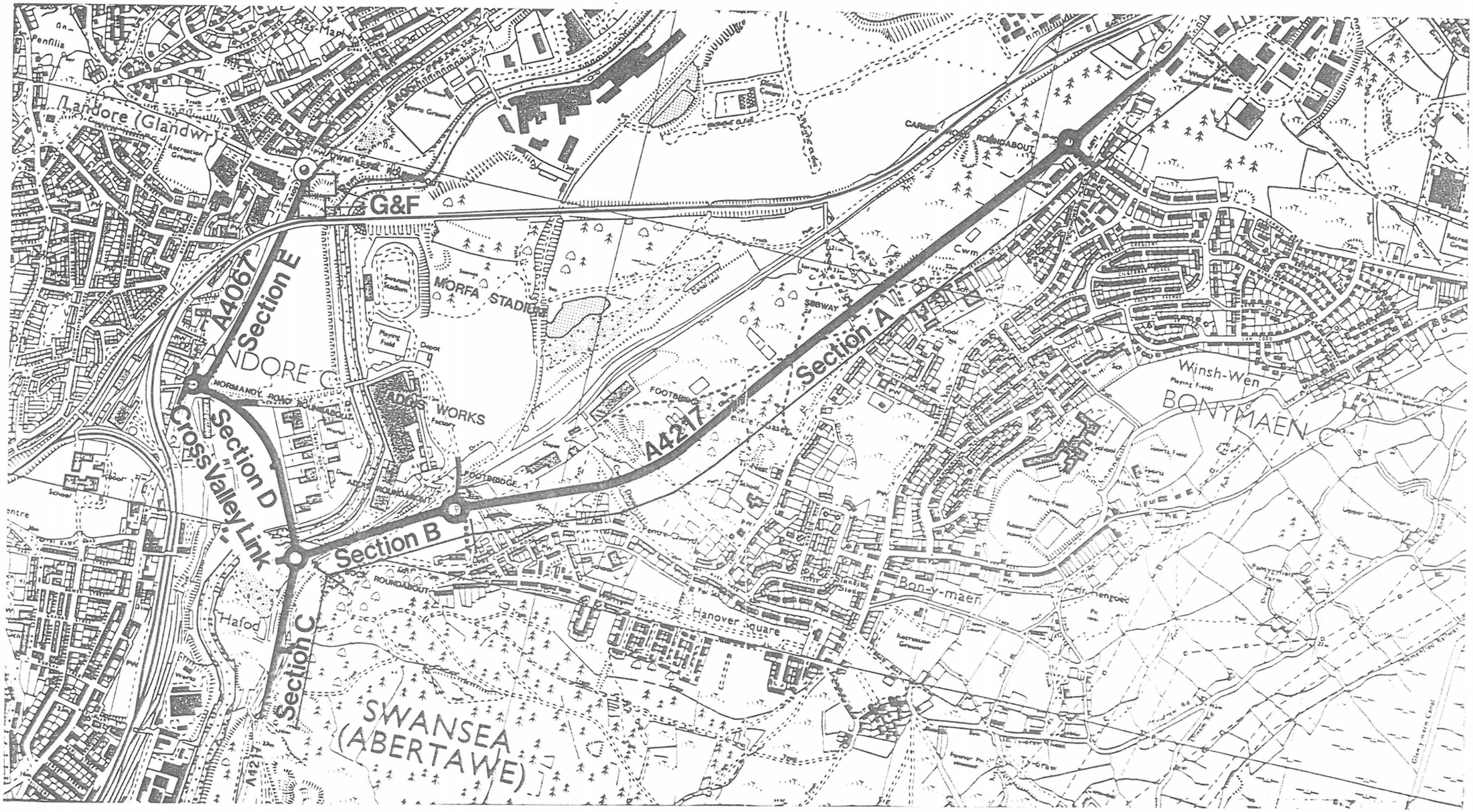
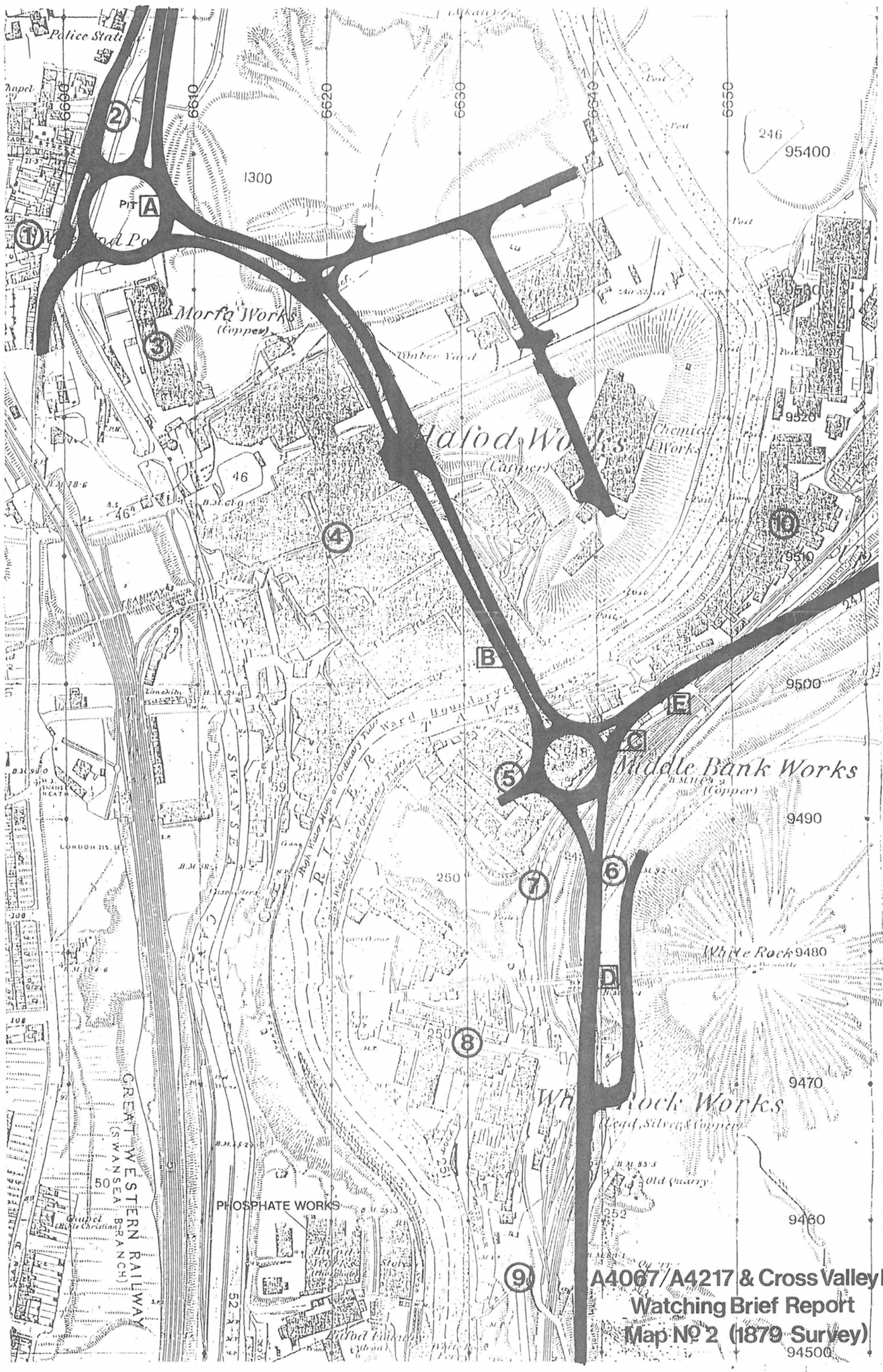


fig 8 Bridge Over Smith Canal

fig 9 Pit Head Shaft



A4067/ A4217
& Cross Valley Link
Watching Brief Report
Map№1



A4067/A4217 & Cross Valley Link
Watching Brief Report
Map No 2 (1879 Survey)