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Event PRN
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SURVEY OF ALPINE BRIDGE, HAFOD, CARDIGANSHIRE

Commissioned by Welsh Historic Gardens Trust
from Dyfed Archaeological Trust

HAFOD: ALPINE BRIDGE

The Site

Alpine Bridge lies at a slight narrowing of the channel of the River Ystwyth. On the southern bank bedrock outcrops. A bridge abutment is founded on this. Directly above it the valley side rises steeply. In the centre of the river channel bedrock also outcrops on which a pier is constructed. The southern edge of the river channel is defined by a steep 3-4m high bluff. This levels out into a 10-12m wide river terrace before rising a further 5-6m into a second terrace. These terraces seem to be composed of glacial gravels.

The approach track on the northern bank diverges from the track that now leads the kitchen garden some 70m the north-east of the bridge. It then turns sharply to the south-west and runs diagonally down the face of the second river terrace before turning to the south to meet the bridge via a 3m high embankment. Probing shows this track to be metalled below its turf cover. It is about 3.5m wide, though narrows where it runs diagonally down the river terrace. This narrowing is not original and seems to have been caused by soil and rubble having been dumped down the face of the second river terrace, perhaps in an attempt to widen the track to the kitchen garden. Pottery, probably of late 19th century, is mixed in with this dumped material.

There are several approaches to the bridge on the southern bank. The main track is about 3m wide and runs diagonally down the steep valley side from the east. This track may have been metalled, but this is uncertain as its surface has suffered severe erosion. One path leads off from the bridge to the west and a second runs to the south-west up the steep valley side. A further path to the east is of less formal character.

The South Abutment

This abutment is founded on bedrock and voids in its masonry on the eastern side suggest that the whole structure encases an outcrop of rock. The character of the stonework indicates two clear periods of construction. The first, from foundation level up to the top of the battering, is composed of large, squared stone slabs about 0.15m thick and up to 1.5m in length (drawings 5 and 6). Mortar, where it survives, is of a white lime mix. The north face has been repointed with cement. Three voids in the south face below the distinct line of overhanging masonry are 0.9m deep. The eastern end of the battered masonry has been partly destroyed, with the eastern end rebuilt with river boulders. The second phase of stonework comprises a randomly coursed masonry wall 1.6m high and 0.9m thick. It sits on the top of the battered wall described above. The mortar is a white lime mix. This wall acts as a retainer to the remainder of the second phase abutment composed of dry-stone walling (see photograph 4). On the eastern side, this dry-stone walling continues for approximately 11m as a revetment for the approach track.

A third phase of construction can be detected in this abutment,

though not represented by masonry. It comprises a 1.2m wide, 0.4m deep slot cut into the top of the abutment and two shallow recesses or ledges cut into the battered face.

This abutment is in good condition apart from several saplings which have taken root in it and the upper 0.5m of masonry which is loose due to rainwater percolation.

The North Abutment

This abutment is built out from the river's northern bank. Three clear phases of masonry can be detected. The first, up to the top of the battered wall face, comprises large, squared stone slabs, 0.15m thick and up to 1.2m in length set in white lime mortar mix (drawings 7 and 8). The lower part of this walling has been encased in concrete. Three 0.9m deep voids just below the overhanging masonry course on the south face probably accommodated timbers. The western end of the battered wall face has been partly destroyed. The second phase of masonry sits on the top of the battered wall face. It consists of a 1.8m high, 4.2m long and 0.9m wide wall. This wall has been heavily repointed with cement, though on its eastern side some of the original white lime mortar can be seen. The character of the core of the second phase abutment is unknown; the eastern side is encased by a later wall while the western seems to have experienced several periods of rebuilding and repair. The third phase of construction is represented by low, dry-stone walling on the top of the abutment. The configuration of this walling in plan indicates part on it was for a splay to the bridge. This stonework is now very loose. Two shallow recesses or ledges cut into the face of the battered wall are also of this phase. It is probable that the massive concrete plinth around the base of this abutment belongs to this phase as does the encasing wall on the eastern side. This steeply sloping wall is founded on the concrete plinth. It is built of reused, dressed blocks of stone with courses of stone slabs. Cement is the bonding agent. There are two slabs of white marble in the upper courses of this wall.

The upper 0.5m of masonry is loose due to rainwater percolation. There is some very loose stonework on the western side - this needs repointing.

Central Pier

Four phases of construction are visible in this pier. The first phase consists of the upstream cutwater and the main body of the abutment as far west as the distinct cracks in the south and north elevations. Part of the downstream cutwater of this phase can be seen in the crack in the south elevation. This phase of the pier is firmly founded on a bedrock outcrop. It survives to about 2.2m above the outcrop and is composed of squared slabs about 0.12m thick and on average 0.8m long. Tooling marks can be seen on the stones used in the cutwater. The original length of this pier including cutwaters would have been about 2.8m. In phase two the pier was extended downstream. The total length of the pier extended to 5.6m. It was also heightened up to at least the two projecting stones shown on the drawings (drawings 9 and

10). The masonry in this phase consists of squared slabs 0.15m thick and up to 1.6m in length. There are no obvious tooling marks on the stones. The masonry of this phase is not founded on bedrock but on large boulders resting on the river bed. On the north-west corner one of these boulders has been washed out and now lies several metres downstream. Phase three consists of all the structure above the two projecting stones apart from a few very loose stones on the top. The narrowing of the pier in the upper 1.6m was for economy and does not indicate a separate phase. The masonry in this phase is random with large, squared quoins, some of which have tool marks. Phase four consists of some very loose rubble and rotted timber on the top of the pier. Two 0.2m deep voids on the north side and two corresponding voids on the south are beam holes associated with this phase.

There has been some subsidence of the western part of this structure causing large cracks to open up at the junction of the phase one/phase two piers. On the south side the crack continues above the height of the phase one pier where it has been filled with water-worn stones. On the north side the crack has been partly filled with cement.

Apart from the undercutting of this pier on its north-west corner this structure is in very condition though the four beam holes have loose stonework surrounding them which needs to be treated and a major stone on the upstream cutwater has been displaced.

Phasing and Comments

Four phases of bridge construction are detectable in the surviving masonry, but the full sequence is only present in the central pier. The first phase is not visible in the bridge abutments (drawing 14), but it is assumed that some form of stonework must have been present on the banks; this has either been demolished or incorporated into later work. Thus the first phase of the central pier is the only remains of this bridge. It is probable that this is the 'long alpine bridge' referred to by Cumberland in 1796 and drawn by Thomas Jones of Pencerrig in 1786-7.

The second phase of construction was more substantial; much of it survives. The stonework on the two abutments up to the top of the battered walls is of this phase plus the full width of the central pier up to the projecting stones. The central pier has been reconstructed on drawing 14 to show a ridged or battered top and a full course of projecting stonework. Three holes below the projecting masonry course on the north abutment and three on the south abutment undoubtedly accommodated timbers, but these may have been for scaffolding used during construction rather than bridge supports. It seems probable that this phase of construction is the 'stone bridge' referred to by a tourist as being built in 1797 and is the one described and drawn by Wood in 1813. Wood's illustration shows a central pier with a ridged top and two timber arches with the bridge decking approximately twice the height of the central pier. If this is correct then there must have been further stonework, now gone or hidden, on the abutments to support this decking. It also suggests that the

approach tracks, in particularly the northern one on the embankment, were constructed at this time. It is of interest to note that though the courses of projecting masonry on the central pier and south abutment are the same height, that on the northern abutment is lower; this would have meant a slightly asymmetrical arch on this side. The width of the battering on the abutments and central pier, circa 4m, and the nature of the approach tracks indicate a substantial bridge, probably one capable of taking wheeled traffic.

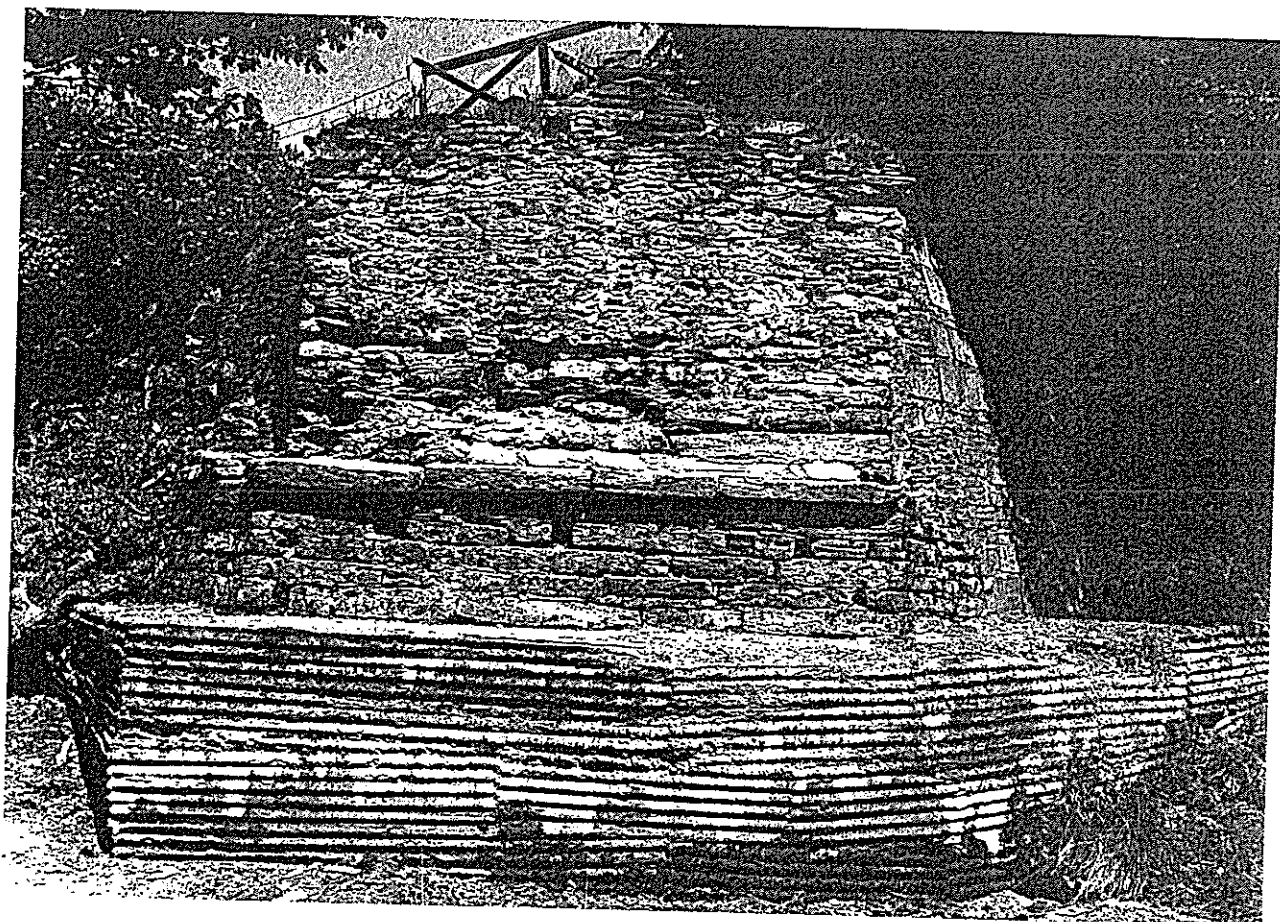
In phase three the masonry of the abutments and central pier was raised to the present height minus a few later additions. If the suggestions concerning phase two are correct then these additions may have encased earlier stonework on the abutments and necessitated the demolition of the ridged top of the central pier. It is suggested by Kerkham and Briggs (1991) that this was the work of John Waddingham in the 1870s-80s. This bridge could not have been more than 2.7m wide - the width of the top of the central pier.

In the final phase narrow, poor quality stonework was added to the top of the north abutment and central pier and a slot cut into the top of the south abutment. The purpose of this work was to provide foundations for horizontal bridge decking. The holes in the central pier and the recesses in the battering of the abutments were created in this phase to accommodate timber struts. It seems probable that the cutting of the recesses resulting in the severe damage to battered walls visible today. This bridge was about 0.8-0.9m wide. Drawing 14 shows details of the surviving timbers. A date of 1937 is inscribed on one of the timber posts of this bridge.

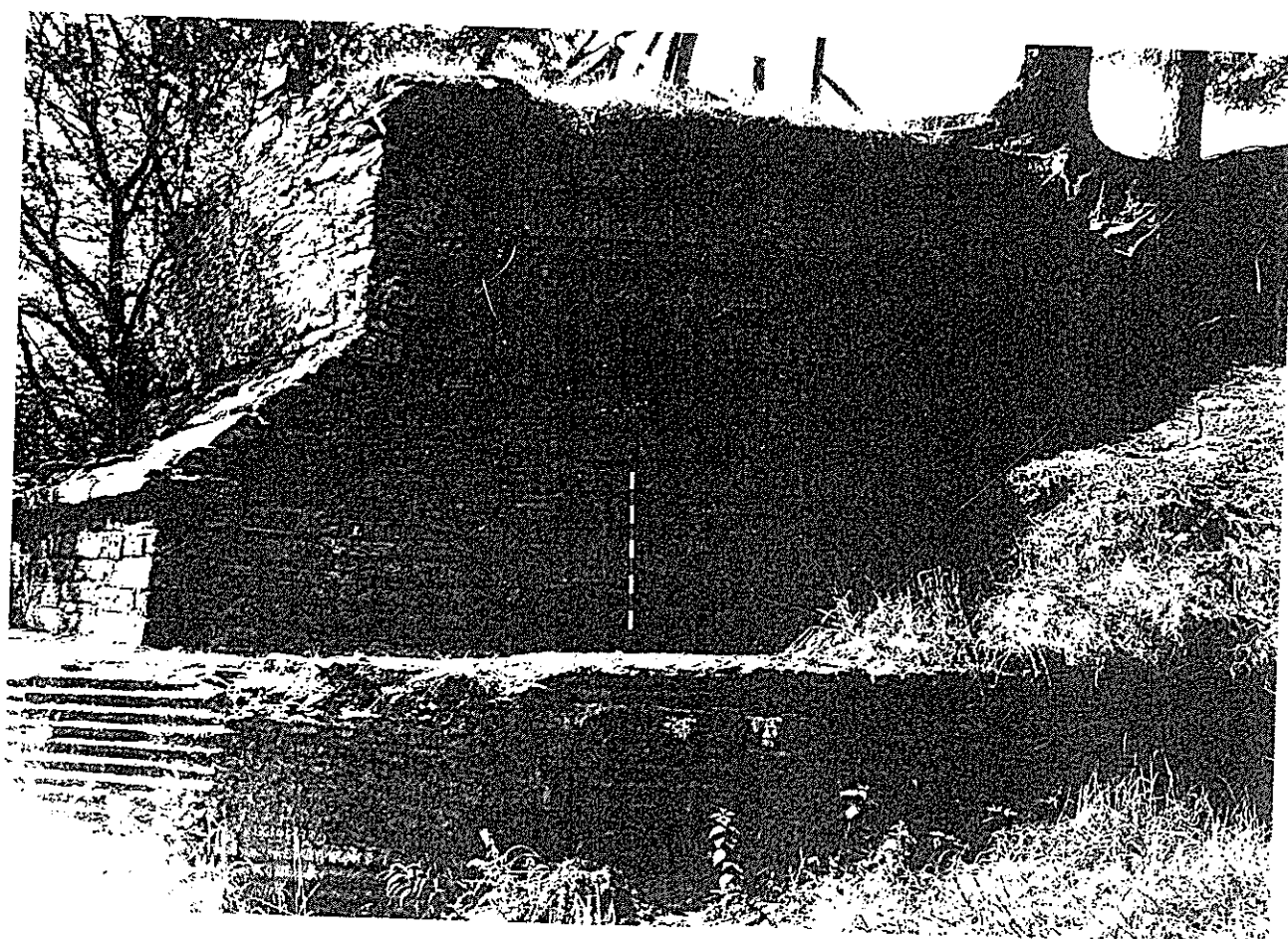
Kenneth Murphy. Dyfed Archaeological Trust. June 1993

PHOTOGRAPHS. Scale 1m in length.

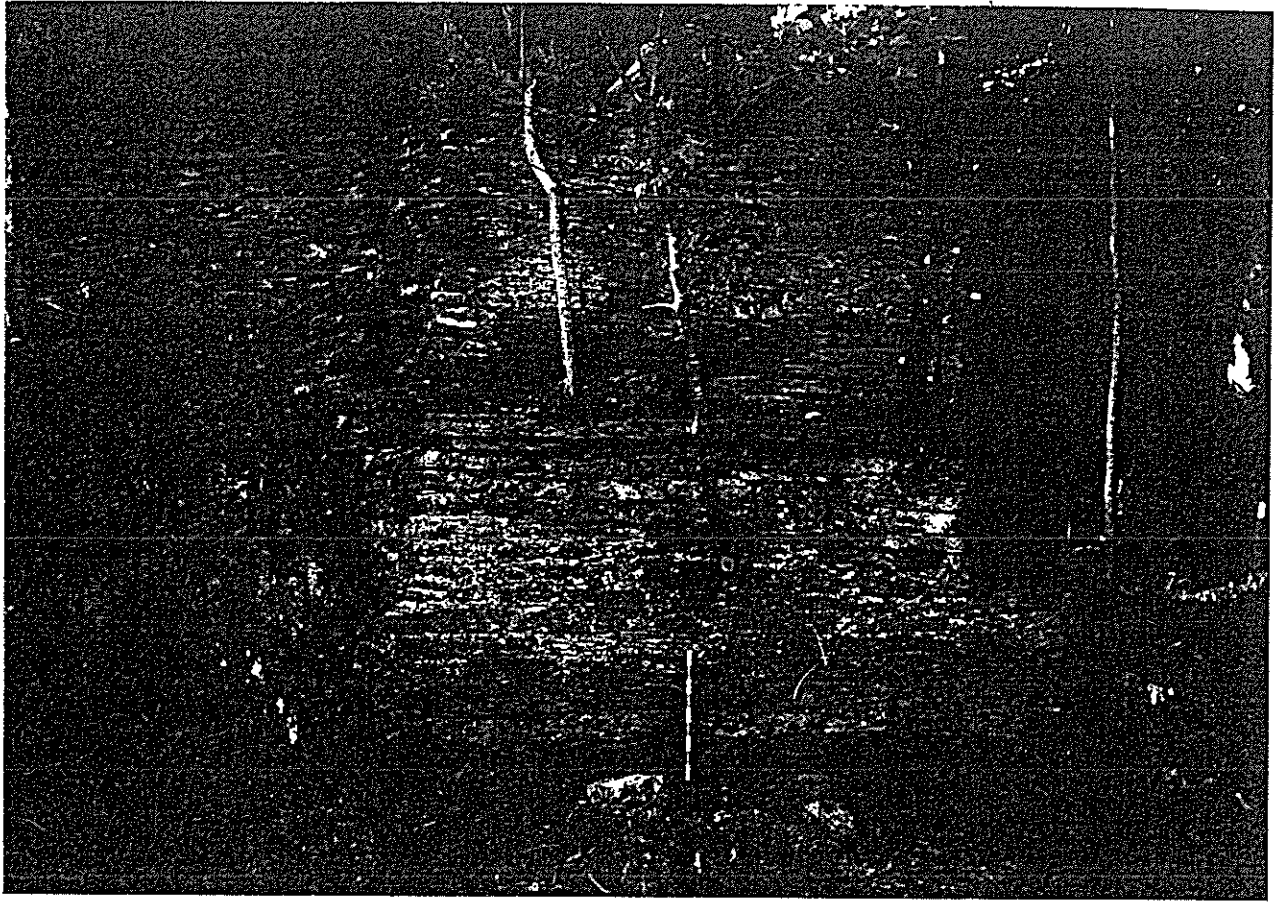
1. North abutment, south face. Lower portion of abutment encased in concrete. Note the poor condition of the stonework on the western end of the battered face and the different character of the masonry above the batter.
2. North abutment, east elevation. The steeply sloping wall of reused stone rests on the concrete plinth.
3. South abutment, north face. Note the poor condition of the stonework on the battered face and the different character of the masonry above.
4. South abutment, west elevation. Note the character of stonework on the battered face in contrast to the wall above. Also the un-mortared masonry behind this wall.
5. The approach track to the northern side of the bridge.
6. Central pier, south elevation.
7. Central pier, upstream cutwater.
8. Central pier, north elevation and downstream cutwater.



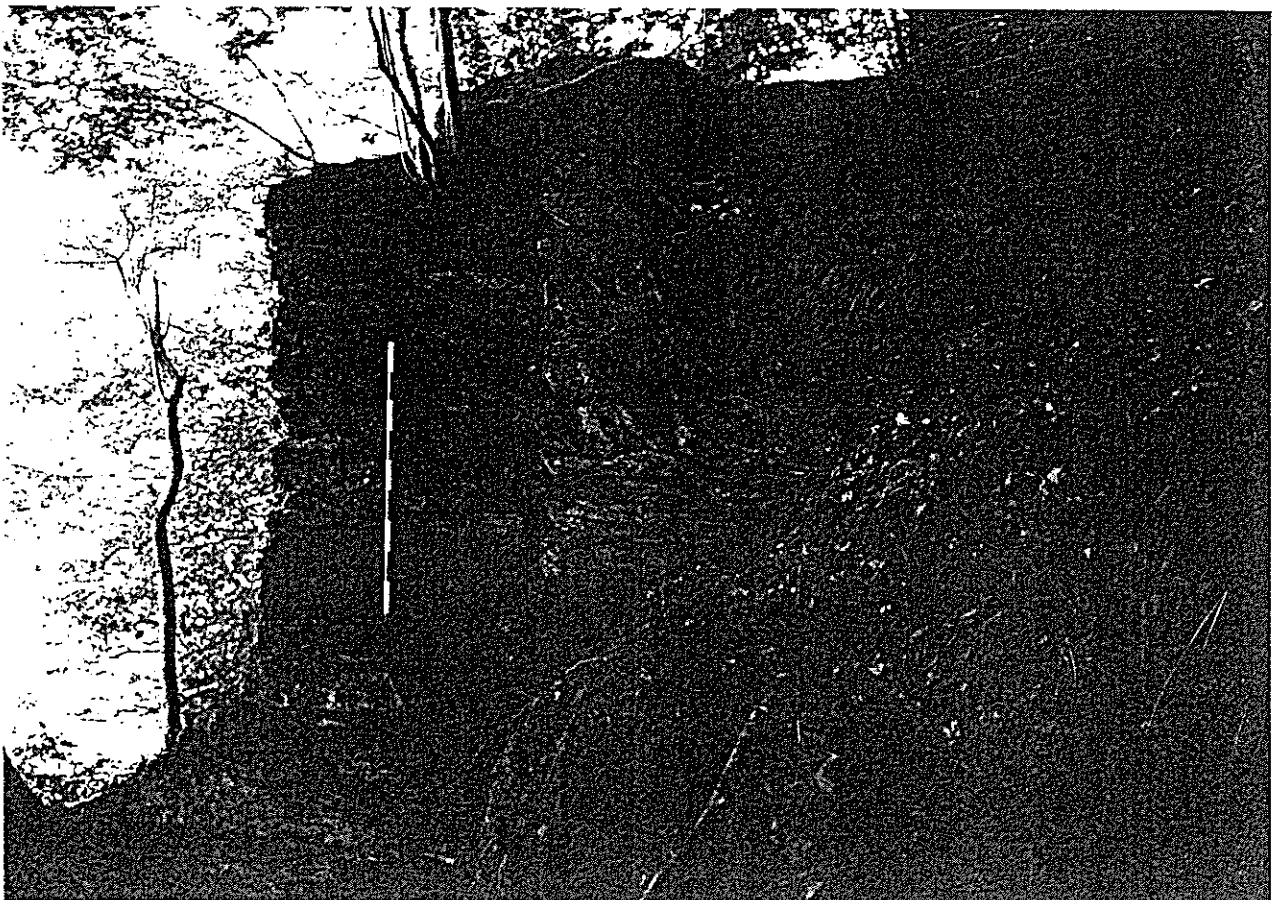
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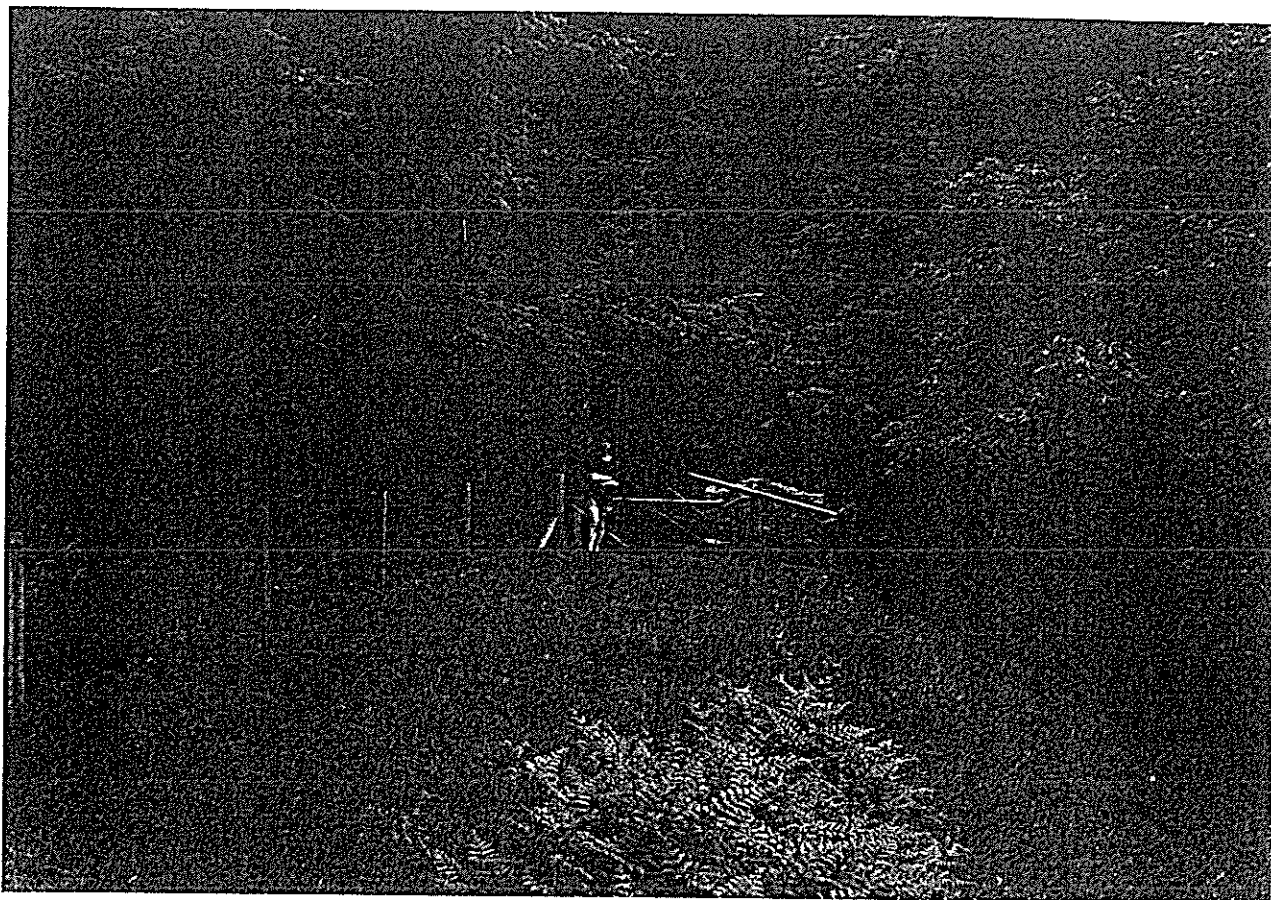
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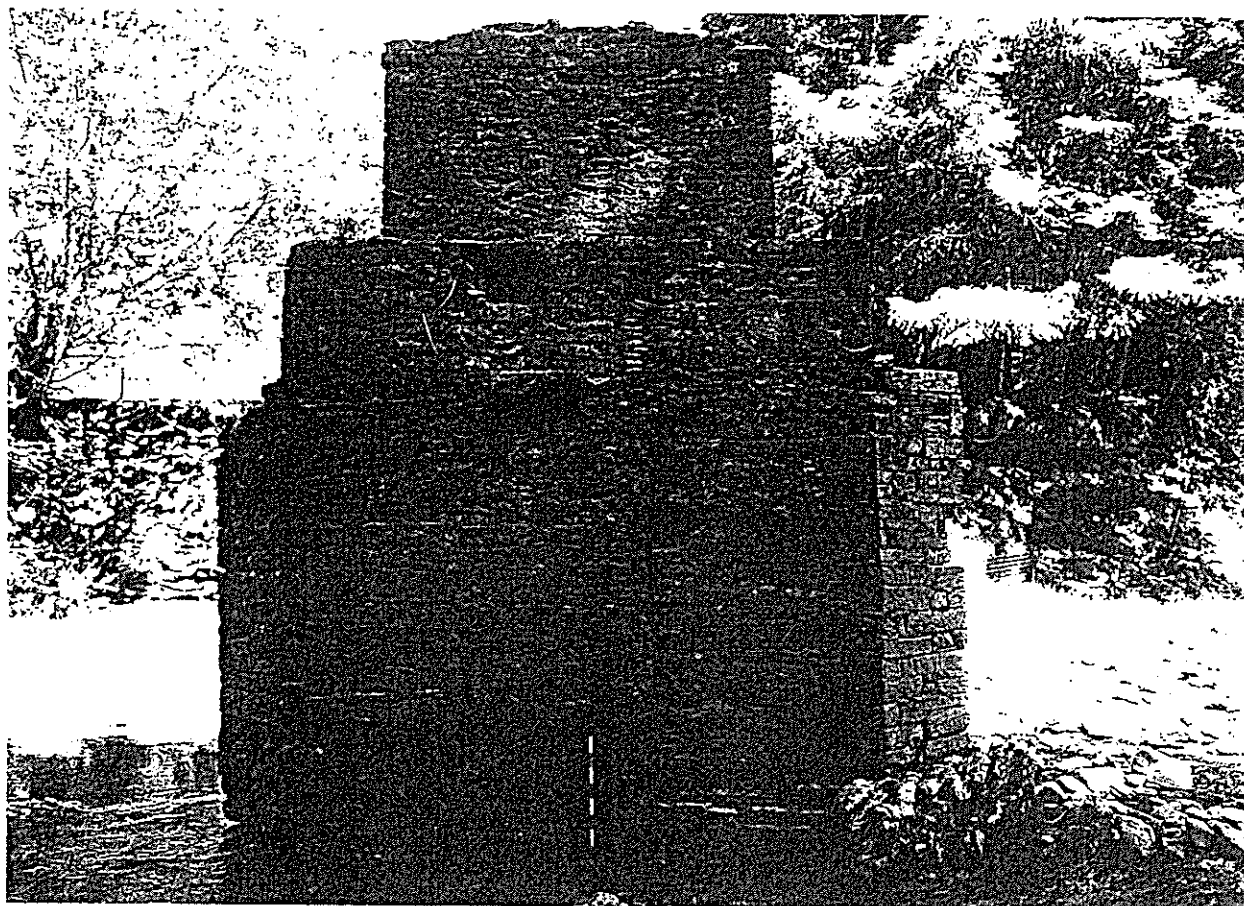
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