DYFED ARCHAEOLOGICAL TRUST LTD

SOUTH EAST DYFED MINERALS PROJECT

MINERAL EXTRACTION
AT PEDAIR HEOL, KIDWELLY & LLANDYFAN, LLANDYBIE

WITH ADDENDA ON
CARMARTHENSHIRE SILICA BRICK MANUFACTURERS
& METAL MINING AT KIDWELLY

Project Record No. 30707
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Commissioned by: **Cadw**

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1. INTRODUCTION

The South-East Dyfed Minerals Project was funded by Cadw and began 1993. It included a survey of the limestone and millstone grit belts which run for some 30km, north east to south west, across Carmarthenshire. The bulk of these areas were covered during the winter of 1993-94 (Murphy & Sambrook, 1994), however two relatively large blocks were not reached and this supplemental project, again funded by Cadw, has been designed to fill in these gaps.

Due to the large number of limekilns and quarries discovered along the limestone belt during the 1993-94 project it was not possible to pay detailed attention to the history of quarrying along the millstone grit ridge. In order to go some way towards redressing this imbalance, more consideration will be directed towards silica quarrying in this report. During the course of desktop and field work some information pertaining to now defunct the silica brick industry of the district came to light and it for this reason that an addendum has been provided which gives some detail as to the companies active in the field at the turn of the 19th - 20th century, companies which were of course responsible for the quarrying in the areas included in this report. Several references were also encountered relating to metal mining in the Kidwelly and Mynydd-y-garreg area during the 18th and 19th centuries, most important of which was a plan of a working copper mine situated near Kidwelly. These details have been included in a second addendum.

2. METHODOLOGY

2.1 Desktop.

A wide range of cartographic sources were used during this project, including mid-nineteenth century parish tithe maps, 1st and 2nd edition Ordnance Survey 1:2500 maps of the late nineteenth and early twentieth centuries and 1:10560 OS maps. The Dyfed Archaeological Trust's Sites and Monuments Record was consulted to identify previously recorded sites, a number of new sites being added to the SMR during the course of the project. Aerial photographs used include vertical photographs taken by the RAF during 1947 and some oblique photographs of specific sites by Terence James of the Royal Commission

Late nineteenth and early twentieth century estate documents held at the Carmarthen Record Office were of value in distinguishing various phases of quarrying operations. These include Dynevor estate records, the Bishop Collection and, of particular value, papers of the W.H.Morris Collection, which include numerous manuscripts relevant to the history of mineral extraction and processing in the Mynydd-y-Garreg area which were not accessible in 1993-94.

The initial South-East Dyfed Minerals Project Report (Murphy & Sambrook, 1994) was also consulted. The general historical and geological information contained in the introduction of that report has not been repeated here and it is recommended that interested persons refer to it for a fuller picture of the history of mineral extraction in South-East Dyfed as well as an extensive bibliography relating to the subject.

2.2 Fieldwork.

Each study area was visited and field walking was carried out in those areas where millstone grit and limestone outcrop or form a prominent landscape feature . The solid geology of the gritstone / limestone belt is interrupted by drift deposits in several locations which are generally composed of pasture or former arable lands with limited evidence of mineral extraction. Such ground was not covered unless local information or documentary evidence pointed to a history of mineral extraction.

The information provided by several landowners was of immense value. Even where quarries have not been worked within living memory, local inhabitants can often provide valuable details of when or by whom various quarries were worked and even the final destination of the extracted mineral. However, this is a finite source of information which is gradually diminishing.

3. THE STUDY AREAS

The study areas in question are the limestone and millstone grit belts between Meinciau and Pedair Heol (Study Area 1; Fig.1) and the millstone grit ridge between Llandyfan and Llandybie (Study Area 2; Fig.1). In both instances Ordnance Survey maps and the Sites and Monuments Record of the Dyfed Archaeological Trust indicated that there are sites of industrial and general archaeological interest within the study areas.

3.1 Threats.

Neither area is currently directly threatened by active quarrying nor subject to consent for future extraction, although Study Area 1 lies between the working Blaenyfan limestone and Mynydd-y-garreg silica stone quarries, whilst the Garnfach Limestone quarry which borders Study Area 2 is subject to an Interim Development Order. Conversely, land improvement often leads to the infilling of quarry pits and removal of associated structures. Such has happened at Garnbica Quarry, which is now largely much improved pasture with little surviving evidence of the quarries which operated earlier this century (Fig.5). Such land reclamation probably poses a more immediate threat to the character of many smaller quarry workings.

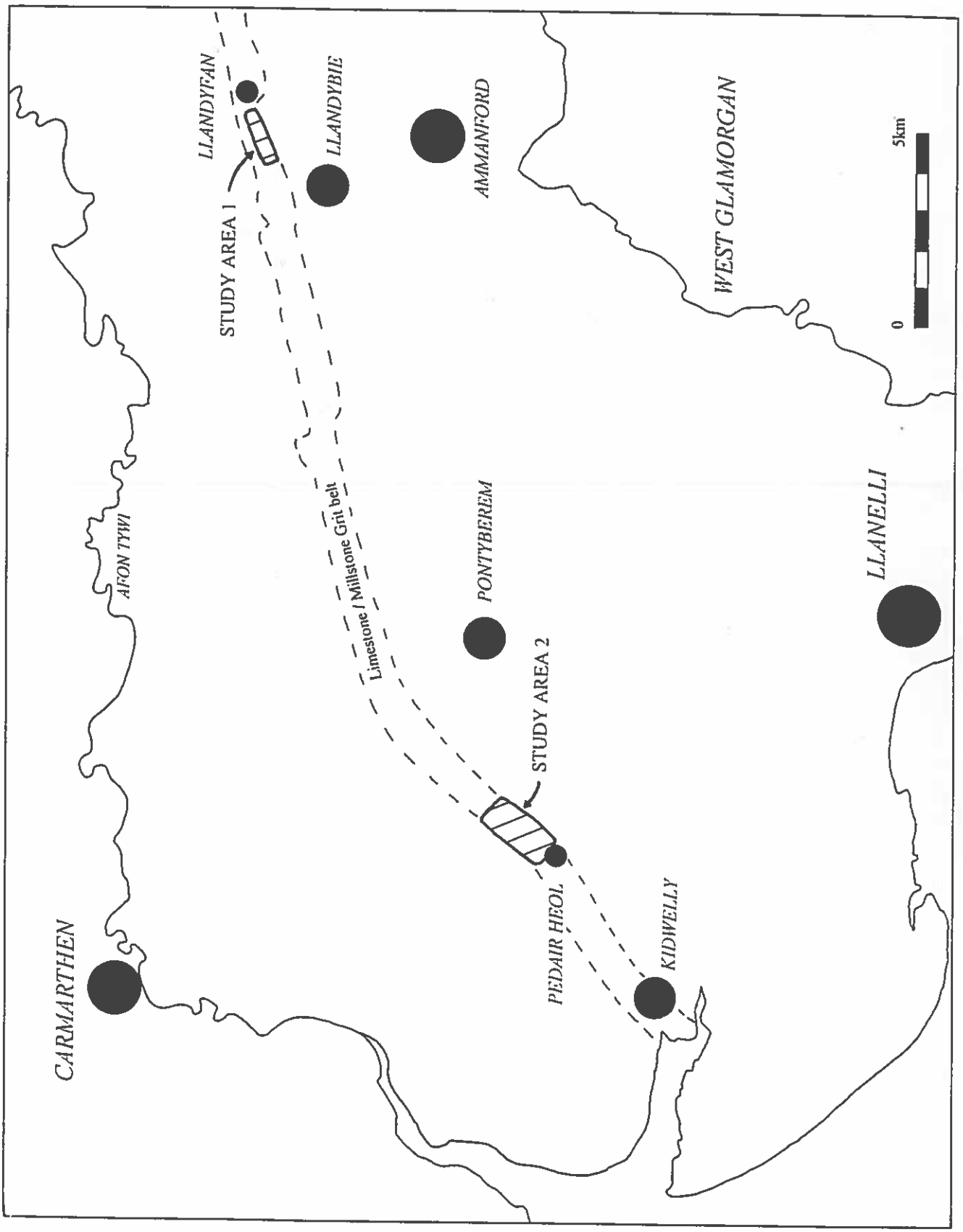

Fig.1; Locational Map of Study Areas

Study Area 1: Pedair Heol -Meinciau

3.2.1 DESCRIPTION

This study area forms the eastern end of the historically important limestone and millstone grit ridge of Mynydd-y-garreg. East of Pedair Heol, this 1km long section of the limestone ridge rises to 198m OD in altitude, thereafter falling away to c.100m OD at a short break in its course before another important limestone outcrop occurs at Blaenyfan. The gritstone ridge, c.1.5km long, peaks at 202m OD above Green Hall and maintains an altitude of over 160m OD as it proceeds north eastwards beyond Meinciau village.

Most of the gritstone and limestone outcropping between Pedair Heol and Meinciau occurs on land owned by Green Hall and Hengoed farms. Here, the limestone forms a ridge which has a steep north western side. It is generally wooded, though some pre-19th century clearances have produced "lleiniau" or narrow strips of pasture land between the outcropping limestone bands (see Fig.2). The western part of the gritstone ridge is quite inhospitable to both man and animal, being characterised by extensive gorse cover and a very rocky surface, though towards Meinciau, around Ffos Wilkin Farm, this gives way to improved pasture land.

3.2.2 NON-INDUSTRIAL ARCHAEOLOGY.

Few sites are recorded in the Dyfed Archaeological Trust's SMR for this area. They include PRN's 10729 (Garn Llwyd - placename), 22176 (Caeffynnon - placename), 22177 (Cae'r efel - placename),

During fieldwork a large, circular earth mound, 35m in diameter x 2m high was observed near Bwlch-chwithiant Farm (PRN 30318). This was initially thought to be bronze age round barrow. However, the field was the site of an old clay pit (PRN 30316) and the landowner believes that the mound is in fact composed of earth stripped from the surface to expose underlying clay, which was used to make "pele" or culm balls. This is a plausible explanation, the depression created where the clay was dug is clearly visible north of the mound. Some suspicion that the mound is a barrow, or that a barrow is located nearby remains, however, the neighbouring field name of "Garn Llwyd" (PRN 10729) being particularly suggestive (see Fig.3).

3.2.3 HISTORY OF MINERAL EXTRACTION.

The mineral wealth of the Kidwelly and Llangyndeyrn area is well known. Samuel Lewis (1833) gave an indication of the uses, apart from lime-burning, of the local limestone when he wrote of the parish of Llangyndeyrn;

> "Iron ore is found here and there are also strata of very fine black and speckled marble...of excellent quality for chimney-pieces and other ornaments (which) is sent from the quarries in great quantities to Bristol and to different parts of the Principality."

The mineral wealth of the parish is also mentioned in "Hanes Dyffryn Gwendraeth" (Evans, 1873);

> "Os nad yw arwynebedd y Dyffryn yn fras a ffrwythlon iawn, y mae ei fynwes yn orlawn o gyfoeth tanddaearol...Mynydd y Gareg a Llangyndeyrn...allant ymffrostio o geryg calch gyda'r goreu yn yr holl wlad."
>
> ("Though the valley surface is not be particu larly fertile, below lies a wealth of subterranean riches...Mynydd-y-garreg and Llangyndeyrn...can boast of some of the best limestone in the country").

3.2.4 LIMESTONE

The limestone band here is relatively thin and has not been exploited to the same extent as seen further south west at Mynydd-y-garreg or north east at Blaenyfan, Limestone Hill, Crwbin and Torcoed quarries. Dating the origins of lime burning and quarrying in the locality, as elsewhere in Carmarthenshire is problematical. The W.H.Morris papers do however include details of a lease of 1682 to one William Dyer to "erect lime kilns upon Mynydd-y-garreg to dig lime stones for burning and selling" (CRO WHM 27/9), which certainly points to the practice being well established in this locality by the eighteenth century. Dating individual kilns or kiln groups (especially earth built flare kilns) is nigh on impossible, however, in the absence of specific cartographic and documentary evidence.

The first clear indication of limestone extraction and lime burning in the study area is provided by the 1845 parish tithe map. Two kilns are shown, one near Hengoed Farm (PRN 27546) the other at Green Hall Farm (PRN 16306). Only patches of clinker indicate the existence of the former, but the latter was seen to be very overgrown but otherwise in good condition. It is a stone built kiln c.3.5m high x 7m long with a single, bottle-shaped drawhole, located alongside a relatively large, overgrown quarry. A second kiln (PRN 28316) at this location (Map 16, Murphy & Sambrook, 1994) should be discounted. Field observation suggests that it is likely that only one kiln (PRN 16306) has been associated with the quarry and it is this kiln which is shown both on the Tithe Map and modern OS map, not two separate kilns as previously suspected.

It appears that earlier quarrying and lime burning took place on the western edge of the limestone ridge, opposite Waunregwm farmhouse. It was

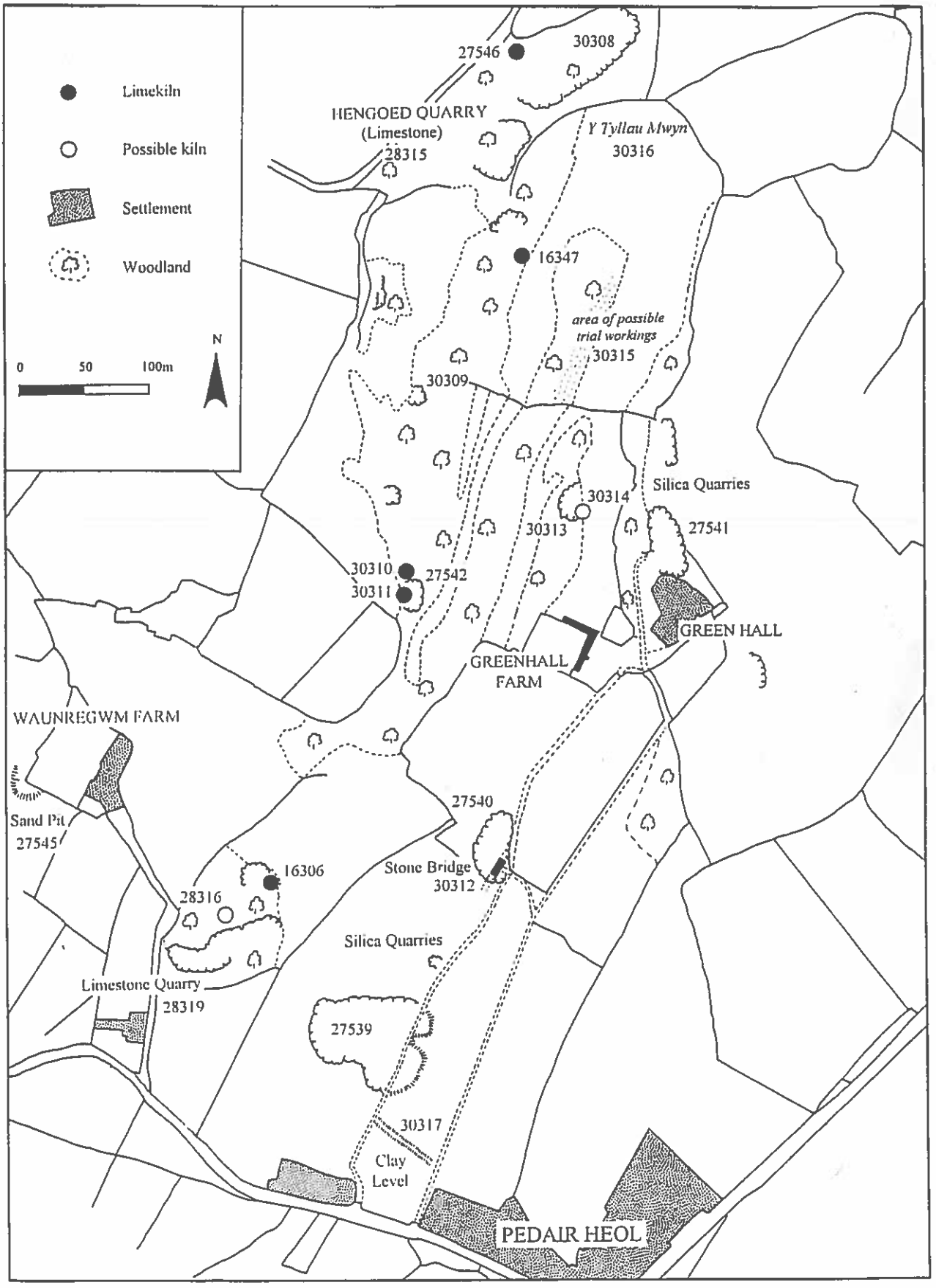

Fig.2; Industrial features around Greenhall Farm, Pedair Heol.

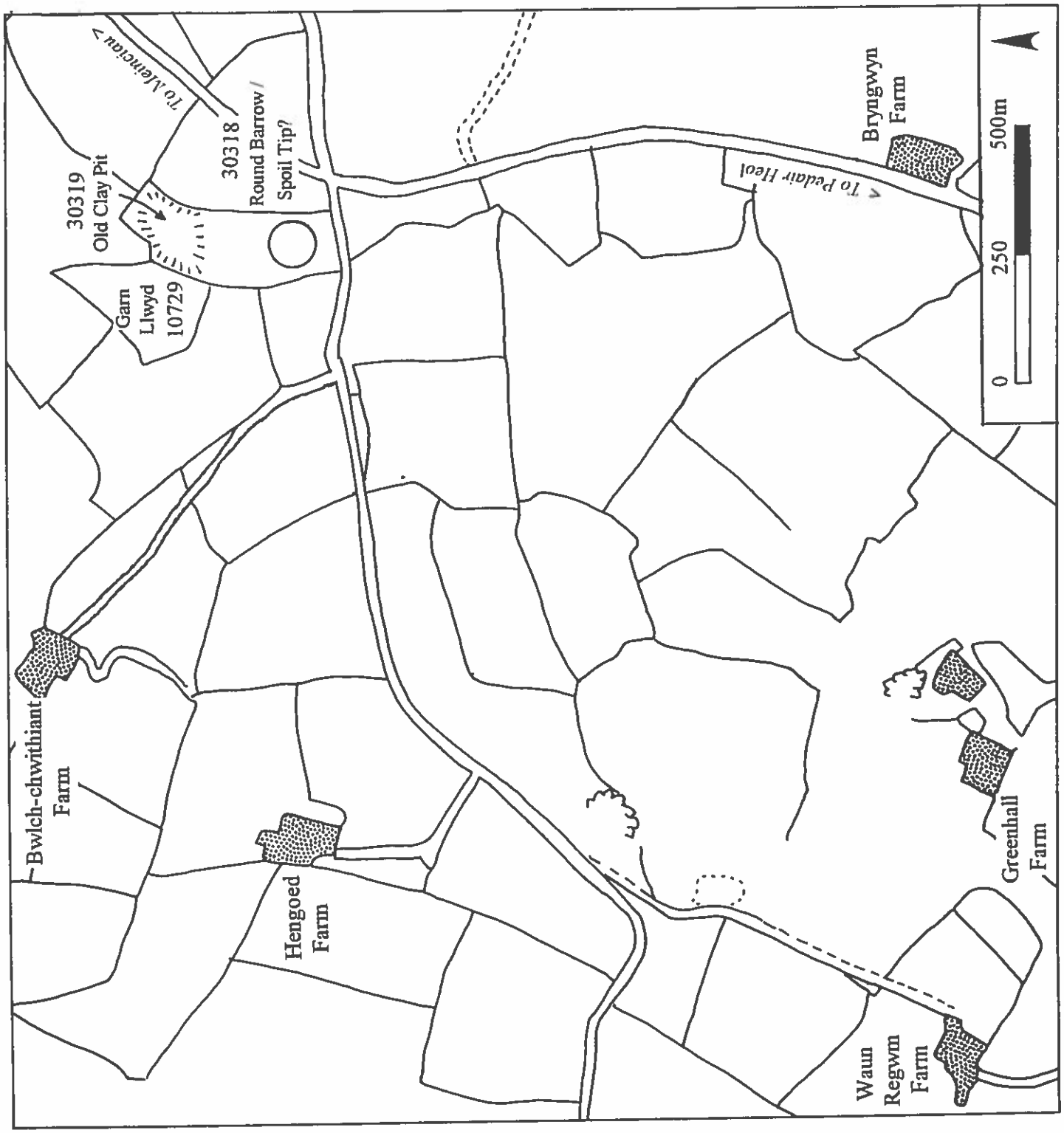

Fig.3; Location of possible round barrow (PRN 30318).

observed that at least two earth built kilns survive here (PRN 30310 & 30311) and the presence of clinker nearby suggests that another kiln may have once been present (PRN 30309). A series of small, overgrown quarries are associated with these kilns.

The western flank of the ridge north of Greenhall Farm is much more extensively quarried than apparent from OS map evidence, though many of the quarries are long abandoned and extremely overgrown, probably dating at least to the early nineteenth century (PRN 30308, for example). At least one earth built kiln, associated with a small quarry was located on the eastern side of the ridge (PRN 16347) and small amounts of clinker indicate another may have worked in association with a small quarry near Green Hall Farm (PRN30314).

A fairly large limestone quarry (PRN 28315) intrudes into the earlier quarries facing Hengoed Farm. This working is twentieth century in date and was purely extractive in nature.

3.2.5 MILLSTONE GRIT

A significant industry developed in the Kidwelly and Mynydd-y-garreg area based on the extraction of silica stone, sand and clay, primarily for the production of fire bricks. Evidence for quarrying along the gritstone ridge occurs south of Green Hall Farm, where several old silica quarries and clay levels are located, along with a number of associated trackways, now used as farm tracks. The 1:10560 OS maps of 1891 and 1922 show clearly that largest quarries date from the intervening years, and were still active in 1922. One clay level (PRN 30317), according to the landowner, was worked by the Stephens Silica Brick Co. of Kidwelly between 1932 and 1937. The level entrance has now been sealed.

The cutting for the bed of a trackway which connected one quarry (PRN 27540) with the main road at Pedair Heol is still clearly visible, and a small stone bridge (PRN 30312), carrying the old farm road to Green Hall over the trackway, stands in good condition. This bridge is the only standing structure which can be attributed to the silica quarrying industry in the locality.

3.2.6 METAL ORES.

Copper and lead are known to have been sought along Mynydd-y-Garreg from as early as the 18th century. How far east along the limestone ridge the search for metalliferous ores extended is not known, but a lease dated 1772, to one John Rolley of Llanfair-ar-y-bryn (possibly associated with the mines around Rhandirmwyn in that parish) entitled him to prospect for lead in the parishes of Llangyndeyrn, Llandyfaelog and Kidwelly (CRO WHM 27/9).

There is evidence that some exploration for metal ores was carried out at Green Hall Farm. A series of depressions in one field, now filled in and ploughed over, were known earlier in this century as "Y Tyllau Mwyn" (the ore pits) (PRN 30316). Along the edge of the same field, in a stretch of wooded limestone outcrop, several small quarry pits are visible, the largest being some 3m deep and c.4m in diameter (PRN 30315). They do not appear related to the extraction or burning of limestone as most of the earth and stone removed has been left at the edge of each pit, indicating they may well be trial excavations for an unknown mineral.

3.3 Study area 2: Garnbica and "Pistill Mountain"

3.3.1 DESCRIPTION.

The study of this area is concerned wholly with the silica quarries along the millstone grit ridge. Detailed study of the neighbouring limestone quarries and kilns between Cincoed and Pistyll quarries was made during 1993-94 (Murphy & Sambrook, 1994).

This section of the millstone grit ridge extends for 1.1km between Llandyfan and Llandybie (Fig.4). It reaches a maximum height of just over 180m OD near Garnbica Farm, declining gently to some 120m OD at its western extremity. The eastern end of the study area, part of Garnbica Farm is characterised by greatly improved pasture land, broken by some craggy outcrops and old quarries, most of which are infilled. To the west, on the hill known as Pistyll Mountain, the landscape is more characteristic of the rest of the Carmarthenshire millstone grit ridge, being rough pasture with craggy outcrops along its central spine.

3.3.2 NON-INDUSTRIAL ARCHAEOLOGY.

There are few recorded archaeological sites in this area. They are PRN's 13384 (Settlement - long huts), 10246 (Circular earthwork - unknown date and purpose) and 4863 (Garnbica - placename).

It is possible that Garnbica (PRN 4863) derives its name from the former presence of a bronze age cairn on the ridge near the farm. There is, however, no evidence of such a structure and it is possible that the name refers to the natural gritstone outcrop known as Y Garn (RCAHMW, 1917).

At the western end of the study area lie several sites of archaeological interest. What is described as an "enigmatic" circular earthwork (PRN 10246) (James,T, 1989) occupies the top of the ridge above Gelliwastad wood. It has been partly quarried away, apparently during the 1870's, but most of the circuit of its stone and earth bank survives. This bank is no more than 1m in height by 1m wide, with a shallow ditch, again no more than 1m wide by c.30cm deep, on either side. It encloses a steep bank on its northern side, though the ground is otherwise fairly level. Some natural outcrops of gritstone protrude through the grass, but there is no suggestion of any man made features associated with the construction or use of the

enclosure. No theory can be offered here as to its purpose, though a local tradition is that some generations ago it was used as a cock-fighting ring.

Within the circular earthwork, there is evidence that a large bronze age cairn once stood at the end of the ridge (PRN 30325). This cairn has been almost completely robbed of its stone (perhaps during the construction of the earthwork) but is now almost wholly obscured by a large, modern clearance cairn. Nevertheless, part of its western side remains distinguishable. The cairn is clearly visible on a RAF aerial photograph of 1947 (RAF CPE/UK/2079 4189-4220), which predates the clearance cairn.

West of the enclosure, aerial photographs (James, 1989) show the presence of two house platforms (PRN 13384). Upon investigation it was discovered that a third, larger, long hut lies nearby, as well as traces of several associated field or garden boundaries. These structures stand in the shelter of the gritstone outcrop on the crest of the ridge at this point, facing north west.

3.3.3 HISTORY OF MINERAL EXTRACTION.

The Llandybie Parish Tithe Map of 1840 does not indicate the presence of any quarries on the lands of Garnbica, Pistyll Isaf, Pistyll Fach and Gelliwastad farms, which owned portions of this section of the millstone grit ridge at that time. The areas which remain as unimproved pasture land include numerous, grassed over minor quarry scoops which may be of some antiquity. It is not possible to be certain of their age, but they represent a very small scale, localised exploitation of stone, probably for building needs. Two small quarry scoops are to be seen close to the long houses described above and may be associated with their construction.

3.3.4 GARNBICA QUARRY. (FIG.5)

The first cartographic evidence for quarrying here appears on the 1879 1:2500 Ordnance Survey map which shows three small, but apparently active quarries along the road between Garnbica Fach and Llandyfan (PRN 30321) and a fourth further east (PRN). By the publication of the 2nd edition 1:2500 map in 1906 a series of new and larger quarries appear north of Garnbica Farm. The land was leased to Griffith and David Thomas of the Bynea Silica Brick Company in 1900 (CRO Dyn 69/31) who extracted silica stone, sand and clay until they were bankrupted in 1907. By 1905 it seems that the quarries were in full production (Thomas, 1975, 55). The quarried stone was taken to Llandybie Railway Station for transport, 3 men and horses being employed in carting.

The lease of 1900 (CRO Dyn 69/31) provides some interesting details. The lessees were required to pay a royalty of 6d per ton on all silica stone sold, 1/- per ton for clay and a compensation of 30/- per acre for surface damage. They were also required to "keep proper and correct books of account" and "to get the said stone, sand and clay in a skilful and workmanlike manner". They were expected to "effectually guard and fence and keep fenced with good and substantial rails and post all the Quarries", being liable to compensate anyone who might lose livestock falling into the quarry workings. With the exception of waggoners and carters, no more than 5 men were to be employed. A closing condition reminds us of the powers which could be exercised by a landowner at the turn of the century, stating that the quarry managers would be expected to "dismiss and thereafter cease to employ any... labourers, workmen or other persons" should the landlord make such a request. This clause was reinforced on a later lease, specifying that anyone guilty or even suspected of poaching on Dynevor lands would be instantly dismissed.

Documentation of the demise of the elderly Thomas brothers tells a sad tale. It appears their solicitor absconded with most of their money, forcing the sale of the Bynea Brickworks for a mere £840; its value then estimated at £3000 (CRO Dyn 75/4). Numerous pleas were made on their behalf to the Dynevor estate not to lease Garnbica to the new owners of Bynea Brickworks, D. Harry & Bros., colliery proprietors of Llwynhendy, as the Thomas's hoped to regain control of the works with the help of new backers. Without the quality stone supplied by Garnbica Quarry, it was contended, the works were not viable. These pleas fell on deaf ears, it would seem, for a lease was prepared and agreed between Dynevor and the Harrys during 1907 for the extraction of sand, roadstone and rubble, china clay and other clay.

A minerals survey of 1910 (CRO Dyn 75/4), describes a clay level worked by the Thomas brothers (PRN 30322). This level is shown to be working on the 1906 1:2500 OS map. Its entrance had apparently collapsed and been sealed in 1909. The surveyor notes the level to have been 180 yards in length, dug to extract plastic clay. He also noted a smaller trial level, dug in the field due west of the first, some 10 yards long, in an unsuccessful search for rotten stone and clay. Neither level is visible in the field today.

D. Harry & Bros. worked Garnbica until 1930, when their lease was determined (CRO Dyn 38/14). In 1931, one John Davies of Cooper's Well proposed to work a vein of china clay at Garnbica, it is not known what became of this venture (CRO Dyn 129/839). Little seems to have been done subsequently for in 1948 Lord Dynevor himself visited an inactive Garnbica and noted deposits of sand "of a beautiful colour" which he thought might be worth someones while to exploit. The eagle eyed lord also noted that someone was still taking silica stone from the "old quarry" (CRO Dyn 135/1479)

By 1945, the lessees of the Garnbica Quarries were Messrs. Jones and Evans, who had failed to develop the quarries and incurred the displeasure of Lord Dynevor, as their annual royalty payments scarcely amounted to the value of the £5 yearly dead rent owed on the land (CRO Dyn 134/1336). A "Lewis of Gowerton" had interest in leasing Garnbica for "a

major development" at this time (CRO Dyn 134 1336).

The main quarries worked by the Bynea Brick Co. and D. Harry & Bros. are now infilled and landscaped. One (PRN 30323) was used as a council refuse tip until recently, now only evidenced by small amounts of domestic rubbish brought to the surface around rabbit burrows in the hillside.

3.3.5 "PISTILL MOUNTAIN". (FIG.6)

A lease for silica, sand and clay extraction on 31 acres of "Pistill Mountain", land then owned by Pistyll Isaf, was issued in 1871 (CRO Dyn 61/31). It seems likely that the land in question is the western end of the ridge, due south of Pistyll quarries (where Pistyll Isaf farm once stood) . This hill is measured at 31 acres 1 rod and 33 perches on the 1840 parish tithe map, then belonging to Pistyll Isaf, and therefore can be identified as the "Pistill Mountain" of the 1871 lease with some certainty. Several small quarry scoops, a larger linear excavation made across the north western edge of the hillside and the small quarry at the top of the hill (PRN 27696) probably represents work subsequently carried out by the lessees. The first edition 1:10560 OS map of 1881 shows that this latter quarry, which has removed part of the circular earthwork feature (PRN 10246), was operative, though the 2nd edition map of 1906 shows it as an "Old Quarry".

A hand-written footnote in the lease of 1871 (CRO Dyn 61/31, p.8), gives some idea of the nature of the quarrying operations envisaged;

> "There will be no pits like coalpits from which all the sand will be worked but several workings at different places in the pieces of ground. It would be impossible to have a weighing machine at every one of these places..."

It appears that all the sand was carted to the railway station (at either Derwydd, Llandybie or Cilyrychen) where it could be weighed before being transferred to railway wagons.

3.3.6 GELLIWASTAD QUARRY. (FIG.6)

At the western end of the study area lies the Gellywastad Silica Quarry (PRN 27299). A 50 year lease dated September 1913 was agreed between the landowner, Mr.DeBuisson of Glynhir, Llandybie, and the Carmarthenshire Silica Company (CRO Bishop 59/5). This company were operating the Pistyll Silica Works and were experiencing difficulty extracting enough good stone on Lord Dynevor's land (presumably on "Pistill Mountain") and therefore were forced to import stone from the neighbouring DeBuisson property of Gelliwastad. A large incline (PRN 27298) was constructed through the woodland between Pistyll and Gelliwastad to bring the stone down to the crushing mill, which had been built on the site of the late nineteenth lime kilns at Pistyll, which had closed in 1901. The alterations made to the kilns to install the crushing mill are still visible.

A correspondence of 1920 (CRO 59/5) to Mr.DeBuisson states that the stone at Gelliwastad is good and prospects excellent for the future of the quarry, much better than those of the Dynevor quarries. The same letter hints at future troubles for the DeBuisson quarry, for the quarry manager had complained to the estate's agent that, unless new terms could be reached on rent and royalty payments, the quarry would be forced to close. It was not until 1927, however that extraction ceased at Gelliwastad.

3.3.7 LLANDYFAN QUARRY. (FIG.4)

An interesting footnote is that the relatively large silica quarry immediately east of the study area, near Llandyfan Church, is described in 1939 as a working quarry (Roberts,GM, 1939), though no indication is given as to who was working it at that time. A lease between the Dynevor estate and a J.E.Cornelius Lloyd in 1920 allowed him to quarry silica at Llandyfan "and take it by lorry to the station, as he has got a big contract for sending it away to England" (CRO Dyn 120/159). This venture had failed by 1923.

All Contracts contingent upon Strikes, Lock-outs, Accidents or other causes beyond our control.

BYNEA SILICA BRICK Co.

Brick Manufacturers.

Telegraphic Address—
"Silica Works, Bynea."

Nat. Telephone No.

Bynea,

Nr. Llanelly,

.....19

Plate 1; Letterhead of the Bynea Brick Co.

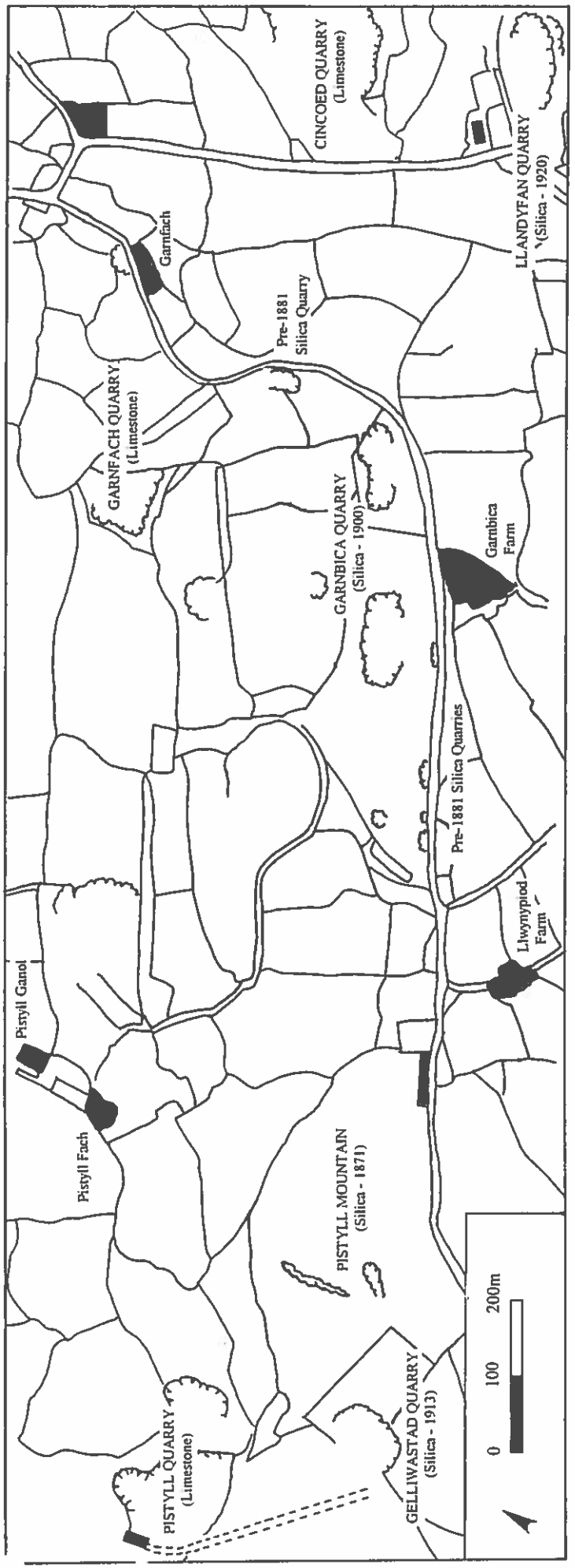

Fig.4; Quarries between Llandyfan and Llandybie.
(Stone extracted and earliest known date of quarrying shown).

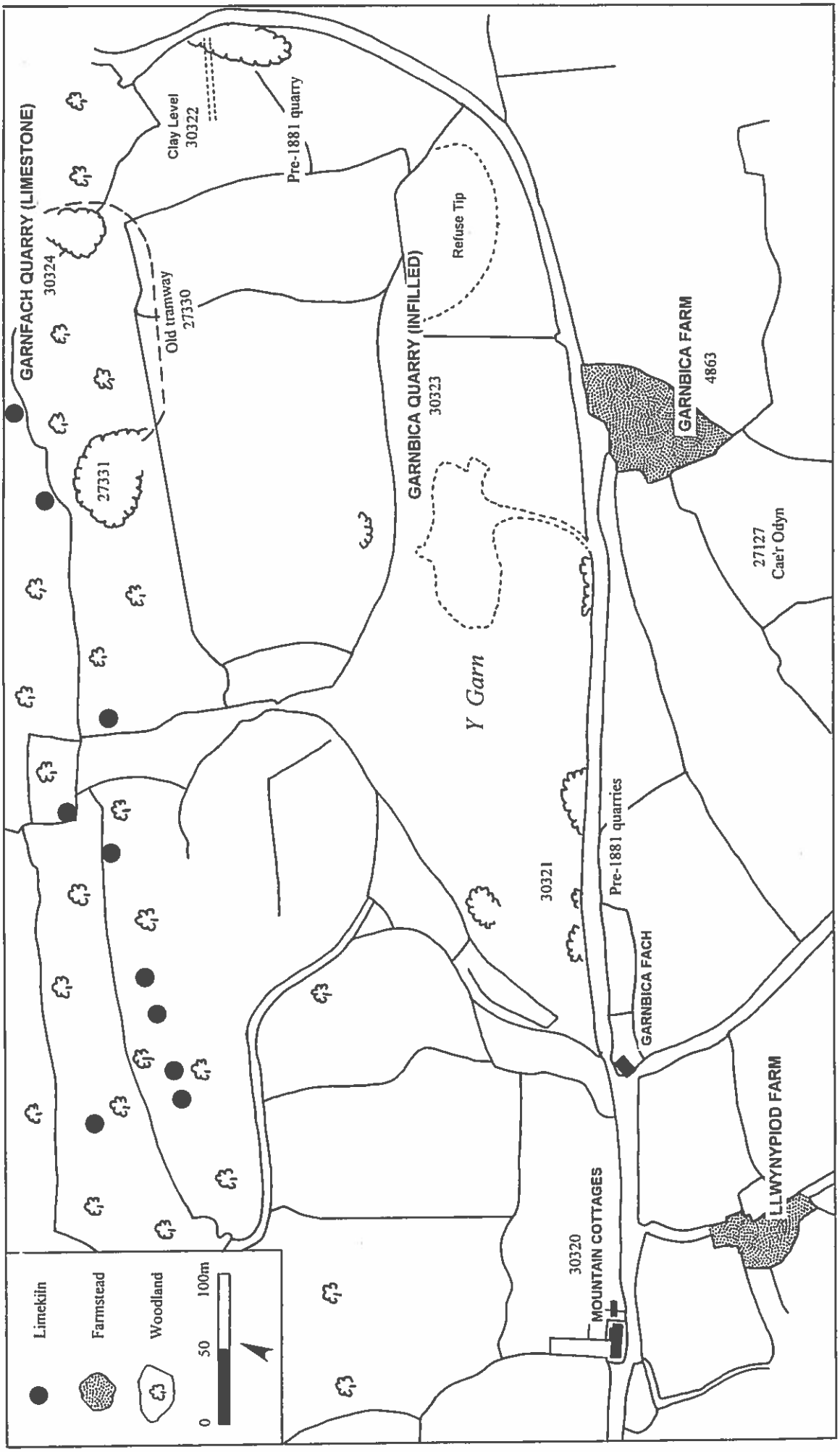

Fig.5; Garnbica Silica Quarries

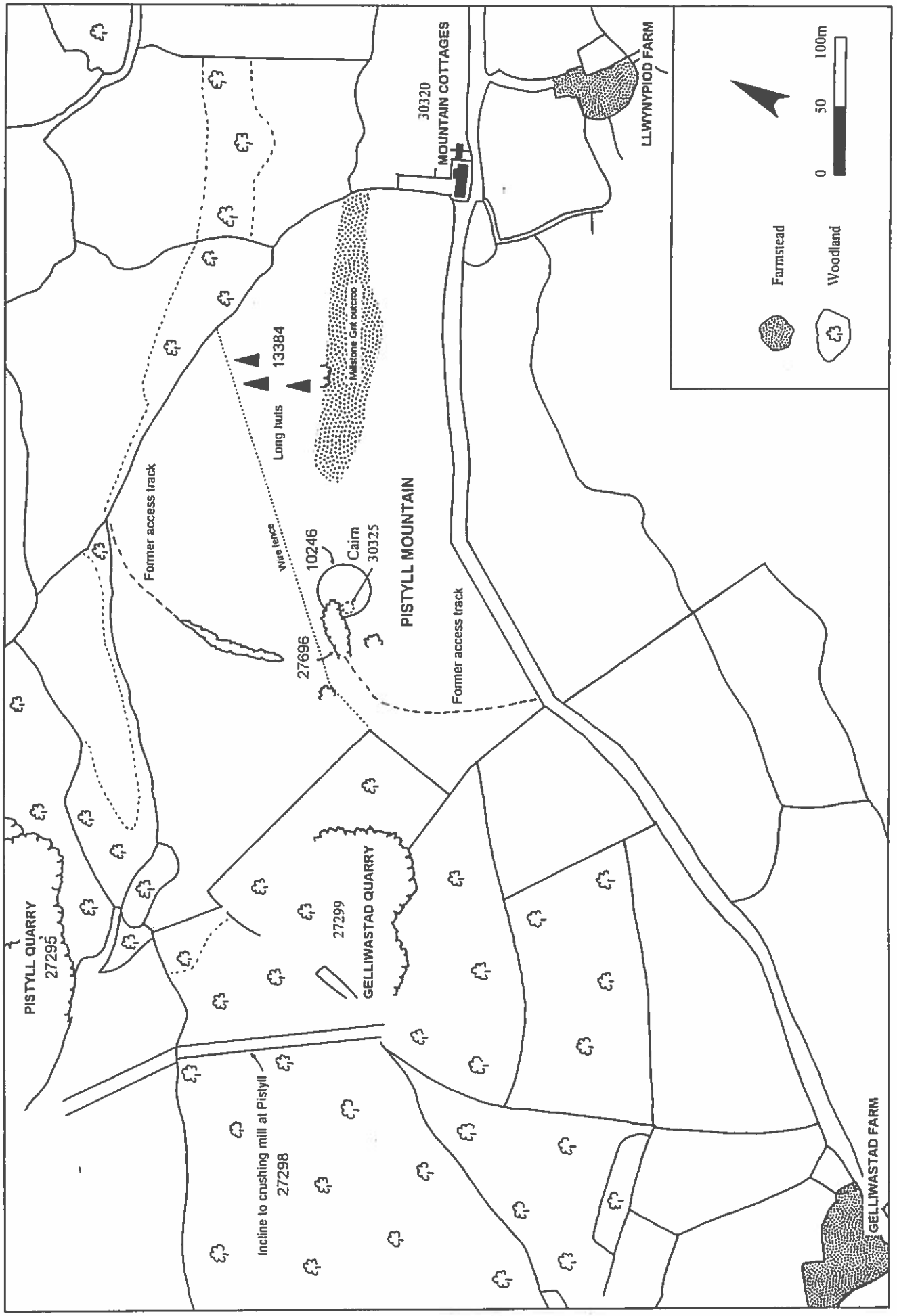

Fig.6; Pistyll Mountain.

4. ADDENDA

4.1 Silica Brick Manufacturers.

It is evident that the silica quarries in both study areas supplied a number of brick companies with the silica stone, sand and clay which formed the raw materials for a variety of products, especially fire-bricks.

The most significant concentration of silica brick manufacturers was at Kidwelly, operating from the mid-nineteenth century onwards. The first silica brickworks to open at Kidwelly was that of William Edwards, of Swansea, in 1858. Messrs. Redford and Harris opened a second in 1865, which was later managed by H. & H.E. Smart. Two other brickworks were established subsequently, the Stephens Silica Works and another owned by an "Alderman Young" (Rev. D.D. Jones, 1908).

Kelly's directory of 1895 carries advertisements for Stephens & Co., "Manufacturers of the World Renowned Dinas Silica Bricks", as well as the "H. & H.E. Smart Fire Brick and Silica Works, Established 1874." (Plate 1.). No mention is made of Redfords. The Edwards works had closed by 1908 (Rev. D.D. Jones, 1908).

Amongst the W.H. Morris papers at the Carmarthen Record Office is a letter, discussing the recent decision of Liverpool "to follow Manchester in erecting a crematorium to burn its dead instead of burying it," on headed notepaper of the Redford Brick Co. (CRO WHM 27/9). Presumably, the construction of crematoria was of interest to the firebrick manufacturer, though Redfords appear rather hesitant to embrace the practice, especially the "morbid desire to preserve in urns the burnt ashes." The letterhead of this note bears the date 189-, suggesting that Redfords were in business at least until 1890. The Rev. D.D. Jones (1908, 102) implies that Redfords were bought by Messrs. Smart, whose 1891 advert shows that they founded their own brickworks in 1874.

4.1.2 THE DINAS FIREBRICK.

It is clear that the Dinas firebrick was an exceptionally successful product. It was devised by William Weston Young of the Dinas silica works at Pont-nedd-fechan, Glynneath in 1823 and was exported widely. The term "dinas" entered the Russian and German languages, being synonymous with "firebrick". (Jenkins, 198). A patent for an improved method of producing the Dinas brick was made in 1873 by a John Conniff of Kidwelly (CRO WHM 27/11). Conniff's modification to the crushing process did away with the need to mix lime with the ground silica, as well as the 5 men required to work the old crushing mill. He also devised a new kiln which would fire 2,500 bricks using less than one half of a ton of anthracite, whereas the old method required as much as 2.5 tons to fire the same quantity. The finished brick was estimated (by Conniff, at least) to be up to 40% more fire resistant than the original Dinas brick. It has been claimed that the process of producing firebricks without adding lime was introduced from Germany during the mid-1890's (Hammond, 1981). Clearly, Connif had overcome this problem at Kidwelly 20 years previously. His method allowed for the addition of lime to improve the appearance of the brick if needed, though this was estimated to reduce the improvement in fire resistance to 20%.

The Dinas firebrick was originally used to construct furnaces for smelting iron ore, but later in the nineteenth century proved ideal for use in the developing steel industry. As late as 1937 a survey of Welsh industry noted that;

"The silica rock from which silica bricks are made is found in the Neath and the Swansea valleys and at Kidwelly. One firm is located at Kidwelly and concentrates its production there, though it owns a number of other works in the district...with...up to date plant... (producing)... bricks of the highest quality. Silica bricks are sent from Kidwelly to a number of the leading steel companies in England and Scotland and there is a considerable export trade." (National Industrial Development Council for Wales, 1937).

It seems certain that the company referred to is the Stephens Brick Co. The location of the "other works in the locality" is not known. In 1952, there were three firebrick manufacturers working in Kidwelly, all of "Quay Street, Kidwelly". These were the Stephens and Smart companies and the smaller Penwyllt Brick Co.

The 1922 1:10560 OS map shows a small, unnamed, brickworks to be in operation just west of Pedair Heol, linked to the Gwendraeth Valleys Railway (Plate 3). The same tramway, on the 1891 1:10560 map appears to serve a complex of limekilns at Pedair Heol, stone and lime again being carried south to the Gwendraeth Valley Railway. The limestone quarries are now owned by Penmynydd Farm, Pedair Heol. The landowner provided information pertinent to the history of both the brickworks and limekilns here, both being operated by the Brigstock & Young Company, the kilns apparently ceasing production in 1910.

`Silica Brick manufacture was not confined to the Kidwelly district. The Bynea Brick Company, responsible for quarrying for silica around Llandybie have been mentioned previously. Another company which might have been exploiting the millstone grit of the Llandybie area were the South Wales Silica Co., who leased land from the Cawdor Estate for a tile factory at Penygroes, Llandybie.

GEORGE REDFORD & CO.,

Dinas Fire Brick and Silica Works,

Telegrams—
"Redford, Kidwelly."

MANUFACTURERS OF
DINAS FIRE CLAY & ALL SORTS
OF FINE FIRE CEMENT.

Trade Mark—R. DINAS.

Kidwelly, South Wales,

_____ *189*

STEPHENS & CO.,

KIDWELLY, SOUTH WALES,

Manufacturers of the World-renowned

DINAS SILICA BRICKS

AND FINE

DINAS SILICA CEMENT,

The best in existence for Steel and Copper Furnaces, also the Crowns of Glass Furnaces and for all purposes where the most intense and long-continued heat has to be resisted.

ALSO ALL KINDS OF BEST GANISTER.

SPECIALITIES FOR STEEL, BRASS AND IRON FOUNDERS.

PARTICULARS AND PRICES ON APPLICATION.

H. & H. E. SMART,

Telegrams: "SMART, KIDWELLY." Brand: "R. DINAS." ESTABLISHED 1874.

FIRE BRICK & SILICA WORKS,

KIDWELLY, SOUTH WALES.

MANUFACTURERS OF

SILICA FIRE BRICKS AND CEMENT,

GANNISTER FOR FURNACE BOTTOMS.

GROUND SILICA FOR USE IN IRON, STEEL, COPPER, GLASS & GAS WORKS, etc.

Plate 2; Advertisments from the 1891 & 1895 editions of Kelly's Directory for South Wales.

4.2 Metal Mining; Kidwelly Copper Mine.

Amongst the W.H.Morris Papers deposited at the Carmarthen Record Office, is a sectional drawing and report of "The Kidwelly Copper Mine" dated 1816, prepared by a Captain Nettles (CRO WHM 27/ 10). The detail of the report shows clearly that Nettles was in charge of an attempt to resuscitate an old working. His plan shows an "Old Shaft", and the report begins thus;

"When I came to the mine on Friday the 7th of June 1816 I found the timber at the inside entrance was much decayed and rotten and the whole of this timber fallen down and a considerable quantity of Clay Broken pieces of Lime rock and sand stone which this timber had supported was fallen down in the level and nearly fill'd it so as quite to prevent the passage thro it."

The mine was also seriously flooded, up to a depth of some 14 feet and a new windlass had to be installed to enable the draining of the lower workings, work laboriously achieved by hauling the water out in barrels. This done, the work of clearing clay and stone which had fallen into the lower "cavern" proceeded and soon copper "of exceedingly rich quality" was being brought out. Mining went on unhindered until the end of July when heavy rains flooded the mine, a problem which worsened during August when :

"heavy rains again filld the mine ...we now drew the water with one barrel and the Copper Clay etc with one kibble."

During September wet weather forced a complete cessation of work. However, between June and September, Nettles recorded, just over 7 tons of copper ore had been extracted, and "cellared at one of Mr.Parkers Rooms in Kidwelly". He also recommended a further effort to work the mine during the following summer if the weather obliged, being of the opinion that sufficient copper remained to at least pay the cost of the trial, potentially leading to the development of a profitable mine.

Unfortunately the exact location of this mine is not recorded, the plan only shows it to be next to a limestone quarry. It may be the old shaft at NGR SN43180840 noted as being associated with spoil tips bearing traces of copper minerals (Archer 1968, 169).

Manuscript notes included in the WH Morris Collection point to a concerted attempt to encourage prospecting and mining of metalliferous ores in the Mynydd-y-garreg area during the early 19th century. The Cambrian newspaper of October 8th, 1808 carried the following advertisement;
"NOTICE: To Miners. To be let for a term of years several veins of a very rich Copper & Lead ore situated within two miles of the boro' of Kidwelly to which there is a navigable river. The above veins are now open worked by the proprietor and produce ore of unexceptional quality. David Davies Esq. of Llechdwnny will show the veins and for further particulars apply to William Owen Brigstock, Blaenpant, Cardiganshire or to Edward Williams, Carmarthen.

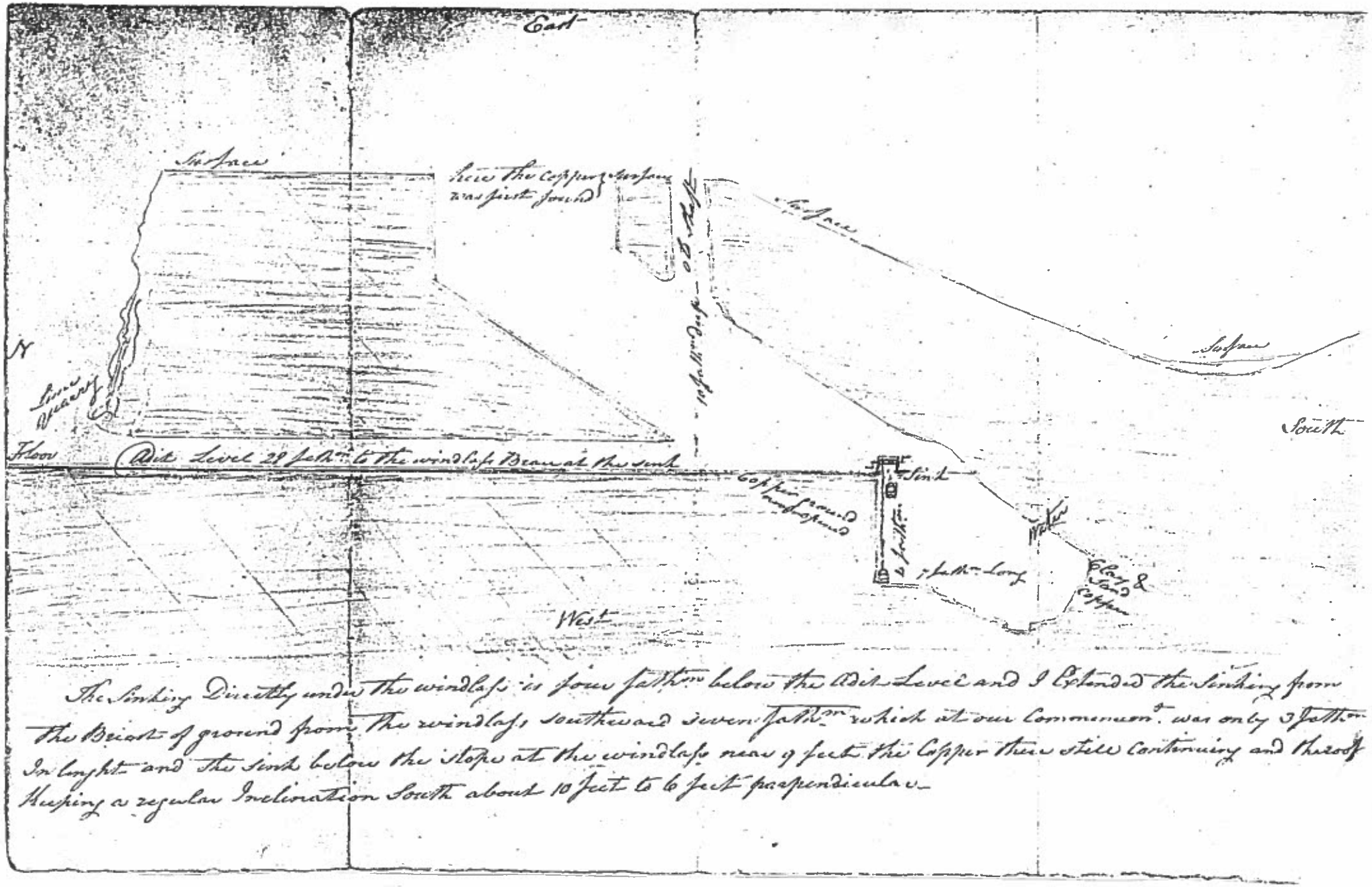

Plate 3; "The Kidwelly Copper Mine", 1816.

5. SUMMARY.

Although, geographically, the scope of this study is fairly limited, the information gleaned about the companies and landowners responsible for the development of the silica quarries in each study area has much wider significance. The leases and plans consulted have made it possible to identify many old silica and clay workings as being of late nineteenth and early twentieth century date. The range of raw materials won from these quarries is surprisingly varied, supplying manufacturers producing firebricks for the iron and steel industries, tiles, roadstone and sand. It is known that clay from Mynydd-y-garreg was used as a cheap (and relatively unsuccessful) substitute for Cornish China Clay from the late 19th century onwards at the South Wales Pottery, Llanelli (D. Jenkins, 1964). At Garnbica, a vein of China Clay referred to in several leases may have been exploited to the same effect, although the final destination of this clay is unknown (the present landowner believes that it was taken to make pottery).

The small area of limestone studied proved, in terms of kiln typology, to be typical of other outcrops along the south western end length of the Carmarthenshire limestone belt. The small, pennanular shaped flare kilns which are so numerous on the north eastern half of the limestone belt are absent, instead early stone built kilns and large flare kilns of both single and double drawing hole type, are found. The presence of good examples of the latter two in close proximity is unusual. (see Murphy & Sambrook, 1994, "Typology of Limekilns", p.16).

Research carried out during this study has indicated that there are two aspects of the industrial history of the district which require a much more detailed appreciation in the future, namely the brick industry and metal mining. The history the of brick industry of South East Dyfed is poorly recorded. Silica brick making has clearly been an important industry in the Kidwelly area since the mid to late-nineteenth century, but silica and clay bricks were being produced at numerous other locations as well, exploiting Coal Measure shales and fireclays as well as Millstone Grit as a source of raw materials. Little remains of these brick factories, most buildings and associated features being long cleared. However, substantial documentary evidence such as leases and plans may be held in library and record office collections which might help trace the development of the industry in South East Dyfed.

Future attention is also needed regarding the history of metalliferous ore extraction in the Kidwelly area. Several authors refer to the presence of iron ore in Llangyndeyrn parish (Lewis, 1833; Evans, 1873), presumably bands of ironstone nodules found within the Coal Measures of the area. Lead and copper veins occur within the Carboniferous Limestone of Mynydd-y-garreg; the detailed plan and accompanying description of "The Kidwelly Copper Mine" shows that serious efforts were made to develop such ore deposits as were known. Apparent trial workings at Greenhall Farm, Pedair Heol, may be linked with prospecting for metalliferous ores in the locality.

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WITH ADDENDA ON
CARMARTHENSHIRE SILICA BRICK MANUFACTURERS
and
METAL MINING AT KIDWELLY