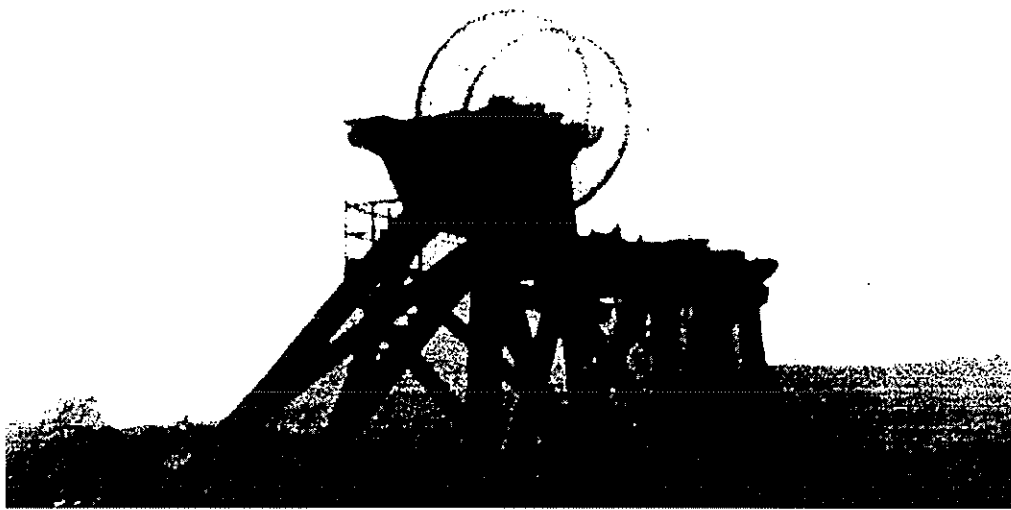


**DYFED ARCHAEOLOGICAL TRUST LTD**



# **THE SOUTH EAST DYFED ANTHRACITE COALFIELD**



## **SOUTH EAST DYFED MINERALS PROJECT III**

**DECEMBER 1995**

**Commissioned by: CADW**

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T H E

SOUTH EAST

D Y F E D

ANTHRACITE

COALFIELD

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## 1. INTRODUCTION

### 1.1 Brief and Objectives.

This report is the third in a series of Cadw commissioned reports produced by the Dyfed Archaeological Trust examining the historic industries of south east Dyfed (see Murphy & Sambrook, 1993; Sambrook, 1995). It was designed against a background of an increase in the provision of individual assessments and evaluations for a range of archaeological and industrial sites, in large part due to growing pressure for the open cast extraction of coal across south east Dyfed. One of the chief objectives of the report is to provide an overview of the relative importance of the historic industries and industrial landscapes within the south east Dyfed coalfield, hence enabling the Trust to be better equipped to ensure that archaeological considerations are taken into account at the early stages of mineral policy planning; to comment at pre-planning stages; to design and assess the results of individual archaeological evaluations; and to ensure the inclusion of archaeological elements within environmental statements.

The legacy of four centuries of coal mining has inevitably left its mark on the landscape and character of south east Dyfed. Aside from several hundreds of known mining sites of various dates and types, evidence of a plethora of associated or dependant industries, communications routes and industrial settlements is to be found. Whereas much of the communications network and settlement patterns of the region which developed during the industrial period are recognisable and influential components in the modern landscape, the survival rate of early mining and colliery sites, as well as other industrial sites, in the district was something of an unknown quantity. It is hoped that this survey will be able to draw attention to the types of site which survive and the immediate threats to their continued survival.

### 1.2 Methodology

The project involved substantial desk-top work, largely based on the use of the regional SMR and the

analysis of 19th and 20th century OS maps (1:2500 and 1:10560 scale) held by the Dyfed Archaeological Trust. Based on cartographic and documentary evidence alone, a significant number of previously unrecorded industrial sites were added to the SMR and additional information added to existing records.

Fieldwork consisted of rapid coverage of selected areas with the intention of providing an assessment of the survival and condition of relevant sites and monuments. A photographic record was made of those sites visited. Again, new information recorded during fieldwork was added to existing SMR records and a significant number of new industrial archaeological sites recorded for the first time.

### 1.3 Acknowledgements

The authors of this report wish to express their thanks and appreciation to Cadw for their grant support for the project and report production. Gratitude is also extended to several individuals who provided valuable help and information during the research period leading to the compilation of this report. Mr. Peter Kendall of Dyfed County Councils Mineral Planning Department provided invaluable information on the current strategy employed by the planning authority and the main interests involved in developing the coal industry in the 1990's - from the licensing authorities and the opencast developers down to the small private collieries which continue to operate within the study area. Mr. Ken Treharne, Pontyberem and Mr. Dilwyn Edwards, Pontyberem each gave freely of their detailed local knowledge of the geology and history of the coal industry in the Gwendraeth Fawr valley, information which proved immensely helpful to the fieldwork aspect of the project. Valuable assistance was also provided during report compilation by Richard Phillips, responsible for the computer digitising of basic map data, Ian Darke, for the production of the finished illustrations included within the report and the staff of the Dyfed Archaeological Trust's SMR, who provided much background information.

MEDALS—Amsterdam, 1883; Antwerp, 1885; Barcelona, 1888; Cardiff, 1898; Paris, 1889, Gold; London, 1890, Exhibition of Mining and Metallurgy, Crystal Palace.

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## 2. THE STUDY AREA

### 2.1 Definition

Due to the limited time available to carry out this study it was decided from the outset to limit the field work aspect of the project to one sector of the relatively extensive Carmarthenshire coalfield. In view of the recent practice of opencast mining in the anthracite coalfield of the Gwendraeth and Amman valleys, this was considered to be the most appropriate area to select. This area is at present the only productive sector of the Carmarthenshire coalfield, with a small number of both deep and opencast mines in production. The area was usefully described as the Gwendraeth-Amman Coalfield by Bowen (1939) and is defined to the north and west by the geological boundaries between the Lower Coal Measures the Carboniferous Millstone Grit, and to the south and east by the boundary between the Middle Coal Measures and the Pennant or Upper Coal Measures.

The characteristics of the Gwendraeth-Amman Coalfield differ in terms of coal type, geology and historical development from that of the neighbouring Llanelli coalfield, which forms the southern sector of the Carmarthenshire coalfield. No fieldwork was carried out in this latter sector, but its general historical development will be considered in this report in conjunction with that of the anthracite coalfield. Coal mining has ceased in the Llanelli area, though by co-incidence, an application to develop a small opencast mine near Llanelli has been made at the time of writing, serving as a reminder that with changing economic circumstances there remain sufficient reserves here to warrant future interest.

### 2.2 Geology

For geological reasons, the Carmarthenshire Coalfield is considered to be part of the South Wales Coalfield, which is composed of a basin of Carboniferous Coal Measures strata, including thick bands of marine shales and hard sandstones interbedded with the comparatively thin coal bearing strata. The Coal Measures are sub-divided into the Lower, Middle and Pennant (or Upper) series, all of which are represented within Carmarthenshire. Within these series there are variations in the properties of the coals found, three types occurring within the Carmarthenshire Coalfield - anthracite and bituminous coals, as well as the intermediate semi-anthracitic or steam coals. The boundary between each coal type is ill-defined, being characterised by a gradual change in the properties of the coal seams south of the Gwendraeth-Amman anthracite belt, the seams becoming increasingly bituminous.

The origin of the anthracite coals has been much debated without a clear resolution as to how they formed. It is generally believed that the heat produced either by deep seated subterranean stresses and faulting or very deep igneous activity resulted in a metamorphosis of the lower coal beds. Anthracite coal contains a much lower proportion of volatile matter and sulphur than those coal seams higher up in the Coal Measures series and has

long been recognised as a good smokeless fuel. Whilst the highest ranking anthracite coals occur in the Lower Coal Measures, lower ranking anthracites are found in the Middle Coal Measures (i.e coals with a higher content of volatile matter and sulphur).

In addition to its coal reserves, the region was highly suitable for industrial development due to the presence of other valuable raw materials, some contained within the Coal Measures series themselves; fireclays (for brickmaking) and iron ore were associated with several important coal seams. The Carboniferous Millstone Grit and Limestone which underlie the Coal Measures series outcrop to the north of the study area and provided silica (for brickmaking) and limestone (for lime burning and use in iron smelting). Some lead and copper ore occurs within the millstone grit and limestone of the Kidwelly area and were exploited before the 19th century.

### 2.3 Geomorphology

The geomorphology of the study area is essentially based around the valleys eroded by the Amman and Gwendraeth Fawr rivers. Firstly, parallel ridges of hard millstone grit and limestone, together only between 0.5km to 1km wide, form the northern boundary of the study area. The former is the higher of the two, rising from c. 150m OD on Mynydd-y-Garreg in the west to over 600m on the Black Mountain and is characterised by rough moorland on its highest parts, although much of the ridge now consists of improved pasture. The limestone ridge is less continuous than the gritstone, its western half especially has been eroded to form wide gaps in its course where the limestone bedrock is masked by drift deposits. Some fragments of semi-ancient and ancient woodland survive along the ridge, such as at Carmel Woods, near Llandybie.

South of this ridge lies the lower ground of the Gwendraeth Fawr and Amman Valleys, worn into the softer Coal Measures strata. The two valleys are separated by the upland block of Mynydd Mawr, where the Afon Gwendraeth rises. The Gwendraeth valley lies at a lower altitude, mostly below the 70m contour and has a much more favourable south western aspect, opening outwards to the coast onto Pinged and Pembrey marshes near Kidwelly, where the land is only just above sea level. The Amman, a tributary of the Llwchwr, flows through a deeper and much steeper sided valley east of Ammanford, the floor of which is generally just above the 70m contour. At each end the valley opens out, merging with the Llwchwr valley at Ammanford and the Tawe valley to the east.

Along the southern edge of the Gwendraeth and Amman Valleys, the ground again rises, with significant (though discontinuous) mountain blocks such as Mynydd y Betws, Mynydd Sylen and Mynydd Penbre effectively marking the boundary between the Middle Coal Measures and the harder Pennant Sandstone series

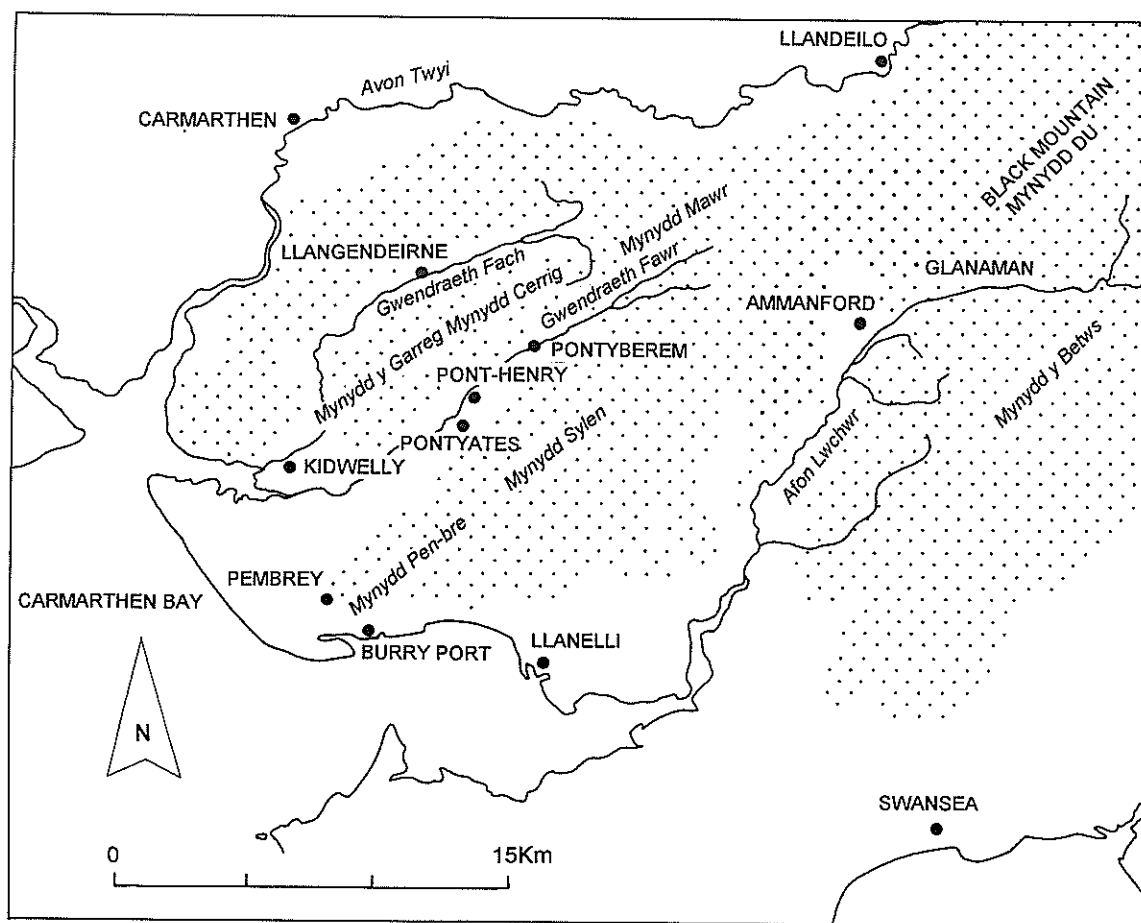


Fig. 1 South East Dyfed principal settlements and relief

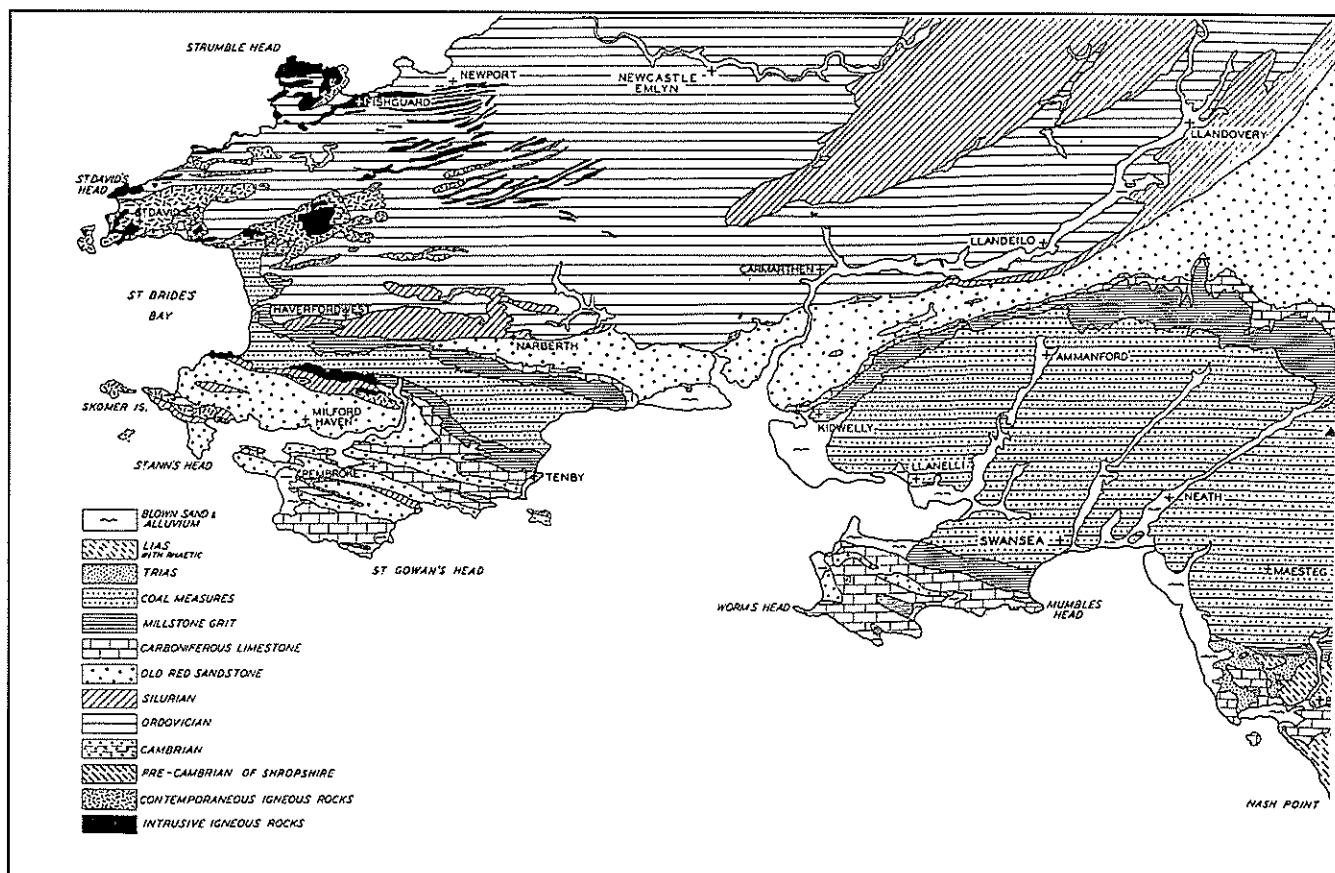


Fig. 2 Geology of South West Wales (reproduced from British Regional Geology: South Wales, 1970).

### 3. ARCHAEOLOGICAL and HISTORICAL BACKGROUND

#### 3.1 Evaluation of the Historic Landscape: Prehistory

The relative lack of prehistoric sites on the coal measures in contrast to the limestone and millstone grit ridge of the Gwendraeth Fach valley has long been remarked upon. Mynydd Llangendeirne with its possible neolithic chambered tomb, Bronze Age barrows, cairns and standing stones is a prominent example of the surviving evidence along the unquarried areas of the limestone ridge. Even there however, there are few Iron Age defended sites. South east of the Gwendraeth Fawr valley there are two Iron Age hillforts in Pembrey parish. The poorly drained heavy clay soils over much of the coal measures may have deterred late prehistoric farmers. But the existence of a presumed late neolithic circle, Y Naw Carreg, between Cwmgwili and Capel Hendre suggests prehistoric settlement at least during the more favourable climatic conditions of the Climatic Optimum. Two further factors have recently been demonstrated which may cause some re-assessment of the prehistoric settlement in the Gwendraeth Fawr valley. The first is the place-name evidence, now being gathered in a systematic and largescale computerized form by the Carmarthen-shire Antiquarian Society. This suggests the loss and destruction of several possible Bronze Age ritual and burial monuments and even of defended enclosures through intense industrial activity. The second is the discovery of Bronze Age and early medieval metalwork through the activities of metal detectorists, notably a cremation burial, pigmy urn and bronze dagger of Wessex type from Portllythen.

#### 3.2 The Mediaeval Background

The principal subject of this Report is the anthracite coal industry. But one of the themes underlying this and the two previous Reports of the South East Dyfed Minerals Survey is the survival of much older patterns of land use and settlement. Such survival may have partly depended upon the exploitation of mineral resources of the area - limestone, ironstone, coal by removing the necessity for the landlords of maximising their farming incomes and for the small freeholder and tenants providing additional employment and income. There has been a tradition of miners running small farms well into this century.

The anthracite belt falls within the two medieval commotes of Carnwyllion and Iscennen. Although, by the later Middle Ages the whole area was within the Duchy of Lancaster, it was never subject to the degree of Norman settlement and remodelling of the landscape which marked the coastal lowlands. Welsh settlement patterns and Welsh inheritance systems remained. The early medieval administrative framework of *maenorau* and customary dues and renders persisted. The area

contains one *maenor* which, almost uniquely, can be traced back to a 9th century multiple estate - *Mainaur Med Diminih* (Meddynfych). Its bounds are given in a land grant registered as a marginal entry in the Llandeilo Gospel Book.

Other indications of primary early medieval settlements come from place-name evidence, the location of churches and the morphology of the settlements. There is a strong impression from the sources of extensive areas of forest, marsh and upland waste. These are likely to be the areas of secondary settlement from the 13th century onwards. Certainly field shapes and place names strongly suggest assarting within these upland afforested areas. The sample areas illustrated show these patterns. A 14th century Duchy of Lancaster account for the *maenor* of Llanedi records 80 tenants who held 685 acres of land between them by Welsh tenure and for customary dues. But there were also 196 acres of new land which had been assarted from the waste. This was held of the lord by individuals and for annual rents - the pattern for the future. Much patient work remains to be done to map these areas of primary and secondary medieval settlement.

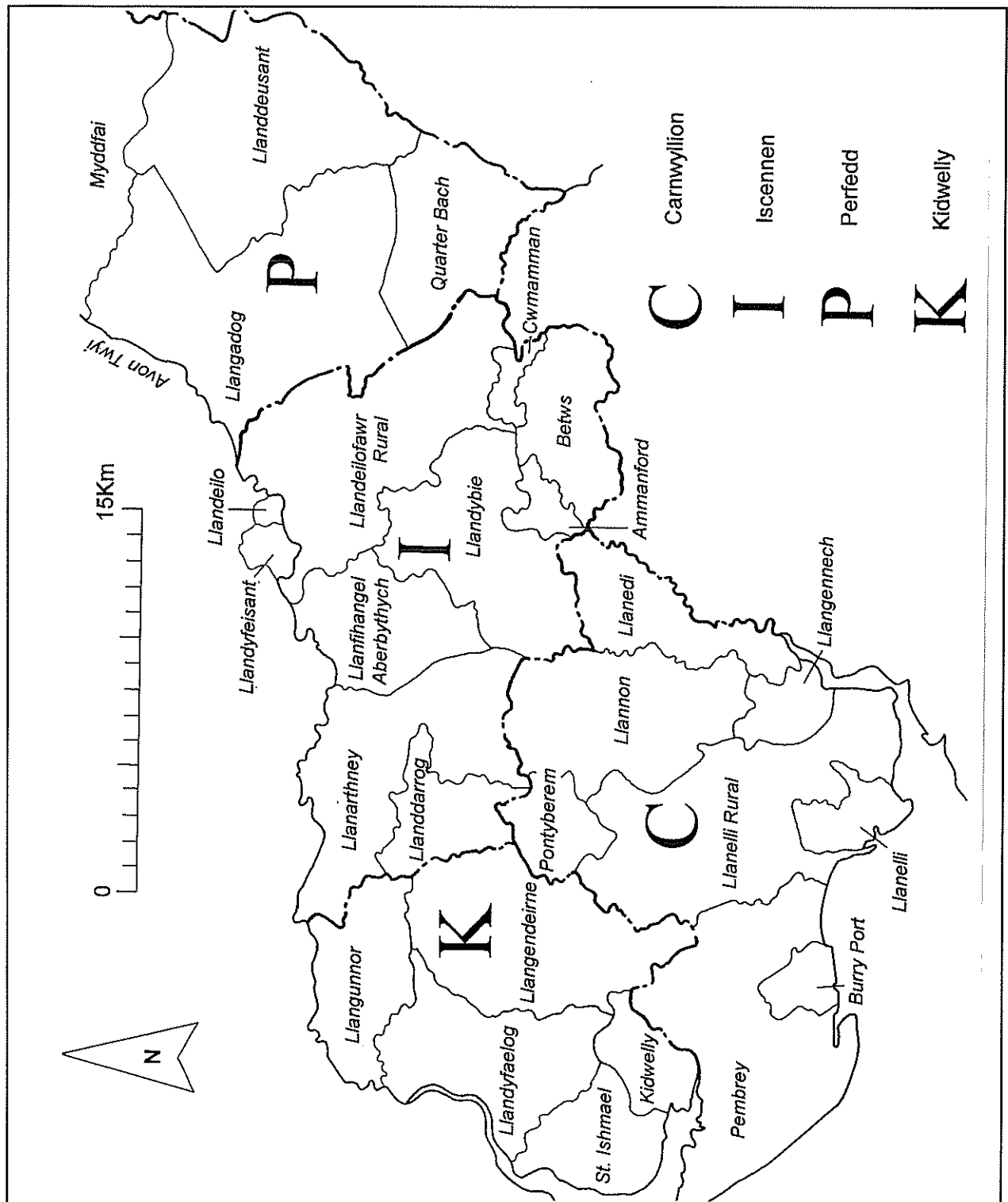
The 14th and 15th century crises of population pressure on resources, decreasing yields on marginal lands, famine, disease and demographic collapse with the Black Death affected south east Carmarthenshire as elsewhere. The consequences in terms of falling land values, vacant tenements, abandoned mills and a shortage of labour can be read from the Duchy of Lancaster account rolls which cover much of the Gwendraeth Valleys area. In the Lordship of Kidwelly further economic and social dislocation was caused by the uprising and guerrilla warfare of Owain Glyndwr in the early 15th century. There was a weakening of seignorial control and the development of an active peasant land market, of new men displacing the heirs of those who had died *contra pacem*, thus forfeiting their land. It is in such a climate in the mid to late 15th century that many of the 16th century gentry families have their roots.

The physical reflection of their landed power can be seen in present day farmhouses, many of 16th or 17th century date, which were the centres of small gentry estates - places like Gwempa, Cwrt y Cadno, Blaenau, Piode. Some of these have only recently been lost to open casting. Many of these estates were held by cadet branches of the dominant family of the Vaughans of Golden Grove. In the 17th and 18th century the Vaughans were notable for their vigorous retention of the feudal rights of lordship since this gave them control over and profits from the mineral and forest resources of their estates.

#### 3.3 The History of Coal Extraction in Carmarthenshire: A Summary

The history of the Carmarthenshire coalfield is in fact the history of the almost separate development of two coalfields. Due mainly to their proximity to the coast, the bituminous and steam coals of the Llanelli coalfield were exploited for export and local use from at least the





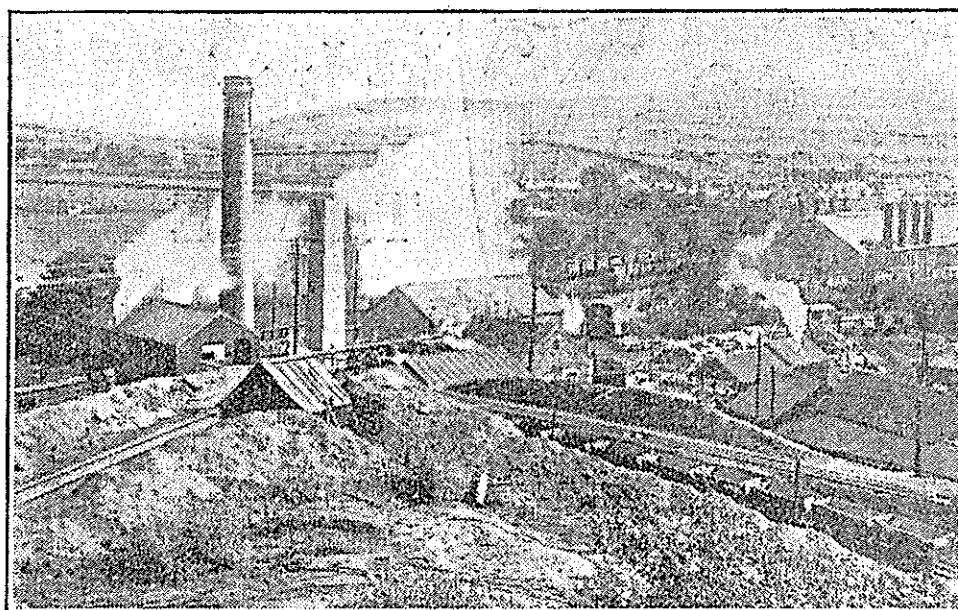
*Fig. 3 Mediæval Commotes*

16th century. Although there was little expansion of the industry during the 17th and early 18th century, the established tradition of coal mining along with the closely associated mining and smelting of iron ore in south east Dyfed was to prove important in attracting the interest of outside capital into the area after 1750, whereafter a concentration of non-ferrous metal smelteries was established around Llanelli, greatly expanding during the early 19th century. These smelteries and associated industries provided important new markets for local collieries, but more importantly the copper and ironmasters of the district themselves sought to develop collieries to supply their own furnaces and also to gain profit from the expanding export market, resulting in significant increases in output during the mid-18th and mid-19th centuries, peak production occurring during the 1860's. Coal output declined as the influence of the smelteries waned during the second half of the century.

The anthracites of the Gwendraeth-Amman coalfield were also exploited from an early date, but the inland location of the coalfield acted as a brake on its development until the railway network expanded drastically during the mid-19th century, despite earlier efforts

by Llanelli industrialists to tap its mineral wealth. Significant increases in anthracite output followed the successful application of hot blast furnaces in the iron smelting industry after the 1830's, when anthracite was successfully used as a fuel in the process. The true potential of the coalfield was to be realised in the late 19th century, however, when anthracite colliery companies successfully marketed their coal internationally. It was on the foundation of this success that the industry expanded during the first quarter of the 20th century, output peaking in South Wales during the 1930's, at a time when many other industries, indeed other sectors within the coal industry itself, were in recession.

The Llanelli coalfield shrank rapidly after the 1860's peak and by today it has no working collieries. The anthracite coalfield has experienced a later decline, and was for a time buoyed by considerable investment by the National Coal Board during the 1950's and 1960's. The recent history of the area has however seen a rather traumatic decline in coal output, with only nine working deep mines and three active opencast sites remaining, the latter perhaps with the best prospects for future development.



TIRYDAIL ANTHRACITE COLLIERY.

*Coalmining districts are generally regarded as bleak, barren, and hideous areas devoid of trees and enveloped in an atmosphere of smoke.- This general view of Tirydail Colliery proves that such a description does not apply to the Welsh anthracite coalfield.*

*Plate 2; Tirydail Colliery, Ammanford, in 1924. Note the Aberlash Tinplate Works on the right hand side of the photograph. The colliery buildings have gone, replaced by woodland, but the now roofless tinplate works building still stands. From "The Times Trade and Engineering Supplement", Dec 6, 1924.*

## 4. INDUSTRIAL HISTORY 1750 - 1950

### 4.1. The historical development of mining in Carmarthenshire

#### 4.1.1 PRE-INDUSTRIAL REVOLUTION

The earliest, detailed historical reference to the Carmarthenshire coalfield is probably that of Thomas Leland, who noted in c.1536 that "*In Llanethle...the inhabitants digge coles...*" and passed comment on the difference between the steam coals of the Llanelli area and the anthracite coal found nearer Kidwelly, described respectively as *ring* and *stone* coals. Leland also observed that coal was "*wrought and digged*" further north, on Mynydd Mawr common.

It is almost certain that coal was mined for many centuries prior to Leland's visit to the area, indeed there is documentary evidence that coal was being mined in the neighbouring Swansea and Port Talbot areas as early as the mid-13th century and the Gwendraeth and Llanelli district by the 15th century (Rees, 1968). However, it was not until the 16th century, when wood was apparently becoming scarcer, that coal increasingly became the main domestic fuel. It seems that the industry was organised and well developed in the Llanelli and lower Gwendraeth valley area by this time. In 1581 Sir George Carey obtained rights to work the coal, iron and lead deposits within the lordships of Kidwelly, Carnwyllon and Iscennen and in 1585 Pembrey was noted as being the chief port for the export of coal in Carmarthenshire (Symons, 1977). Llanelli was also developing as an export outlet by this time, supplying the West Country, the Channel Isles and France (Lewis, 1927). The early development of the Swansea - Llanelli part of the coalfield undoubtedly rested on the fact that coal and sea adjoined, making coal transport relatively easy.

The Survey of Duchy of Lancaster Lordships in Carmarthenshire of 1609-13 includes references to coal extraction at several locations (Rees, 1953), including Llanelli, Llangennech and Mynydd Mawr. In the latter instance some indication of one of the traditional markets supplied with anthracite coal, tenants of the commote of Iscennen having "*severallye and respectively hadd for all the tyme whereof the memory of man ys not to the contrary for necessary ffyre and burninge of lyme as parte of their freehould and appurtenaunte to the said severall tenements*" (Rees 1953, 300). About the same time comes a reference to coal mining at Forest, near Carway, which would become the site of one of the most important 18th century collieries in the county. Here one Lewis Morgan worked "*old pits sunk before the memory of man and full of water*" being "*unable to make a profit except for expenses of his own house*" (Rees, 1968, 108).

Due to the relatively easy access to the outcropping seams across much of the area, it is probable that in the main small drift workings (locally known as slants), coal pits and perhaps deeper bell pits were used,

the latter worked to a depth of some 20m. Despite the simplicity of such techniques they were probably employed from the earliest period of coal mining in the area until relatively recently; indeed, several slant mines still operate. Underground, there would have been little need for elaboration, whether or not pillar and stall mining was carried out below ground is not known, though the technique was certainly in use in other areas by the 14th century, exemplified by discoveries at Lounge, Leicester (Grimshaw, 1992). In bell pits and slants alike it may well have been common practice to work the easily accessible coal until haulage or winding to the surface became difficult, whereupon the workings could be abandoned and a new site developed.

Drainage was a major factor in the success or failure of underground workings. Drainage adits were the simplest and most effective method but were only suitable where seams were worked at outcrop on hillside locations, excess water freely draining away downslope of the working mine. Shafts sunk in valley floors required excess water to be collected in a sump at shaft bottom, below the working level, and raised to the surface in kiddles or buckets wound up by a simple windlass. The windlass and kibble would also serve to wind coal to the surface in such locations. The drainage of some surface coal pits was effected by "*ditching*", simply cutting a channel on the downslope side of the pit so that water was able to freely run away. Undated examples of small coal pits with such drainage ditches survive on Mynydd-y-Betws.

In the absence of documentary records, evidence of mining from this early period would be exceptionally difficult to recognise in the field as the techniques employed both on the surface and below ground are chronologically non-specific. It is also probable that many early sites have been re-worked at later dates and been obliterated or incorporated into new workings. Within south east Dyfed the earliest cartographic representation related to coal mining is of coal seams at Dynant, Tumble, a very rough sketch of which survives, dated 1601 (CRO Cyngorddy 348). Unfortunately, part of the area shown has been lost to recent opencast mining.

#### 4.1.2 1750 - 1790; EARLY EXPANSION.

It is unlikely that mining techniques within the Carmarthenshire coalfield changed considerably during the first half of the 18th century, despite the availability of new technologies and modes of transport in other areas. From the 1750's onwards, however, there are clear indications of change, most significantly in the Llanelli area where some stimulus to the development of the coal industry came from a growing number of metal smelting industries, both locally and elsewhere. These were often funded by industrialists wishing to secure private coal supplies for their smelteries, hence new collieries were opened, some linked to the coast by private horse drawn tramways or canals. One of the most significant developments of this period occurred to the west, with the construction of the Kymer Canal

which connected Pwlllygod and Great Forest Pits in the lower Gwendraeth Valley with a purpose built quay at Kidwelly. The canal was built between 1766-68 by Thomas Kymer of Kidwelly, owner of a group of coal pits near Carway who was intent on supplying the growing coal export market.

#### **Old & New technologies.**

During the 1750's and 1760's, several collieries around Llanelli were provided with Newcomen atmospheric steam engines to assist in the pumping of water from deep workings, but otherwise steam power was very slow in penetrating the Carmarthenshire coalfield. Coal winding and mine drainage would have generally relied on the use and refinement of traditional techniques, especially across the anthracite coalfield where steam engines were not installed before c.1817. Part of the reason for this might be that coal was in general easily located and mined in the area. Small workings could therefore be started with a minimum of capital input and abandoned in favour of a new site if technical difficulties occurred. The investment required to install a steam pumping or winding engine would be beyond the reach of most small proprietors and miners, many of whom may have been local farmers or landowners only involved in coal mining on a seasonal or infrequent basis.

It is known that horse power had long been used for winding coal to the surface, in terms of the extra weight that could be raised by horsepower the horse gin was a major improvement on the windlass. Their use was probably widespread and is testified by 18th and 19th century colliery names such as "Rever Vaine Ginn Pit" (one of Kymer's pits) and "Pwll y Gin" (Pontiets). Surface traces of gin-pits are often identifiable without the need for archaeological excavation, and a number of possible gin-circles appear to have survived beside old mine shafts at Y Rhâs, Pontiets.

Horse, water and wind power all featured in pre-19th century water drainage schemes for deep mines, the same techniques often used to raise both coal and water from underground workings. Some were an extension of the windlass principle, but instead of winding single buckets on the end of a rope, the winding drum could be provided with an endless rope to which was attached a series of small buckets. Alternatively, the "chain and rag" system involved drawing leather balls attached to an endless chain up a wooden pipe, each ball acting as a piston to help push the water upwards. Thomas (1904) mentions that early wooden pumps associated with old workings were occasionally discovered by 19th century miners in the Gwendraeth valley. Documentary evidence shows that during the late 18th century an "engine" at the "Rever Vaine Engine Pit" (part of Great Forest) was a pumping device driven by a waterwheel (CRO Dynevor Box 22/9). Water to power the wheel was taken from Cwm Gelynnog, a small tributary valley of the Gwendraeth Fawr, where a system of leats and dams was constructed to ensure a dependable water supply.

Away from the coastline and the lower Gwen-

draeth Valley the available evidence suggests that coal was mined on a low technology, low investment level until well into the 19th century. Samuel Lewis (1833) noted that the extensive coal reserves of the Betws area had been left largely untouched even in his day. Undoubtedly a poor communications network was the main factor which retarded the development of the inland coalfield. Although coal was generally easy to locate and mine in this area it was difficult to transport beyond the local market, supplying little more than domestic fuel requirements and the lime burning industry in what was a thinly populated rural area before the later 19th century. Most coal mined during this period in the upper Gwendraeth and Amman valleys was probably extracted by local people for their own use. Thomas (1894) records a simple mining technique employed on Mynydd-y-Betws which consisted of quarrying pits into the outcropping coal seams and then using gunpowder to blast the pit sides and bottom in order to loosen the coal face. The crudity of this method reinforces the picture of coal being perceived as a common and unlimited commodity in some places. However, greater consideration certainly went into the development of some early collieries in the Amman valley, probably the most important of which was a boat level opened at Brynllloi, Glanamau. This mine operated during the 1750's and took the form of a level driven into the hill which was then made into a subterranean canal connected to pillar and stall workings at the coalface, the coal being brought out in wooden barges (Thomas, 1894).

#### **4.1.3 1790 - 1880; THE STEAM COAL BOOM.**

The early years of the 19th century saw a series of developments which would lead to significant changes in coal mining in south east Dyfed. Again it was the metal smelting industries of the Llanelli district which were to provide the impetus for development, but this was part of a general upturn in industrial activity across the country which far surpassed anything previously seen and which would be carried onwards by the rapid growth in the use of the steam engine, for which the dry steam coals of the Llanelli coalfield were ideally suited.

Outside capital was being ploughed into new copperworks and ironworks at Llanelli at the turn of the century with important figures such as Alexander Raby and Richard Nevill behind often ambitious schemes to exploit the natural reserves of the district. The development of their smelteries went hand in hand with the development of collieries to supply them and tramroads to carry coal, limestone and other raw materials from source or from coastal shipping places, which with time would be replaced by purpose built docks. Raby was particularly influential in the development of the Carmarthenshire Tramroad and Docks. This was the first serious attempt to gain access to the anthracite coal, iron ore and limestone which abounded in the upper Gwendraeth valley.

It was Nevill and his Llanelli Copperworks Company which proved the most resilient and successful

group during the first quarter of the 19th century, however. Metal smelting became the prime industry of the Llanelli area during the period 1800-1830, coal in many respects being ancillary to its development (Symons, 1984). During this period the population of Llanelli town doubled and there was a five-fold increase in output from the collieries of the district. During the 1830's the demand for steam coals began to rise sharply and a number of new collieries were opened by the Copperworks Company and The Llangennech Coal Company - its only serious rival. The Llangennech Coal Company were partners in a key development during the 1830's when the Llanelli New Dock was built by the Llanelli Railway & Dock Company, complete with a rail link to their new St. David's Colliery, which, at 700', had the deepest coal workings in Wales at that time (Symons, 1984). The dock was to prove a starting point in the construction of the Llanelli Railway, which reached Ammanford in 1840 and the Mynydd Mawr and Amman Valley areas by 1841, opening up the whole of the anthracite coalfield for development.

The general expansion of the Llanelli coalfield continued throughout the 1840's - 1860's. Although the Copperworks Company was the largest concern in the area a countless number of smaller companies and partnerships were also active, working less rich seams and re-working old workings, exploiting the Llanelli coalfield to its maximum. Against a background of such intensive activity, peak output was reached in the Llanelli Coalfield in 1864, at nearly 500,000 tons, 7% of the South Wales total (Symons, 1984).

The subsequent decline of the Llanelli coalfield was almost as spectacular, for the best coal reserves had been extracted by 1870 and a period of general economic depression during the late 1860's was followed by a decade of industrial unrest in the 1870's. Trade was also being lost to other South Wales ports, and copper smelting was in decline. The combination of these factors saw the reduction of annual output from the Llanelli coalfield to just 200,000 tons in 1880. However, the loss of employment and trade suffered by the coal industry was not devastating to the local economy. The concentration of heavy industries attracted to Llanelli by its convenient coal reserves and its improved transport network and port facilities included iron and steel production, tinplate manufacture and non-ferrous smelting and would prove a solid base for economic growth well into the second half of the 20th century.

#### Early 19th century collieries.

Any account of colliery development throughout most of the 19th century is one of small concerns working the easiest possible coal seams with the minimum possible investment. Such ventures were often short-lived, or changed ownership frequently, and mining techniques in the smaller collieries probably remained little changed from those of the previous century. A description of the coal industry in the Pontyberem area before the opening of the large Coalbrook Colliery in 1838 illustrates this point;

*"...nid oedd y pentref ond bychain iawn a glöwyr oedd y gweithwyr yn gyffredin, pa rai oeddynt yn gweithio yma a thraw mewn pyllau bychain ar hyd y gymdogaeth, ac yn codi glo at wasanaeth teuluoedd yr ardal, ac hefyd i galchwyr at losgi ceryg galch."*

*"...the village was a small one and the workers mostly miners who worked in small pits here and there in the vicinity, raising coal either to be used by local families or by limeburners."*

(Evans, 1856).

The capital available to the larger industrial concerns around Llanelli allowed investment in modern steam engines at an increasing number of pits - Raby, for example, installed a Trevethick engine to wind coal at one of his collieries in the first few years of the 19th century. However, it is apparent that steam power only had limited application in the Gwendraeth-Amman coalfield during the first half of the 19th century, probably due to the relatively under-developed nature of the coal industry in the first decades of the century. According to E.G. Bowen (1939) the first steam engine installed in the anthracite coalfield was c.1815, but in the lower Gwendraeth valley it is said to have been in 1838, when one was installed at the Llwyn-y-wiwer Colliery near Pontiets (Thomas, 1904). It appears that these early engines were usually used for coal winding, rather than pumping water; certainly this was the true in the case of several Gwendraeth pits, where waterwheels were maintained for pumping water. A late example of this method of drainage being used was at Glangwendraeth Colliery, Pontiets, where elmwood pipes were used in conjunction with a waterwheel to drain workings well into the 1850's (Thomas, 1904).

Another common method of coal winding in South Wales during the first half of the 19th century was the simple water balance system, of which there are several documented examples in south east Dyfed. In 1838, a water balance operated at the above named Llwyn-y-wiwer Colliery, Pontiets, which had two vertical shafts; one shaft having a steam engine for pumping water whilst coal was raised by the water balance system operating in the other (Dilwyn Roberts, pers. comm.). Pwll-y-lord Colliery, Blaenau, opened c.1850 and was locally known as *Pwll y Balance*. Contemporary plans show that a small supply reservoir was located near the single shaft in which the balance system operated (CRO Dynevor Map Bundle 4/4). Unfortunately this site has been lost to opencast operations. Another *Pwll y Balans* is recorded as operating at Y Tymbl during the first half of the 19th century (Dilwyn Roberts, pers. comm.).

#### 4.1.4 1800-1923; THE DEVELOPING ANTHRACITE COALFIELD.

Although the main focus of coal mining during the first quarter of the 19th century was around Llanelli, the potential of the northern anthracite coalfield was

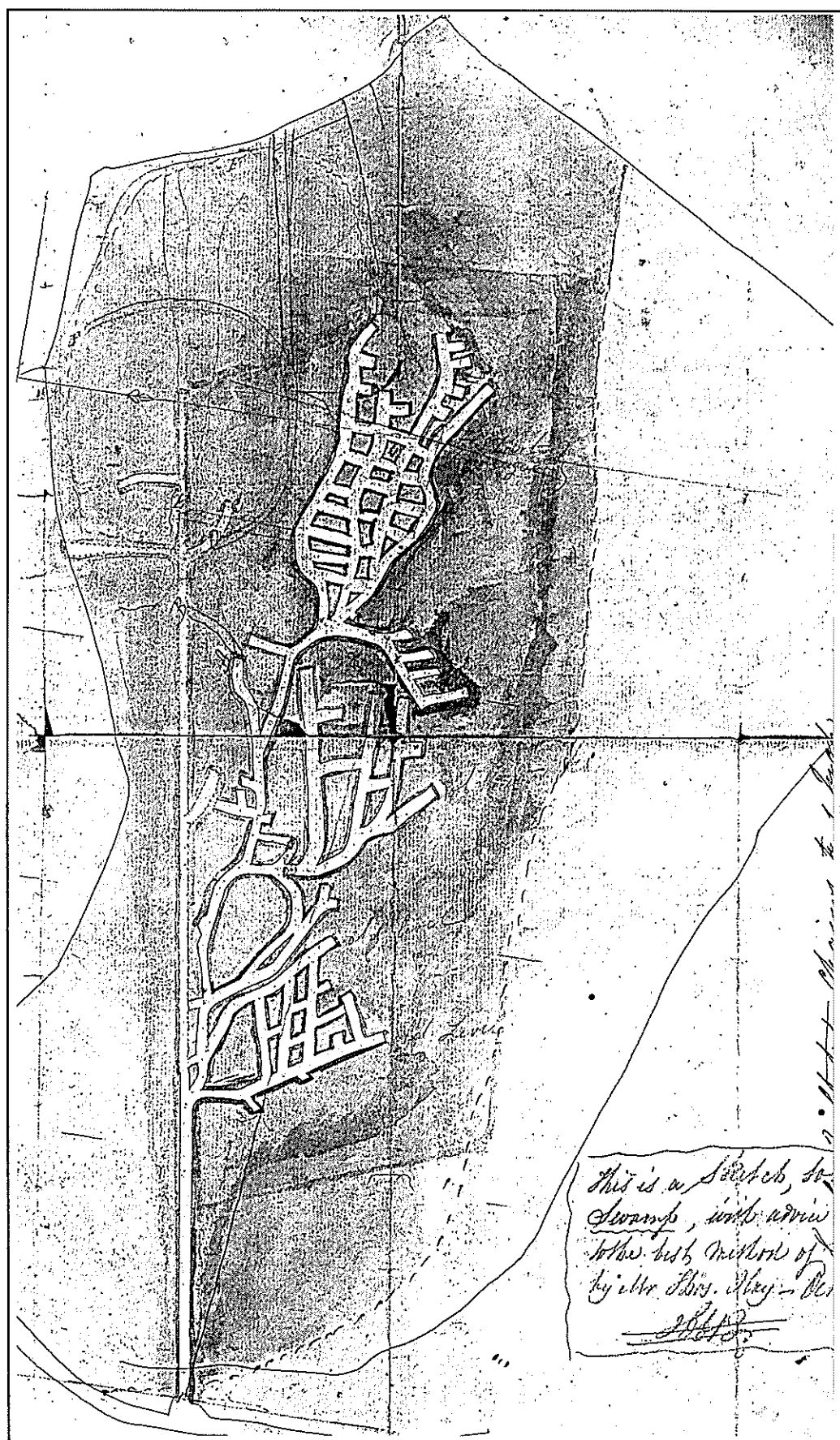


Plate 3; Plan of pillar and stall workings in an early 19th century colliery. Cynheidre in 1828, drawn by Thomas Hay. (Carmarthen Record Office, Castell Gorfod 22).



widely appreciated. Traditional markets already existed for Carmarthenshire anthracite as a domestic coal, as well as for use in malting, the growing lime burning industry and, further afield, for heating systems in overseas hothouses. There were also important iron ore deposits associated with some of the anthracite seams as well as nearby limestone quarries, the potential of which were not lost on an ironmaster such as Alexander Raby who, as early as the 1790's, had experimented (unsuccessfully) with anthracite as a fuel at his Cwmddyche iron forge.

As previously noted, significant efforts were made to improve access to the anthracite coalfield with the construction of the Kidwelly & Llanelli canal and the Carmarthenshire Tramroad, but the effect on the coal industry of these improvements in the communications network were not initially startling. The tonnage which could be handled on horse drawn tramways and canal barges was still relatively limited. Even so, with access opened up to Kidwelly, Pembrey and Llanelli via the Gwendraeth Valley there was a continuous upturn in the number of collieries working and in the scale of operations. By 1830 there was a fairly long list of Gwendraeth Valley collieries producing over 100 tons of anthracite coal per day, such as those at Ffou Farm, Ty'nywern, Ty'nywaun, Old Pentremawr, Old Caepontbren, Crosshands as well as the Gilfach, Miller, George and Pwlllylledrim pits around Gorslas (Bowen, 1939, 385). A greater impetus was provided in 1835 when anthracite was successfully used as a fuel in the open hearth iron smelting process, a development which saw an increase in both anthracite output and iron smelting in south east Dyfed. This was soon followed by the opening of the Llanelli Railway and its branches to Brynaman and Gorslas which was followed by the opening of a number of new collieries. It was on these foundations that the anthracite mining industry would operate through mid-19th century, though it was still short of its full potential.

It was in the Amman valley that developments occurred which would rapidly establish Welsh anthracite as an internationally acclaimed fuel and would lead to a new impetus for expansion within the industry. Much of the credit for this has been attributed to one individual, a Yorkshireman named Edward Cleaves, owner of the Cross Hands Colliery Company (renamed the Cleaves Western Valleys Anthracite Collieries Company in 1924) and known as "the father of the anthracite industry" (Treharne, 1995, 4; Morgan, 1958, 12). The company owned the Gwaun-cae-gurwen Colliery, located at the Glamorganshire end of the Amman Valley, which became the first colliery to introduce the mechanical breaking, sizing and washing of coal. The company's ability to supply coal prepared in up to 10 different grades was a distinct advantage when attempting to attract new European customers. Cleaves travelled widely advertising his product, which won acclaim at European Trade Exhibitions at Amsterdam (1883), Antwerp (1885), Barcelona (1888) and Paris (1889). One of the new markets opened up during this period was the market gardening industry of the Netherlands, anthracite coal proving ideal to heat its hothouses, whilst

the invention of an anthracite burning stove in Scandinavia in 1880 as well as new developments in central heating added to the overseas domestic fuel market, particularly in France, Germany and Italy. Anthracite was increasingly seen as a fuel suited best to the closed ovens or fires of new central heating systems, rather than for burning on an open hearth. It was rarely used as a household coal outside the anthracite coalfield, the steam and bituminous coals proving easier to light and maintain in an open grate. The new markets meant that the period 1887-1902 saw almost a 300% increase in the output of the South Wales anthracite collieries, half of which went for export. (Bowen, 1939, 386).

The 1914-18 war inevitably affected the continental market for Welsh anthracite, but somewhat fortuitously a new and extensive market opened up in Canada, where Welsh anthracite became favoured to the poorer quality, more expensive Pennsylvanian anthracite. A temporary decline in output followed the war, but as the 1920's progressed the anthracite industry experienced a boom period which saw a dramatic increase in demand and prices whilst many other industries had gloomy prospects.

#### Late 19th century collieries

By the 1870's colliery sites were being recorded in some detail by the Ordnance Survey for the 1st edition 1:2500 County Series. This edition provided a valuable record of the size and layout of many contemporary collieries. It is evident that literally hundreds of minor coal pits, shafts and slants were still being worked across south east Dyfed at this time, many in the ownership of small local concerns. Significant numbers of more substantial coal mines are annotated as collieries, many seen to include characteristic buildings such as engine houses which testify to the widespread use of steam power for winding and pumping. By this date the larger collieries often possessed small networks of tramways linking the slant or shaft mouth with the screening plant and those closest to the main railway lines were often integrated into the network via their own sidings. The favoured location for developing new collieries was as close as possible to a railway, but even collieries relatively distant from the main lines were often provided with tram links. In the Amman Valley, for example, the Cawdor No.1 pit, which was located high up on Mynydd-y-Betws, was provided with a 2km long tramway link to the Garnant branch of the Great Western (formerly Llanelli) Railway. Ownership of these collieries was now in the hands of small independent companies which might own more than one site, such as Cleaves Western Valleys Company.

Little now remains of these late 19th century collieries, either due to later expansions and rebuilding of the colliery complex or due to site clearance. However, those sites which survive are generally characterised by a range of earthwork features with little evidence of stone or brick buildings. It is possible that many of the structures shown on contemporary OS maps were in fact easily dismantled tin sheet or wooden buildings,

reflective of an expectation that a colliery would probably have a short lifespan. Some of the larger complexes certainly did possess ranges of more substantial and often architecturally valuable buildings, but almost without exception these have been lost. Betws Mine (formerly Ammanford Colliery) and Emlyn Colliery, Penygroes (now Castle Brickworks) are the only sites which appear to have retained any substantial number of pre-20th century buildings in the Gwendraeth-Amman coalfield.

#### 4.1.5 AMALGAMATION 1923-1947

The management style of Cleeves and the preparation and grading of coal produced at his collieries was an early indication of how the industry was to develop. The day of the small independent colliery owner was passing and from the opening decade of the 20th century the amalgamation of collieries was discussed widely, though this was not to happen on a significant scale until the 1920's. Initially, companies such as Cross Hands Colliery and the Blaina Colliery companies brought groups of collieries into joint management, but during the 1920's these companies themselves combined. In the Amman Valley district Cleeves Western Valleys Collieries Company was accompanied by the Gelliceidrim Collieries Ltd, Gurnos Anthracite Collieries and the Cawdor & Cwmgorse Collieries in uniting into the Amalgamated Anthracite Collieries in 1923 (managed by the leading Swansea industrialist Sir Alfred Mond). Further west, the Great Mountain Anthracite Collieries, Ammanford Anthracite Collieries, Pontyberem Anthracite Collieries and the New Dynant Anthracite Collieries Companies were to become partners in a second large combine, the United Anthracite Collieries Ltd in 1924. The AAC and UAC were only two of six large combines which controlled the majority of South Wales anthracite production, but in 1928 they all united under the Amalgamated Anthracite Collieries name, with control of 80% of South Wales anthracite production.

It was not just in the boardroom that these changes were felt, for the mechanised preparation of coal for sale meant a new range of plant had to be installed at the pithead, with screening, washing and crushing machinery required. Collieries now developed as large complexes, often on more than one site. The Emlyn Colliery at Penygroes had opened in 1890 and later saw the introduction of conveyors and coal cutters at the coal face, giving an output of 1000 tons a day which was washed and screened on site. Emlyn also produced its own electricity and had the first pithead baths in the Ammanford area. In many instances formerly independent pits were now connected below ground to produce extensive networks of subterranean roadways. In the Gwendraeth Valley for example, progressive linking of underground workings left Glynhebog, Maesmawr and Coalbrook (Pontyberem) collieries integrated, firstly with each other and, by 1941, with the Cynheidre No.3 & 4 workings. Further east, modern coal-cutting machinery was installed at Gelliceidrim in 1923, new screens and washeries were installed at Raven, Garnant.

Despite such technical improvements the years of AAC management were very much a period of consolidation which saw little development of new pits. Periods of serious industrial unrest afflicted the coal industry throughout the 1920's, including a bitter strike in the anthracite coalfield in 1925 which led to the closure of Ammanford No.1 Colliery. Despite these problems, the peak year of output from the South Wales anthracite industry was 1934 (over 6,000 million tons), the sector protected from world recession by the varied nature of its markets - from the brewery industry to the supply of central heating and domestic fuel systems, most of which were unaffected by industrial recession.

By the late 1930's it is clear that production was concentrated on the larger collieries of the anthracite coalfield, it is also evident that a serious decline in the prospects of coal mining was being felt in some localities. G.M. Roberts noted of the parish of Llandybie in 1939;

*"Ychydig o weithio glo sydd heddiw yn y plwyf... Yn ôl pob argoel ni bydd ond ychydig weithio glo yn y plwyf yn y dyfodol agos, a hwyrach gwelir y plwyf yn mynd yn ôl i 'w wedd amaethyddol, fel yn y dyddiau gynt."*

"Little coal mining now occurs in the parish... The signs are that there will be very little mining here in the near future, perhaps we will see the parish returning to its former, rural character.

(Roberts, 1939, 223).

Roberts was somewhat premature in his assessment of the prospects of the industry in the area, but clearly sensitive to contemporary events. Shortly afterwards the outbreak of war led to an initial loss of overseas markets and manpower and the temporary closure of collieries such as Llandybie, Pantyffynnon and Wernos, some of the most important collieries in the Ammanford district. This was not however to prove to be the end of mining in this area as most of these were to re-open by the end of the war, as markets re-opened and demand once again rose..

#### 4.1.6 NATIONALISATION 1947-1960

When the coal industry came into state ownership in 1947, a number of the collieries of the Gwendraeth-Amman coalfield were in a vulnerable condition, many being almost exhausted. Within a decade several were closed, including Blaenau-Saron in 1956, which had remained unmechanized and used pillar and stall method of extraction. Wernos was put to good use between 1947 and 1952 as a NCB training centre, though in 1957 it was to reopen as a modern colliery, the first anthracite pit to have power loading of longwall coalfaces installed. Glynhebog Colliery, Pontyberem, also became a training centre after closure in 1949. Both are good examples of the new approach of the early NCB. New, public money was available for investment in the coal industry,



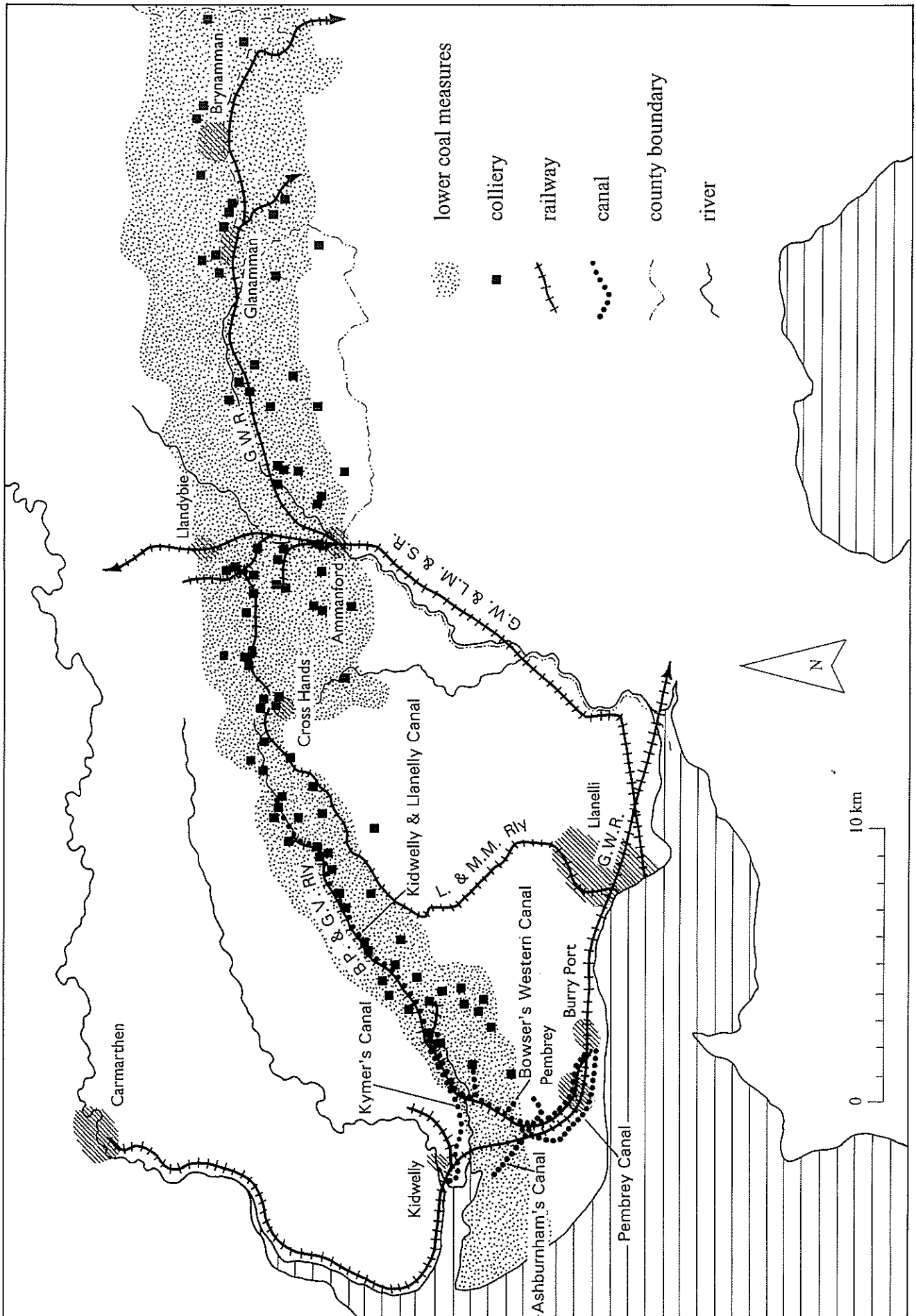


Fig. 4 The Study area, showing railways and canals of the anthracite coalfield.

matched by an endeavour to improve the training of miners in order to improve conditions and output.

The NCB were also prepared to invest in the development of new collieries and large mines opened at Abernant (West Glamorgan) and Cwmgwili during the early 1960's, the latter still in production. The effect of these new ventures was to concentrate mining activity into relatively few, large collieries; such as Pentremawr and Cynheidre in the Gwendraeth Valley and Betws, Cwmgwili and Abernant in the Amman Valley area. Washery facilities were also centralised at sites such as Gwaun-cae-gurwen, Wernos and Cwmmawr, under common ownership individual pits no longer needed to process their own coal.

In the late 1950's the Gwendraeth-Amman coalfield was still producing over 25% of South Wales anthracite, but there were fewer collieries operating and fewer miners employed - the population was also beginning to fall after the growth of the first half of the 20th century. It is also significant that by this time a number of opencast operations had already been started, taking up an increasing share of the total output figure.

## 4.2 Associated industries

The mineral wealth of south east Dyfed was not confined to coal. A suite of other valuable raw materials were located within close proximity to the coal seams, some occurring in association with the coal itself. These included iron ore, limestone (used for limeburning and in the iron smelting process), copper and lead, as well as fireclays, boulder clays and silica which were all used in brick manufacture. The easy access to coastal ports not only allowed for easy export of native minerals, it also allowed the import of raw materials not found locally. Thus as local reserves of iron ore, copper and lead dwindled during the early 19th century, there was little difficulty in importing foreign ores. Similarly, tin, not found in Wales, was easily brought from Cornwall to supply the tinplate industry, which was one of the biggest providers of employment in the Llanelli and Swansea areas by the late 19th century.

The following brief overview of the main industries which developed alongside coal mining is not intended to provide an exhaustive list of sites nor a detailed history of each industries development. It is intended merely to draw attention to the rich variety of industrial activity in the region and the importance each has played in its overall industrial history.

### 4.2.1 METAL ORES

Metal mining and processing had a surprisingly long and varied history in south eastern Carmarthenshire, with lead mines recorded as early as the 16th century and several important iron foundries established during the early 17th century (Rees, 1968).

Although a wide range of metal ores have been extracted in Carmarthenshire, particularly in the Kidwelly and Gwendraeth area, none were available in

sufficient quantities to supply the demand of local foundries and mills over an extended period. The iron mining sector probably came closest to achieving this, but only whilst production remained on a relatively small scale. Non-ferrous ores, including lead, copper, tin and silver were all imported into the area via the ports of Kidwelly, Llanelli and Burry Port, to supply local smelting and tinplate works. These ventures were of course attracted to the area by ready supplies of coal and it was common for industrialists and companies to own metalworks and collieries, to ensure that they could supply their own furnaces with their own coal.

### a) Iron & Steel

Iron mining was intimately associated with coal mining as ironstone nodules and beds of clay iron occur within the Coal Measures. In the early years of iron smelting in Carmarthenshire, iron ore was found in sufficient quantity in some localities to supply the foundries, this is clearly evidenced in a 19th century anonymous poem which commemorates the endeavours of the iron miners of the Pontiets area;

*"Fan draw ar fferm Penrhas, cryf fwynwyr a welir  
Yn cloddio mwn haiarn o'i hen wely cudd;  
A'r mwynau mewn certi i'r ffwrn arafgludid,  
Dros ddwy ran o filltir drwy gydol y dydd."*

Over there, at Penrhas Farm, I see strong miners  
Taking iron ore from its hidden bed  
And the ore, in carts, is slowly carried  
Two thirds of a mile so the furnace is fed".

(Anon, from Ap Huw, 1873)

The ore extracted near Pontiets came from the ironstone beds which immediately underlie the Rhasfach coal seam at the base of the non-marine deposits of the Lower Coal Measures. The furnace mentioned in the poem was located nearby at Ponthenri, where traces of masonry survive. A system of leats brought water down to drive the waterwheel at the foundry and the English term "race" has been incorporated into the local place names of Y Rhâs, Penrhâs and Rhâs-fach, denoting the course of these long disused channels which apparently extended for several kilometres along the western side of the Gwendraeth Valley (Dilwyn Roberts, pers. comm.).

Another known source of ironstone was found near Gorslas, Crosshands. "Old Pits" marked around Gorslas on late nineteenth century OS maps were iron ore pits and it is significant that the Carmarthenshire Tramway, built during the first decade of the 18th century with the intention of linking Llanelli with the limestone quarries of Castell-y-garreg, Gorslas, never reached the quarries, but actually terminated at the ironstone pits.

Blast furnaces were apparently working at Glan-aman during the 18th or 19th century. According to local historians (e.g. Rees, 1898) the coal was carried by mule along "Y Gwter Fawr", a trackway which ran from

the coal pits in the area of modern Gwaun-cae-gurwen down to the furnaces. The accuracy of this story must be doubted however as anthracite was not used in blast furnaces until 1837, by which time those at Glanamau were ruinous. It is more likely that this was another charcoal iron forge, supplied with local iron ore and limestone, but not coal.

The local supply of iron ore was diminishing rapidly by the mid-19th century and proved unsuitable for use as steel production increased, thus the iron mining tradition of the district came to an end.

### Forges and Furnaces.

The iron industry in Wales enjoyed two distinct periods of activity, termed by D. Morgan Rees (1975) the "Charcoal and Water Era" and the "Coke and Steam Era". Until the mid-18th century charcoal was the fuel used by the iron industry and forges and blast furnaces

were generally sited where there were areas of woodland available to provide sufficient charcoal supplies, many of these being relatively remote, inland sites. A constant water supply was needed to power the waterwheels which worked large bellows providing the blast required to heat the furnaces. Within Carmarthenshire, wooded river valleys as far inland as Cynwyl Elfed and Llangadog proved ideal locations of iron forges. The "charcoal and water era" ended c.1760 in many areas, as improved methods meant that coke became the preferred fuel, with steam engines providing the blast for the furnaces. In Carmarthenshire, however, the late introduction of steam engine technology meant that most iron forges retained their dependence on charcoal and water well into the 19th century. Some coking works did operate around Llanelli, as at the Old Castle Iron Company from 1886, but it seems that generally the industry in south east Dyfed switched from charcoal to anthracite

PRN	NAME	DATE	NGR
30668	Kidwelly Forge	1636	SN4005
30707	Ffwrneis, Pontiets	17th cent.	SN478085
9928	Pont Henri Foundry (SAM Carm 227)	17th cent.	SN47410917
30670	Glanaman Furnace	pre-1800?	SN672138
4491	Raby's Furnace, Cwmddyche, Llanelli	1793	SN50390151
4491	Shewen's Furnace (Cwmddyche?)	c.1755	SN50390151
30700	Gwendraeth Iron Works, Pontyberem	1670 reb.1801	SN5011
26584	Trimsaran Iron Works	1838-48	SN44890510
30701	Amman Valley Iron Works, Brynaman	1848	SN716140
4493	Dafen Iron Works, Llanelli	1846	SN52950125
4662	Morfa Iron Works	1851	SS511986
8817	Old Lodge Iron Works	1852	SS50659980
8816	Marshfield (Western) Iron Works	1863-79	SS50609968
30702	Old Castle Iron Works	1866	SN49900020
4492	Llanmore Iron Foundry, Llanelli	pre-1880	SN50800000
8818	Wern Foundry, Llanelli	pre-1880	SS50759990
8861	Llanelli Iron Foundry	?	SS50909885
9042	Gwscwm Furnace, Burry Port	pre-1880	SN43850121
30704	Penrhâs Ironworks, Llanelli	pre-1891	SS505993
4952	Glanmor Iron Foundry, Llanelli	1891	SS50409951
5338	Pembrey Iron Foundry	1921	SS556986

as a main fuel from the mid-19th century - due to its low sulphur content anthracite did not require coking.

Charcoal fired iron furnaces are known to have been operating at Kidwelly and Ponthenri during the 17th century, the Kidwelly Forge working as early as 1636 (Rees, 1968, 266). Another early forge was situated at Llandyfan, just north-east of Llandybie (Riden, 1987), as well as at sites further north and west at Whitland, Abercych, Carmarthen, Cwmbran and Cwmndwyfran. In the 18th century another ironworks located within the study area was the Gwendraeth Ironworks, Pontyberem. A major figure in the development of the charcoal iron industry in Carmarthenshire was Robert Morgan of Carmarthen, who owned several of these furnaces (Bowen, 1939).

Another early charcoal iron furnace was located at Ynyshafren, Pontiets, apparently first observed by the late M.C. Evans (Roberts, 1979). The blast furnace reportedly survived until the early years of the present century when its destruction was recorded (D. Thomas 1904). The site now only contains the ruins of an old cottage named Ffwrneis around which can be seen considerable quantities of iron slag. Several leats also run into the site and the passing Hafren stream appears to have been dammed higher up the valley to form a supply reservoir. Ynyshafren may well have been a forerunner of the nearby Ponthenri furnace and is possibly Elizabethan in date. This site has been subject in part to archaeological excavation by members of the Gwendraeth Valley Historical Society, under the direction of the late W.H. Morris, Kidwelly (Roberts, 1979).

At Llanelli, Alexander Raby, by the end of the

18th century, recognised the potential benefits of the iron, limestone and anthracite deposits of the northern part of the coalfield, which might supply his own ironworks at Cwmddyche, Llanelli. He pursued this idea and was a prime mover in the building of the Carmarthenshire Tramway, which opened in 1805. His experiments with anthracite as a fuel at his furnaces were unsuccessful and costly, probably a major factor in Raby's constant financial troubles. It was in 1835 that the hot blast process involving the use of anthracite coal as a fuel was finally perfected by Neilson. The process was first put to use in the Welsh anthracite coalfield by George Crane of Ynyscedwyn Ironworks in 1837, leading to an increased demand for anthracite and to the opening of new ironworks across the South Wales anthracite belt, including Trimsaran (c.1838) and Brynaman (1848). A cluster of new ironworks also developed on the coast around Llanelli and Burry Port during the period 1840-1880, supplied with coal and limestone from the Gwendraeth-Amman area (Bowen, 1939).

As the 19th century progressed the iron industry would gradually be replaced by tinplate and steel manufacture, the new industries often utilising the same sites as the old iron foundries. The growth of steel production along the coast was the death knell of the inland iron industry. Native iron ore was now in short supply and proving unsuitable for use in steel production. Foreign ore, particularly from Spain, was imported by sea into ports such as Llanelli and made the coastal strip a favoured location for the new steelworks from the 1880's onwards, with much of their output going to the thriving tinplate industry of the Swansea and Llanelli districts.

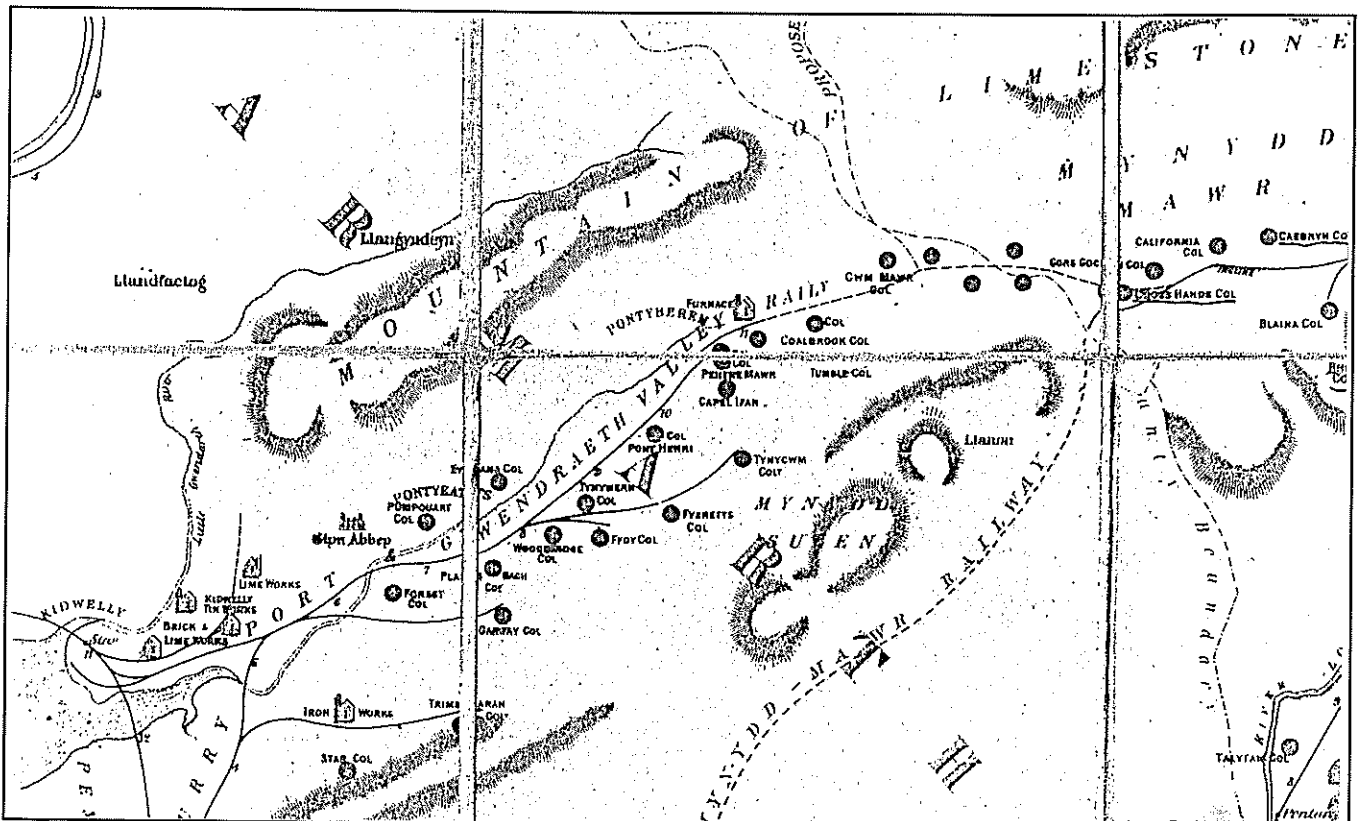


Plate 4; Reduction of Campions Map of the South Wales coalfield showing the Gwendraeth Valley area c. 1881.

**b) Tinsplate.**

Tinsplate has been described as an industry characteristic of the Swansea region, financed and managed locally, with tinsplate works buildings architecturally reminiscent of the Welsh chapel (Hughes & Reynolds, 1988, 20). The regional importance of the industry is shown by the fact that 80% of the workers of the British tinsplate industry lived within a 20 mile radius of Swansea in 1913. The process involves rolling iron or steel bars into thin sheets and then coating them with tin. It was a labour intensive industry until the strip mill replaced the traditional handmill in the mid - late 20th century.

The first tinsplate works in south-east Dyfed was opened at Kidwelly in the early 18th century (c.1737) (Ludlow, 1991), another followed at Carmarthen in 1759. However, in the 50 years between 1860 and 1910 over 20 other tinsplate works operated within the Carmarthen - Brynaman - Llanelli triangle, attracted by the region's ready supplies of coal and water. Tin was of course not found locally and had to be imported, but the earliest tinsplate works used pig-iron and wrought iron produced from local ores. This appears to have been the

case with the Amman Valley works for some time, but as imported ores and cheap steel bars from America and the continent replaced native ores the inland location of such works became a distinct handicap. From the late 1880's onwards, iron, steel and tinsplate industries were tending to relocate along the coastal strip, and the inland factories gradually declined. A major blow to the industry were the "McKinley Tariffs", imposed by the American government in 1891 to restrict the import of foreign tinsplate into the USA, one of the major markets supplied by the South Wales industry. This led to a temporary depression in the industry until new markets could be established, many workers emigrating to work in the growing American tinsplate industry.

Tinsplate manufacture continues at Trostre, Llanelli, but of the earlier works little has survived. The shell of the Aberlath Tinsplate Works is an architecturally impressive reminder of the Welsh character of the industry, but undoubtedly the most impressive survival is that of the Kidwelly Tinsplate Works, where a range of buildings, some containing original machinery, has been preserved as the site of the Kidwelly Industrial Heritage Museum.

PRN	Name	Opened	NGR
8448	Kidwelly Tinsplate Works	1737	SN42120040
4710	Hendy Tinsplate Works	1866	SN58250355
9746	Old Castle Iron & Tinsplate Co., Llanelli	1866	SN49900020
4709	Llangennech Tinsplate Works	1867	SN56160140
8769	St.David's (Yspitty), Bynea	1869	SS56100060
30701	Amman Iron Co., Brynaman	1872	SN716140
30708	South Wales Iron & Tinsplate Works, Llanelli	1872	SS50829858
8926	Morlais Tinsplate Works, Llangennech	1873	SN56100060
30709	Burry Tinsplate Works, Llanelli	1875	SS509983
8817	Old Lodge Tinsplate Works, Llanelli	1880	SS50659980
9663	Dynevor Tinsplate Works, Pantyffynnon	1880	SN62201070
30710	Cambrian Tinsplate Works, Llanelli	1880's	SS50009930
4493	Dafen Tinsplate Works	c.1880	SN52950125
8861	Llanelli Tin Works	c.1880	SS50909885
8938	Morfa Tin Works	c.1880	SS51709875
8816	Western Tinsplate Works, Llanelli	c.1880	SN50609968
30711	Garnant Tinsplate Works (Amman Tinsplate Co.)	1882	SN685133
30712	Raven Steel Sheet & Galv. Co., Cwmaman	1889	SN676137
28175	Aberlath Tinsplate Works, Ammanford	1889	SN62301305
9043	Ashburnham Tinsplate Co., Burry Port	1890	SN44160040
30713	Wellfield Galvanising Co., Llanelli	1908	SS503990
30714	Pemberton Tinsplate, Llanelli	1910	SS501992
30715	Trostre Tinsplate Works, Llanelli	Working	SS530995
*	J.S.Tregoning & Co., Llanelli	1851	?
*	Welsh Tinsplate & Metal Stamping, Llanelli	1897	?

**c) Copper.**

The Swansea and Neath district was until the mid-19th century one of the most important copper smelting areas in the British Isles (Hughes & Reynolds, 1988, 11). A concentration of copperworks were located in the Llanelli - Pembrey area, working from the early 19th century. The Llanelly Copperworks Co. became the most important industry at Llanelli by the 1820's and was a prime mover behind the development of collieries and smelteries for several decades.

Relatively small amounts of copper ore were used as compared with the large amount of coal required to smelt, therefore it was convenient to bring the ore to the coalfield for smelting rather than vice versa. Initially, ore was brought from other parts of Britain, such as Cornwall or Anglesey, but by the 19th century foreign ores were generally used. The import of copper and export of coal was a reciprocal trade which meant that Carmarthenshire coal was widely used in the south west of England, ships carrying copper to Llanelli returned laden with coal.

Copper was mined at an early date in the Kidwelly area (Strachan et al, 1909, 155). A short lived copper stamping mill was founded by Dr. John Lane at Kidwelly in 1719 (on the same site as the later Kidwelly tinplate works), supplied with ore mined at several places along Mynydd-y-Garreg. A sectional plan of "The Kidwelly Copper Mine" survives, dated 1815, accompanied by a report which makes it clear that the work carried out that year involved re-opening an old copper

mine with a view to assessing its potential for future mining (Sambrook, 1995). Seven tons of copper ore were raised in some 3 months, the destination of which is not known, although by 1815 there were at least two working copperworks at Llanelli which may well have been convenient customers.

**d) Lead.**

It is known that lead has been mined in small quantities on Mynydd-y-Garreg, Kidwelly, where it occurs in fissures in the limestone rock (See Strachan et al, 1909, 155 for descriptions of known workings). However, there is evidence that lead was mined at other locations within south east Carmarthenshire at an early date. A list of lead mines was prepared by a German metallurgist for Henry VIII in 1530. It names 33 Welsh lead mines, amongst which are well known sites such as Rhandirmwyn along with less well known locations including Kidwelly and Llanelli (Rees, 1968, 135).

Several lead smelting mills were constructed in Carmarthenshire, the first at Pencoed on the Llwchwr estuary in 1754-55, part of which still stands (Hughes & Reynolds, 1988, 16). There was also an early leadworks at Carmarthen. During the 19th century there were leadworks at both Pembrey and Llanelli, part of a concentration smelteries attracted to the district during the first decades of the century. How much locally mined lead was smelted at these early sites is not known, but by the 19th century lead was certainly being imported into the area, some from other areas within Wales.

PRN	NAME	DATE	NGR
30661	Dr. Lane's Copper Stamping Mill, Kidwelly	1721	SN421004
30662	Pencoed Lead Works	1755 & 1804	SS56069954
30663	Lord Cawdor's Leadworks, Llanelli	1812	SS509989
30665	Spitty Copperworks, Llanelli	1807	SS560983
30666	Llanelly Copperworks Co.	1805	SN506991
5339	Pembrey Copperworks	1849	SN44900035
4666	English Copper Co. (Cambrian) Llanelli	1891	SN50059937
23879	Pembrey White Lead Works	1907	SN44800055
30664	Pembrey Lead & Silver Works	1907	SN44800050

#### 4.2.2 LIMESTONE

The South Wales coalfield is of course bounded on its northern edge by a relatively narrow band of Carboniferous Limestone. This limestone has been burned to produce lime, a valuable agricultural fertiliser, probably since the 16th century. It was also used in the production of lime mortar for building purposes in earlier centuries - as was used in the construction of the Norman castle at Carreg Cennen during the twelfth century. As early as the 17th century there is documentary evidence to show that anthracite coal was being used as fuel in limekilns within south east Dyfed, this relationship being maintained until the end of limeburning in the region c.1970.

The practice of liming agricultural land became increasingly widespread and demand arose in areas well away from the outcropping limestone. Production inevitably rose and the small flare kilns of earth and stone construction which supplied local markets were complemented (though not entirely replaced) by larger, continuously burning stone built kilns. The extra fuel demands of the growing industry meant that the coal obtained from the adjacent anthracite belt became increasingly important as a fuel source.

Though lime was burnt along the length of the limestone belt, some localities developed into particularly important centres of lime production, especially around Mynydd-y-garreg (Kidwelly) and Llandybie. Large numbers of farmers travelled to these centres to collect cartloads of lime and in part it was the heavy costs imposed by Turnpike Tolls on the lime traffic which led to the outburst of popular anger manifested in the Rebecca Riots of the 1840's.

Fieldwork carried out during 1993-4 (Murphy & Sambrook, 1994) identified several hundred small earth and built kilns still surviving along the limestone ridge. These may date from any time between the 16th and 20th centuries, the last of this type apparently worked near Pentregwenlais, Llandybie in 1910 (Thomas, 1973). Of the larger kilns, numerous examples of single or double pot kilns survive, some in good condition, whilst at least seven larger kiln bank complexes of late 19th century date also survive, including the well-known Penson Kilns at Cilyrychen, Llandybie.

PRN	Name	NGR
25537	Pentregwenlais Lime Kilns, Llandybie	SN607163
27792	Cilyrychen Lime Works, Llandybie	SN616168
27294	Pistyll Lime Works, Llandybie	SN623167
27511 16313	Mynydd-y-garreg Lime Works, Kidwelly	SN426083 SN428083
16304	Pedair Heol Lime Kilns, Kidwelly	SN439094
22120	Henllys Vale Lime Kilns, Ystradowen	SN762137

#### 4.2.3 BRICKMAKING.

Brickmaking was, of course, not confined to one area. There was, however, a high concentration of brickworks within the Carmarthenshire coalfield area, particularly in the Llanelli district. These brickworks naturally used local coal as a fuel in their kilns and in many cases the raw material for their bricks was also derived from the coal industry, being the fireclays which are found in association with several coal seams in both the Lower and Pennant Coal Measures.

The industrial boom of the 19th century also created a large demand for bricks for the construction of new factories and works, as well as ancillary features such as bridges and tunnels. The increase in employment led invariably to an increasing demand for workers' housing, again usually built with locally produced bricks. Collieries and brickworks were sometimes interdependent, and several brickworks were located on colliery sites, such as at Emlyn Colliery, Ammanford Colliery, Crosshands Colliery and Trim-saran Colliery. By now the bricks produced at some of these sites are the only surviving reminder of their former industry. Emlyn Brickworks (now Castle Brick-works) is the sole producer of clay bricks in south-east Dyfed.

Other raw materials used in brick production in south-east Dyfed included Boulder Clay (at the Eclipse Works, Horeb), crushed Carboniferous marine shales (at Trimsaran), quartzitic sandstone (at Ynyshafren) as well as silica stone obtained from the millstone grit band which forms the northern boundary of the coalfield. Silica stone and its associated sand and clay had been used to line iron blast furnaces since the 18th century; Alexander Raby used silica stone, sand and clay from Banc-y-llyn, Gorslas at his Cwmddyche furnace (Treharne, 1995). A silica firebrick, known as the "Dinas Brick" was first produced by William Weston Young at the Dinas Silica Works, Pont-nedd-fechan in the Neath valley in the 1820's, but the "Dinas" was to become the trademark of a successful silica brick industry in south east Dyfed, largely concentrated at Kidwelly, where ready supplies of quality silica stone were available along Mynydd-y-garreg. Several manufacturers produced the "Dinas" firebricks, which were ideally suited for use in high temperature steel, copper and glass furnaces and had large domestic and foreign markets. The stone was also extensively quarried around Llandybie, some being taken by rail to the Bynea Brickworks, Llanelli. Silica was also used in the manufacture of tiles at Penygroes. Silica brickmaking has not survived to the present day (Sambrook, 1995).

PRN	NAME	Known date operating	NGR
30716	Ynyshafren Brickworks, Pontiets	1843	SN477086
23913	Sandy Brickworks, Llanelli	pre-1849	SN49680054
30721	Cwmamman Brickworks, Glanamau	1862	SN675136
30717	Pontyclerk Brickworks, Ammanford	1878	SN620114
30718	Unnamed, Copperworks, Llanelli	1891	SS507991
30719	Unamed, Penygaer, Llanelli	1891	SN517011
30720	Bigin Brickworks, Llanelli	1891	SN51050005
8939	Morfa Patent Brickworks, Llanelli	1891	SS51799875
8940	Morfa Brickworks, Llanelli	1891	SS52109880
9037	Machynys Brickworks, Llanelli	1891	SS51209830
9434	Pwll Brickworks, Llanelli	1891	SN47700090
9437	New Lodge Brickworks, Burry Port	1891	SN46000117
4671	Bynea Brickworks, Llanelli	1891	SS55249905
30722	Banc yr Offis, Pontiets	1900	SN466087
30723	Ammanford (Colliery) Brickworks, Pontaman	1907	SN638124
24394	Emlyn Brickworks	1907	SN58201330
24132	Cross Hands Colliery	1907	SN56391318
16376	Dinas Silica Brickworks (Stephens) , Kidwelly	1907	SN4005
30727	Dinas Silica Brickworks (Smart's) , Kidwelly	1907	SN4005
30728	Dinas Silica Brickworks, Kidwelly	1907	SN4005
4711	Talyclun Brickworks, Llanedi	1921	SN57550345
24294	Dafen Brickworks	1921	SN52860134
16268	Un-named, Llanelli	1921	SN48540068
30724	Stanley Brickworks, Llanelli	1921	SN505989
30725	Trimasaran (Colliery) Brickworks	1921	SN465052
30726	Penygroes Tile Factory	1923	SN578136
30729	Penwyllt Silica Brickworks, Kidwelly	1957	SN4005
24394	Castle Brickworks, Penygroes	Working	SN58201330
20792	Horeb Brickworks (Eclipse), Llanelli Rural	?	SN50080528
21790	Ferry Marsh, St.Ishmael	?	SN37001090
23683	Brigstock & Young, Graig, Llandyfaelog	1922	SN43530936
24333	Brynhyfryd, Llangennech	?	SN55560123
8047	Maes Oland (Morva Bricks), Llanddowror	?	SN28131496
8925	Furnace Brickworks, Llanelli	?	SN50480127



### 4.3 Transport.

Throughout the history of coal mining in south east Dyfed all conceivable forms of power have been employed in moving the valuable cargo from the colliery to the customer. We know that animal power, including horse, mule and oxen was put into service in the pre-turnpike era to move coal from often remote collieries to their markets. Manpower was of course often important in the initial journey of the coal from the coalface to the surface, and it is possible that sleds may have been employed to carry coal from hillside workings to more level ground where it could be transferred to panniers or carts attached to stronger beasts of burden.

Before wheeled transport became common in the area the *car llusg* or sled was used in the hilly area of the region for moving bulky or heavy materials. The use of the *car llusg* in agriculture and peat cutting is well documented into the 19th century. There is evidence to suggest that they may well have been used for moving coal from mountainside coalpits and slants to lower ground. At one location on Mynydd-y-Betw (SN692-108), a cutting in the hillslope leading from a slant mouth to more level ground some 30m below may well have been intended to aid the use of such sleds.

#### 4.3.1 ROADS.

The extent and suitability of pre-turnpike roads within and around the coalfield area is not well understood, but it must be assumed that in the main the inland coalfield especially was poorly served and heavy goods such as coal may have been difficult to move during the wetter months of the year. This certainly is the picture portrayed by local historians of the 19th century, who note the benefits which followed the improvements of the Turnpike Trusts (Rees, 1898; Thomas, 1894). The turnpike roads had a significant impact on the coal industry in the inland parts of the Carmarthenshire coalfield, for the first time allowing relatively free access to markets further north in the Tywi Valley. The Amman Valley was provided with its first turnpike road c.1817, before which time communities such as Betws and Gwter Fawr (Brynaman) were notably isolated. New roads west to Cross Inn (Ammanford) and north to Llangadog were locally significant developments, though it should be remembered that by this time a number of tramroads and canals were already opening up the Llanelli and Gwendraeth coalfield areas.

However, the fact that Llanelli and Pembrey were developing as coal exporting ports before the end of the 16th century must suggest that a road network of sufficient quality to meet the needs of the day was already functioning. How far this early road network owed its form to the requirements of the early coal industry is not known, but it is possible that elements of the modern road network have origins in this early industrial activity.

Some traditions of the pre-rail period in the Ammanford area are recalled by Roberts (1939, 217). At

Cwmfferws, Ammanford in the early 19th century the days when the *Wagenni Mawr* (literally Great Wagons) came via the turnpike road were a cause of much excitement. They collected coal from a number of small slants along the Fferws Brook for the Llandeilo market. Barter it seems was the method of exchange, agricultural produce from the Tywi Valley for anthracite coal. At an earlier date we know that mules were being used in the Amman Valley to carry coal, limestone and ironstone in panniers down *Y Gwter Fawr* (The great cutting), apparently a purpose built road connecting pits around Gwauncaegurwen with the iron blast furnaces at Glan-aman (Rees, E 1898). *Gwter Fawr* was in fact the name applied to the Brynaman area before 1868. Another, undated, tradition has it that oxen were used to pull loads of coal across Mynydd-y-Betws to markets further south (Thomas, 1894).

Rather ironically, after over a century of canal, tramway and railway development, the opening of Mount Colliery, Betws in the 1920's, saw the return of coal traffic to the roads, with the advent of modern lorry haulage. Increasingly, coal has been moved by road as smaller branch and mineral lines of the rail network have closed. Much of the output of modern deep and opencast mines is now moved by lorry.

#### 4.3.2 CANALS.

The first documented use of a canal for coal transport in Carmarthenshire comes from an area outside the coalfield and dates to the mid-17th century, when a short canal was in use moving coal from the Tywi river to somewhere near Golden Grove house (Wood-Griffiths, 1950). It may be that the coal was being shipped up the Tywi from a source along the Carmarthen Bay coast. A documented example of an early canal being employed in the anthracite coal belt is that of a boat level working at Brynllloi, Glanaman during the 1750's (Thomas, 1894). Here a drainage adit was modified to create a channel deep enough and wide enough to enable wooden barges to carry coal from the underground workings. It is possible that some evidence of the former canal survives near Gelli Aur village in the Tywi valley (Sambrook & Page, 1995), but the latter colliery was subjected to further mining activity during the late 19th century and no evidence of the canal is known to survive.

The Llanelli Coalfield was expanding rapidly from the 1750's onwards and during the latter half of the 18th century a number of short, tidal canals were cut in the Llanelli area to aid the transport of coal from source to shipping places along the coastline (Symons, 1977). Coal was generally moved from the colliery to the canal wharf via private horse-drawn tramroads and waggonways then taken by barge to shipping places on the coast for re-loading into sea-going vessels. The loading and unloading involved made this an unsatisfactory mode of transport in many respects, not only because it meant higher labour costs but also because the much of the coal was broken into smaller, less valuable pieces. The obvious alternative, where possible, was to load directly

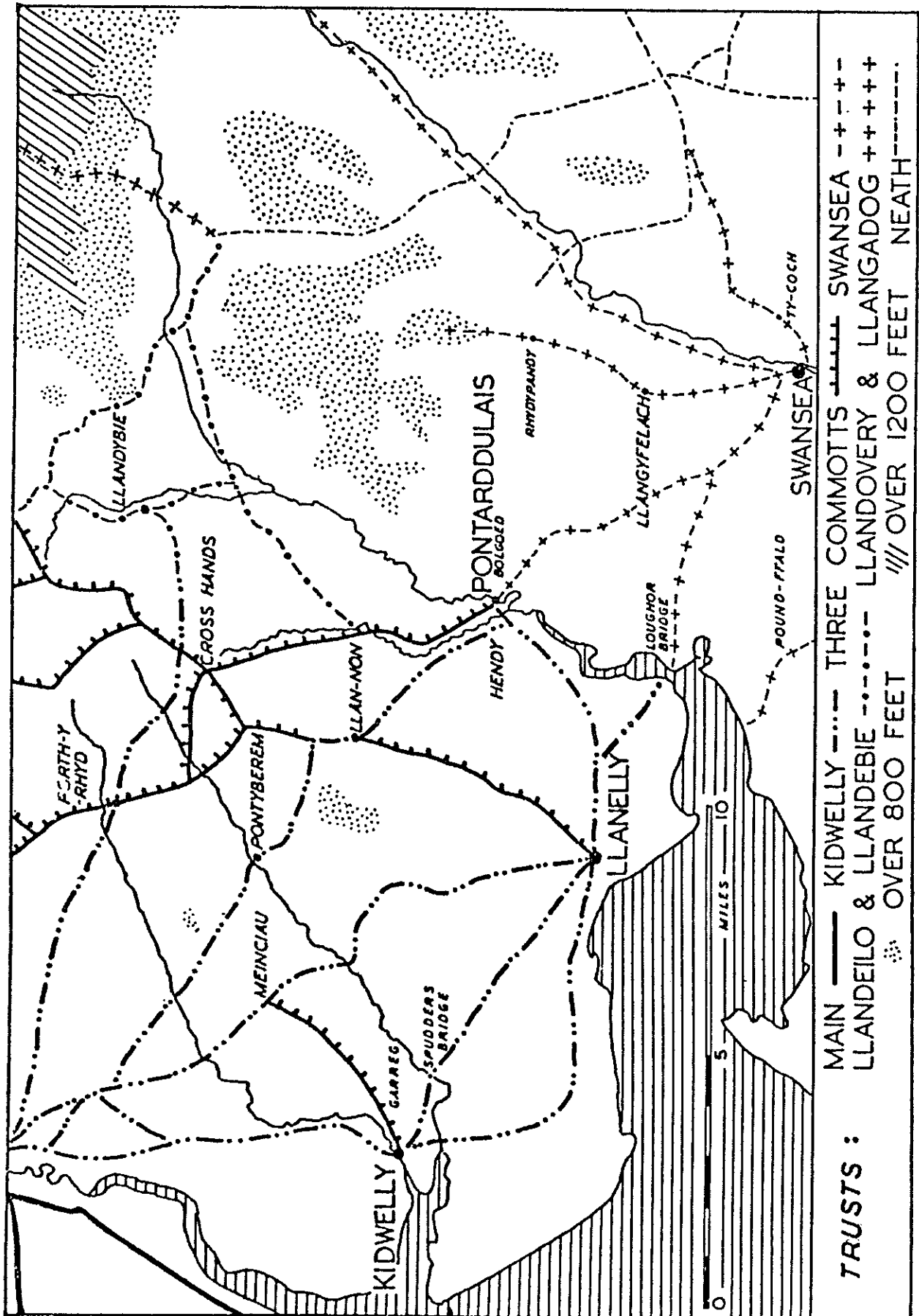


Fig. 5; Mid 19th century Turnpike road network (reproduced from *The Rebecca Riots* by D. Williams, 1986)

on to sea-going boats, and this was probably done in any natural creeks and pills which occurred near to coal pits.

These minor canals lacked the sophistication of Kymer's Canal, built between 1866-68 by Thomas Kymer, a Kidwelly businessman who had earlier experience of coal mining in his native Pembrokeshire. It ran for over 4km and was provided with viaducts, wharves and passing places and linked a purpose built quay at Kidwelly with collieries owned by Kymer in the lower Gwendraeth Valley, including Pwll-ygod and Great Forest Pit, probably the area's most important anthracite colliery during the 18th century (Jones & Morris, 1974). It is said that Kymer had his coal boxed in wooden containers and loaded and off-loaded by crane in order to minimise the damage caused to the valuable cargo, small coal fetching a far lower price than larger coals (*pers. comm Dilwyn Roberts*).

Kymer's Canal was followed by a series of short canals constructed to link coal workings with quays and docks at Pembrey and Kidwelly. The first quarter of the 19th century saw the Ashburnham, Pembrey and Bowser (West and East) Canals built, but all were dwarfed by the building of the Kidwelly and Llanelli Canal, which was first planned in 1811 (Jones & Morris, 1974). This was by far the most ambitious and technologically advanced canal built to serve the Carmarthenshire coalfield and was intended to improve access to and from the anthracite collieries of the mid and upper Gwendraeth Valley. It incorporated Kymer's Canal, but was provided with locks and inclines to allow an extension to be built as far as Cwmmawr, Crosshands, whilst another extension linked up with Pembrey New Harbour (Burry Port). A tramroad link was also provided between Pembrey and Llanelli.

It was intended that this canal would link the anthracite collieries of the Mynydd Mawr area and the

upper Gwendraeth Valley with Kidwelly and Llanelli. Work began in 1814, but progress was intermittent and only in the late 1830's were the final sections to Cwmmawr, at the top of the Gwendraeth valley, and Pembrey, on the coast actually completed (though there is doubt as to whether the Cwmmawr section was ever used). The canal had five sets of locks and three dry inclines, where a counter balance system used loaded barges travelling south to haul empty barges travelling north up considerable slopes. The uppermost of these, at Hirwaunisaf (SN52291207) involved a climb of nearly 30m. A canal basin (PRN 30702) at Cwmmawr was the terminus of the canal, but further north at Cwmyglo, Crosshands a 50 acre reservoir (PRN 22244) was provided to feed the watercourse. The link with Llanelli was provided with the construction of a tramway between Pembrey and Llanelli.

The working canal was some 16km long and the whole network can be considered to have been on the point of becoming profitable when it was abandoned in 1865 and replaced with a new railway, The Burry Port & Gwendraeth Valley Railway (BP&GVR), which was in large part laid along the old canal bed, opened for coal traffic in 1869. Several sections of the canal are still visible where the railway was laid on a slightly different course and some features remain in daily use, such as the cast iron aqueduct at Pontnewydd (PRN 30648), laid in 1833 to carry the canal over the Gwendraeth Fawr and now used as a mineral railway bridge. The ruins of Hirwaunisaf Incline survive as does the embankment which once penned back the waters of the Cwmyglo reservoir. The Cwmmawr Canal Basin has recently been infilled, though archaeological features may well survive.

PRN	Name	Date	From	To	Length
5777	Kymer's Canal	1766-1814	Pwll-llygod Colliery	Kymer's Quay, Kidwelly	4.5km
5347	Pembrey Canal	1823-1843	Pinged	Pembrey	4.5km
5337	Ashburnham's Canal	1796-1801	Collieries at Pinged	Gwendraeth Fawr	3.5km
8830	Bowser's Western Canal	1810-1820	Bryndias Colliery	Pembrey Canal	500m
30667	Bowser's Eastern Canals (lost)	c.1815	Collieries near Pembrey	Shipping place at Pembrey	?metres
8822	Burry Port & Gwendraeth Valley Canal (incorporating Kymer's Canal)	1814-1868	Cwm-mawr	Burry Port	16.5km

### 4.3.3 TRAMWAYS.

A number of terms have been applied to railed transport systems; tramroads, tramways, waggonways, railroads and railways are all known. There is not always a precise distinction between one and the other, but tramways shall here be taken to be the subsidiary lines which link industrial complexes or collieries with a canal or main railway line.

Early tramways were constructed with wooden rails and stone sleepers, though iron strips were often used to strengthen the running face of the rail. By 1800 iron rails were common. Until the late 1830's, when steam locomotion was introduced to the Llanelli Railway, horse power was used exclusively on these tramways and railways.

The role of the tramway has always been a subsidiary one and early examples include Chauncey Townsend's Railway, built c.1770, which was only 228m long and linked the Ysbitty Canal with Genwen Colliery. Similar short lines were laid in conjunction with most of the 18th century canals, though in some localities the tramways became quite extensive, such as in the case of the Llangennech Tramroad System, operating from c.1775 onwards, which extended to over 4km of line in total.

As with the canals, so was the tramway to prove a flexible extension of the new railways during the 19th

century. When the Carmarthenshire Tramroad was built between Llanelli and Gorslas in the first decade of the 19th century, Alexander Raby of Llanelli established tramway links to several of his collieries from the main line. With railways being driven up all the main valleys of the Carmarthenshire coalfield it proved convenient and economically expedient to locate collieries as close as possible to the main line and early OS maps show that most had their own sidings integrated into the main network in order that coal might be loaded and removed from site in one simple operation.

Where collieries developed away from the valley floor the tramway became an indispensable feeder to the main line and good examples of this are seen both in the Gwendraeth and Amman valleys. Ffou Colliery, Pontiets was linked by a 1km long tramway to the BP&GVR, whilst on Mynydd-y-Betws, above Garnant and Glanamman the Cawdor No.1 and No.2 pits were linked to the GWR Garnant Branch line by tramways 2km and 1.2km long respectively. Probably the longest and most spectacular tramway was that which brought limestone to the limekilns at Henllys Vale Colliery, Ystrad Owen. Trams were drawn by steam winding engine up the first 2.5km length (almost a 250m climb) and then pulled by horse along for a further 2km to the quarries (another 40m climb).

PRN	NAME	Branch of	Length	NGR
30742	Cawdor No.1 Tramway	Llanelli Railway (Amman Valley Branch)	2km	SN675115-670131
30743	Glynmoch Colliery Tramway, Glanamman	Llanelli Railway (Amman Valley Branch)	300m	SN660130
30744	Dyffryn Amman Colliery Tramway, Glanamman	Llanelli Railway (Amman Valley Branch)	600m	SN667127-666132
30745	Ammanford Colliery Tramway, Betws	Llanelli Railway (Amman Valley Branch)	1.1km	SN640123-647119
20834	Gelliau Mineral Railway, Ystradowen	Swansea Vale (Garnant Branch)	2.5km	SN755121-760132
25545	Henllys Vale Tramway	Gelliau Mineral Railway (West Glamorgan)	4.5km	SN760132-763172
30746	Cawdor No.2 Tramway	Swansea Vale (Garnant Branch)	1.2km	SN692116-695124
27736	Llandybie Mineral Railway	Llanelli Railway (Mountain Branch)	3km	SN611138-608163
30748	Rhos Colliery Branch Line, Ammanford	Llanelli Railway (Mountain Branch)	2km	SN602113-622115
30747	Blaenhirwaun Colliery Branch	L&MMR	600m	SN548131-554130
30749	Cwmgelwr - Cynheidre Tramway	Carmarthenshire Railway	1km	SN484081-492075
30862	Carway Siding	BP&GVR	2km	SN441067-461069
30863	Ffou Colliery Tramway, Pontiets	BP&GVR	1km	SN481082-473085
16323	Trimsaran Colliery Railway	BP&GVR	2km	SN427052-447051
5439	Cwm Capel Branch	BP&GVR	1.5km	SN449014-457022
8664	Kidwelly & Llanelli Canal Tramway	Later BP&GVR Llanelli Branch	6km	SN4400-SM4999
30864	Park Siding, Ammanford	Llanelli Railway	800m	SN622115-621123

#### 4.3.4 RAILWAYS.

The early years of the 19th century saw a marked increase in activity across the whole of the anthracite coalfield, chiefly due to a growing awareness amongst Llanelli industrialists that a large source of mineral wealth lay untapped in the northern part of the coalfield, including coal, iron ore and limestone. Numerous short railways and canals had been constructed during the second half of the 18th century to link collieries in the Llanelli district with various industrial concerns and the coast, but now attention was beginning to be turned to the interior. The most important figure in the initial attempts to reach these inland deposits was Alexander Raby of Llanelli who was the driving force behind the construction of the Carmarthenshire Tramway, the first section of which (some 2.5km long) was open by May 1803, making it the first *public* railway to operate in Britain. By 1805 the line had reached Gorslas, Cross Hands. The tramroad was of course used only by horse drawn traffic at this early date. It was not an unqualified success and was constantly troubled with financial problems. By 1830 it seems that for most of its length it was derelict.

Further inland, the Amman Valley would have to wait another generation before a rail link would open. This eventually came with the commencement of work on the Llanelli Railway in 1828, which reached Ammanford, via Pontarddulais, in 1840. From Ammanford, the Mountain Branch (1841) and the Garnant Branch (1842) extended the network west to Mynydd Mawr and east

along the Amman Valley, giving this hitherto underdeveloped sector of the anthracite coalfield direct access to the Carmarthen Bay ports. A number of mineral and colliery lines developed, branching off the main lines, including the Rhos Colliery Branch Line (2km long), serving a group of collieries west of Ammanford and the Llandybie Mineral Railway (3km long), linking up with Llandybie Colliery and the Pentregwenlais Limestone Quarries.

By 1847 the main South Wales Railway had reached Pontarddulais and within a few years had reached Llanelli, Kidwelly and Carmarthen. From the late 1860's direct rail links were open from Brynaman to Swansea, via the LMR Swansea Vale line up the Tawe Valley. From 1869, work was in progress converting the Kidwelly & Llanelli Canal, stage by stage, into a standard gauge railway, the line reaching the Cwmmawr Terminus in 1886. This line remains in use for the purpose it was intended, namely carrying coal from the upper Gwendraeth Valley, though the coal now comes from opencast mines rather than collieries.

With the maturing of the rail network, all parts of the Gwendraeth-Amman coalfield had easy access to the main domestic and overseas markets by the end of the 19th century. The full potential of the anthracite coalfield could now be tapped and the benefits of the improved transport network would be enjoyed by the subsequent generation of coal owners, for despite periods of war and depression, the early 1930's would see the coalfield achieve its maximum output.

PRN	Name	Built	Closed	From	To
30865	Carmarthenshire Railway	1802-05	c.1830	Llanelli	Gorslas (1805)
3086630	Llanelli Railway LR Mountain Branch LR Garnant Branch	1828-42	Open ? ?	Llanelli (New Dock)	Ammanford (1840) Crosshands (1841) Brynaman (1841)
*	South Wales Railway (later GWR)	1850-52	Open	Swansea (1850)	Carmarthen (1852)
*	Midland Railway - Swansea Vale Section. (Garnant Branch)	1852-64	1964-83	Swansea	Brynaman (1864)
16324 8664	Burry Port & Gwendraeth Valley Railway BP&GVR Llanelli Branch	1869-86	Open	Burry Port/Kidwelly	Cwmmawr (1886) Llanelli
30867	Llanelli & Mynydd Mawr Railway (used as Cynheidre Colliery line in 20th century)	1880-83	1980's	Llanelli	Crosshands (1883)

### 4.3.5 PORTS.

The proximity of coal and sea was crucial to the early development of the Llanelli coalfield, Burrey (Pembrey) being noted as a leading coal port as early as the 16th century. Easy access to the coast was equally as important to the industrial development of the district from the 18th to the 20th centuries. During the 19th century, the provision of good port facilities would prove essential in order for local industries to compete with those elsewhere in South Wales.

The early coal exports from Carmarthenshire were probably loaded along the small coastal creeks of the area, ships grounding on the mudbanks and refloating at high tide. By the 18th century a rather more organised approach to the loading of ships was being taken as favoured shipping places and collieries were being linked by tramways and canals. Ysbitty Bank, on the Llwchwr estuary, was one of the most important of these shipping places.

From the late 18th century quays and tidal harbours were being constructed to serve collieries or industries located along the coast or in the lower Gwendraeth valley. These were often private facilities, such as that built by Thomas Kymer at Kidwelly to

handle the coal and culm brought down his canal from his own collieries at Carway. Some of the docks at Llanelli are also associated with individual industrialists or rail and canal companies; the Carmarthenshire Dock was established by Alexander Raby but developed by the Carmarthenshire Railway Co.; RJ Nevill owned the Llanelli Copperworks for which he constructed the Copperworks Dock. The Llanelli New Dock was however the first public floating dock in Wales, and established Llanelli as one of the leading coal ports of South Wales; ahead of Cardiff on tonnage handled until 1842.

A increasingly large proportion of the coal carried along the network of canals, tramroads and railways which developed across the Carmarthenshire coalfield from the late 18th century onwards was destined for export by sea. While this network linked collieries to the ports of Llanelli and Burry Port their status remained, but after the mid-19th century the South Wales Railway and its Swansea Vale Branch gave access to the larger and better equipped Swansea Docks, even from the Amman Valley, and the Carmarthenshire ports declined in relative significance.

PRN	Name	Built	NGR
7808	Kymer's Quay, Kidwelly	1768	SN397064
17329	Ashburnham Quay, Gwendraeth Fawr Estuary	c.1800	SN398051
*	Pemberton's Dock, Llanelli	c.1794	SS50109930
4654	Carmarthenshire Dock, Llanelli	1803	SS49919950
4667	Copperhouse Dock, Llanelli	1804	SS50539905
5344	Pembrey Harbour	1819	SN4370001
5345	Pembrey New Harbour (Burry Port)	1832	SN4454002
24438	New Dock, Llanelli	1834	SS50959873
24439	Scouring Reservoir, New Dock, Llanelli	*	*
5340	Burry Port East Dock	1840	SN4456005
5341	Burry Port West Dock	1888	SN4452004
4652	North Dock, Llanelli	1898	SS49809950

## 5. OPENCAST MINING

Although the opencast mining of coal began as early as 1870 in America, it was the demands of a wartime economy that brought opencasting to the British coalfields during the 1942 (Grimshaw, 1992). It is not known when the first opencasting was carried out in the Carmarthenshire coalfield, but Morgan (1958) lists Saron, Llandybie, Penybanc, Glanamau, Brynaman, Penygroes and Gwauncaegurwen as the locations of opencasts which worked during the 1940's and 1950's, though all but the latter two were worked out by 1957.

Successive edition of OS maps since the 1950's show that a number of opencast sites have been developed along the Amman and Gwendraeth Valleys. Only two sites are currently operational (Ffoslas, Trimsaran and Gilfach Iago, Saron) with a third in its initial stages of development (Brynhenllys, Ystradowen). A further ten sites in the Gwendraeth-Amman area are the subject of plans for future opencasting, though some of these may never be developed, such as the Cathilas Site, Ammanford which has been abandoned due to insufficient coal reserves (see Murphy & Sambrook, 1993, Map2).

Interest is now being shown in at least one site in the Llanelli coalfield, at Porth-dafen, Felinfoel. This recent development may mark the beginning of a wider search for deposits suitable for opencasting within the Llanelli coalfield area. The seams at Porth-dafen, as at many other locations around Llanelli, are dry steam coals or semi-anthracites which still have a market for use by power stations and as domestic house coal.

## 6. MINERAL PLANNING, CONSERVATION POLICIES & DESIGNATIONS

### 6.1 Introduction

At the time of writing (October 1995) there are considerable uncertainties regarding the future development of the opencast coal industry in south east Dyfed. Three main factors are responsible for the current position;

- (1): The privatisation of British Coal
- (2): The hiatus in Welsh office mineral policy planning guidance
- (3): The emergence of the new unitary authorities and the as yet undecided new location of mineral planning within the new Local Authorities.

Whilst this makes it difficult to assess the scale and the location of possible threats to archaeological sites and historic landscapes, it nevertheless allows an opportunity to put forward the case for conservation of what remains of the industrial archaeology of the region.

### 6.1.2 THE PRIVATISATION OF BRITISH COAL

The Coal Industry Act 1994 established The Coal Authority as a non-departmental public body analogous to the Forest Authority. It has responsibility for un-worked coal and coal mines, exercised through licensing. Licensees will become responsible for any claims arising from subsidence. All other areas are the responsibility of the Coal Authority. The Coal Authority owns all old coal workings and mine entries with their liabilities. It owns some, though not all of the land formerly owned by British Coal, including areas with potential for future working. In the Gwendraeth Valley this includes Glyn Hebog and Pont Andrew. The Coal Authority is a small organisation with new staff; many operations are sub-contracted. The dispersal of colliery records is a huge problem which RCAHMW have recently tackled. The principal problem for this survey has been the lack of any local presence and the difficulty of gaining information.

The principal player in the market is Celtic Energy, a company formed by management buy-out. In south east Dyfed & west Glamorgan they operate Gilfach Iago, Ffos Las and Brynhenllys opencast sites, Coedbach Washery and Cwmmawr coal transfer depot. They have acquired rights to the following prospective opencast sites: Tir Dafydd, Llandybie, Rock Castle West, Glanston south west of Trimsaran and East Pit east near Rhosamman. Dyfed County Council refused planning permission to Tir Dafydd in 1994. There will be an appeal against this decision at a Public Local Inquiry in January 1996. It is understood that Celtic Energy have commissioned an archaeological contractor (Glamorgan - Gwent Archaeological Trust Contracts) to look into the archaeological and historic landscape aspects of the site, the conservation of which was one of the reasons for refusal.

The residual British Coal Corporation owns a substantial amount of land and property. It has not been possible within the scope of this project to establish where all their agricultural land, housing and commercial properties are. Some tenants are anxious to buy agricultural land but these retain areas of interest for open casting. Some Local Authorities are pressing to acquire sports and leisure facilities on former opencast sites. (Countryside Commission for Wales Survey of implications)

### 6.1.3 MINERAL PLANNING POLICIES & PROPOSED UNITARY DEVELOPMENT PLANS

In 1990 the Secretary of State invited the Assembly of Welsh Counties to review existing Welsh Office guidance and identify the main strategic planning issues of most concern to Wales in the next 10-15 years. A series of Topic Reports were prepared together with an Overview Report submitted in May 1993. With regard to opencast coal mining a revision of MPG3 was recommended to (*inter alia*)

*"express . . . a balance between opencast mining and the environment which gives greater emphasis to the protection and enhancement of the environment".*

*"give a clear commitment to the role of the Structure Plan and Minerals Local Plan in guiding and controlling opencast coal development."*

However, a Welsh Office Consultation draft of a Summary Guideline Report on Minerals Planning of November 1991 noted that few Welsh county councils or national parks had prepared a Minerals Local Plan to elaborate Structure Plan Policies. Attention was also drawn to the review of mineral planning concerns within the 1190 White Paper 'This Common Inheritance'.

Only in July 1995 did the Welsh Office respond with a public consultation on Planning Policy Guidance (Wales) and Planning Guidance (Wales): Unitary Development Plans in Wales. Among the key topics envisaged in the latter is mineral working. This will include a proposals map. No statement has yet been made about Mineral Policy Guidance.

## 6.2 Scheduled Ancient Monuments & Listed Buildings

Partly because of its recent industrial past, and the problems of dereliction it is true to say that the Gwendraeth valleys do not have a high conservation profile. There is an adequate coverage by scheduling of prehistoric monuments, mainly Bronze Age ritual and funerary monuments and of the few Iron Age defended sites that exist. For the middle ages monuments like mottes are protected. The scheduling and listing of industrial sites is increasing and beginning to reflect what survives on the ground. The only recent listing surveys have been of Llanelli and Ammanford, and there are no other Aman and Gwendraeth Valleys communities currently being re-listed or being considered for re-listing. These problems of perception are changing, partly due to the work and interest of local historians. It is hoped that the three 'South East Dyfed Minerals' surveys commissioned by Cadw from the Dyfed Archaeological Trust, including this Report will provide sufficient detail on the context and significance of the surviving industrial archaeological traces to halt the trend towards their obliteration.

## 6.3 Ecological protection (SSSI's)

It has been suggested that the availability of seasonal or part-time employment in the extractive and mining industries from the late 18th through to the early 20th centuries may have perpetuated conservative methods of farming. Their legacy in the late 20th century are the survival of unimproved pastures, which display a range of increasingly uncommon plant communities. A number of outstanding examples have been designated SSSIs, such as *Gweunydd a Choed Pen-Ty & Gweunydd Glan-y-Glasnant*. Citations for these and other areas highlights their survival in the former coal field areas.

The Gwendraeth valleys are also notable for numerous hay-meadows, such as the SSSI at *Cae Cwm Tywyll*. CCW's now completed Phase 1 Habitat Survey for Wales documents these relict traces. Information being gathered for the Carmarthenshire Antiquarian Society's computer based Place names Survey of the county provides complementary toponomic evidence for these relict patterns of land use. The relevance of this ecological data to the conservation and management of industrial archaeological sites is twofold:

1. The SSSI designation can provide a sheltering umbrella for some former industrial sites and areas.
2. The ecological data is an integral part of the sources for working out the landscape history of the area - but systematic studies have yet to be undertaken.

## 7. ECONOMIC DEVELOPMENT INITIATIVES & CONSERVATION STRATEGIES

### 7.1 Introduction

This term is preferred to that of 'threats', commonly used by archaeologists. Certainly, many developments, particularly mining and quarrying, can pose a threat not just to individual sites but whole blocs of landscape. But it is essential, in attempting to bring archaeology and historic landscape concerns into the whole development process to be able to present both as an asset as well as a constraint.

#### 7.1.1 PARTNERIAETH AMAN GWENDRAETH.

This is a partnership between local authorities and other key organisations including local businesses. Its aim is to prepare, manage and implement a co-ordinated economic, environmental and social regeneration strategy for the Aman and Gwendraeth valleys. It has recently produced a Strategic Action Plan 1996-1999. There has been no direct consultation between the Partnership and archaeological bodies (DAT and Cadw). The Action Plan is officially recognised by the Welsh Office and its proposals are eligible for funding through the Strategic Development Scheme. The Plan highlights at the outset that . . .

*"these Valleys also possess certain unique linguistic and cultural attributes which should be nurtured and protected and indeed used as a resource for local economic development".*



The principal strategic objectives which might benefit from a greater input of archaeological information and assessment are:

(iv) secure effective land use, environmental & infrastructure improvements as an attraction to business and tourism & for the people of the Amman & Gwendraeth Valleys.

(v) Establish a series of visitor attractions and amenities for local people to widen the area's appeal as a place to live and visit.

#### **Proposals with archaeological implications**

Transport proposals include the Gwendraeth Valley Link Road between Pont-Henri, via Pontiets, Carway, Moat Farm Llandry & across Kidwelly Marshes to the A484. The scheme involves new lengths of road across the Ynys Hafren valley which contains several early industrial sites. New lengths across the lower Kidwelly marsh are likely to have archaeological implications. Other transport proposals include an outer relief road at Ammanford. A Rail Corridors Study has been carried out. Development of new linear walking trails and cycle trails, is underway. The principal re-use of opencast and former colliery sites is seen as recreational, with sports and leisure facilities. A major reclamation scheme is planned for Great Mountain Colliery. DAT have already commented on proposals for Ynys Dawela colliery site. Country Parks and Interpretation centres are also proposed but with no firm proposals as yet.

#### **7.1.2. AMAN AND GWENDRAETH WOODLAND INITIATIVE**

The Coopers and Lybrand Report of 1991 into the Aman & Gwendraeth Valleys recommended the establishment of a new national Forest in the Upper Aman Valley seeing it as a means of regeneration following the decline of heavy industry. The resultant Aman & Gwendraeth Woodland Initiative is one of 3 such groups in Wales supported by the Forest Authority with a woodland officer. DAT is represented on its steering committee and is funded, through Cadw's SMR/DC budget to comment on the archaeological implications of all Woodland Grant Schemes. The initiative is aimed at stimulating farmers and landowners to enter a Woodland Grant Scheme. In addition to normal grants the Initiative area carries an additional locational supplement.

## **8. SITES AND AREAS OF IMPORTANCE WITHIN THE STUDY AREA**

### **8.1 Survival of industrial sites**

It is unusual for an industrial site of any description to survive closure in pristine form. Defunct machinery is easily transferred to other sites or sold as scrap and buildings are either put to alternate use or cleared to

open the site for redevelopment. The Kidwelly Tinplate Works is an example of a very well preserved industrial site which, despite closure in the 1930's, escaped destruction and retained most of its buildings and machinery until the 1970's. Sadly, part of the site, including its tinning bays, was demolished before the site was purchased for conversion into an Industrial Heritage Museum during the early 1980's, but the machinery and buildings which survived are almost exceptional in south east Dyfed. That a collection of industrial relics is now amassing at the museum, including the headgear from Morlais Colliery, Llangennech illustrates the tendency for industrial sites to be stripped once they close.

Fieldwork carried out during this study often proved fruitless inasmuch as that many former collieries and manufacturing sites were found to be redeveloped and possessed little scope for even the archaeological survival of industrial features (for example, Raven Colliery, Garnant is now the Raven Industrial Estate, the site landscaped and built over. Many of the large colliery complexes, some closed as recently as the late 1980's, have been completely demolished. Cynheidre is probably the largest example, but nearby Pentremawr and Glynhegog Collieries have suffered a similar fate. More encouragingly, it was found that where sites have continued in use, either for their original purpose or for alternative industrial or economic activity, old buildings are often incorporated into the new complex. Undoubtedly the best examples of this are found at Betws Mine, which possesses a number of late 19th century colliery buildings and the Castle Brickworks, Penygroes, where some buildings of the Emlyn Colliery and Brickworks survive.

### **8.2 Early industrial landscapes**

The best survival rates of coal mining sites undoubtedly occur in areas of early mining activity where the land has subsequently been left to return to woodland, scrub or moorland. Even in well farmed landscapes, or even areas of former opencast mining, valuable fragments of early industrial landscapes survive, some having significant archaeological potential. During fieldwork three important examples of such landscapes were noted;

- i) The largest block of such a landscape is probably Mynydd-y-Betws where numerous early coal pits and slants survive on the open mountain. One area in particular was noteworthy, a small valley on the east slopes of the mountain above Gwauncaegurwen, at SN692108. There are clearly numerous other sites of early mining activity in a good state of preservation.
- ii) Along the Gwendraeth Valley, several wooded valleys of tributary streams which flow from both the east and west into the Gwendraeth Fawr have been left largely undisturbed. Many are the sites of pre-19th century coal workings, and one includes an example of an early post-mediaeval iron furnace. Some were also tapped to supply water, either for iron furnaces or to turn waterwheels used to pump water from early collieries and earthwork

traces of the leats and dams constructed for this purpose may survive. The most significant of these valleys are Cwm Hafren (SN481089) and Cwmffou (SN481080), between Pontiets and Ponthenri and Cwmgelynog (SN467074) and Fforest (SN459070), between Pontiets and Carway.

iii) Y Rhâs, an area of scrub west of Pontiets where old coal pits and iron mines are known to have been worked since the 18th century. The area has not been improved by modern farming techniques and may include features such as bell pits and gin-circles.

### 8.3 Underground features

Despite the paucity of surface remains, the extent and nature of underground mining features is unknown, but potentially highly significant. It is apparent that the opening of old workings is a regular occurrence at opencast sites within the study area and that some recovery of artefacts does occur, including tools, old trams and machinery.

### 8.4 Collieries visited

The Dyfed Archaeological Trust's Sites and Monuments Record (SMR) holds records of over 100 former and current collieries in the Gwendraeth-Amman Coalfield, many of which have been entered for the first time during the course of this study. Their period of activity ranges from the 1760's until the present day. It is in no way claimed that this record is a comprehensive one, for minor workings have generally been excluded and it is probable that some poorly documented collieries have not been picked up during the brief research period available. Certainly, some collieries named in various documentary sources have not been located and therefore have not been entered into the SMR.

At least a further 100 collieries within the Llanelli coalfield are recorded in the SMR, but as no new sites have been identified in that area by this study it is probable that this number very much under estimates the total figure.

A relatively small number of the collieries of the anthracite coalfield were visited in order to gain a general picture of surface remains. The following sites were visited during the course of this study.

**Betws Mine.** (PRN 18405) This modern, working mine incorporates some buildings which probably date to the first decade of the 20th century, the period when the old Ammanford Colliery (PRN 18405 & 30641) worked part of the same site. This is probably the most complete collection of 19th century colliery buildings surviving in the county and its future protection must be considered highly desirable. Betws, like the old Ammanford Colliery, operates on two sites some 1km apart, the upper site being the site of the drift where coal is brought to the surface. It is on the lower site that several old red-brick

buildings can be seen from the main road.

**Blaengrenig Mine.** (PRN 30622) A small, private drift mine located on the northern slopes of Mynydd-y-Betws. It occupies the same site as the old Cawdor No.1 Colliery and the road up to the present workings has made use of the bed of the old Cawdor Tramway which took coal from the old workings down to the railway at Cwmaman. The present mine buildings are all small structures built of corrugated zinc sheeting, with a small, concrete office building. There is no trace of any buildings which can be attributed to the Cawdor Colliery, which had ceased work by 1907.

**Cawdor No.2 Colliery.** (PRN 30623) This mine was working by 1907, linked by tramway to the main railway at Garnant. A working mine is shown on the same site on the 1964 1:10560 OS map, but part of the area seems to have been opencasted subsequently. No trace of the buildings shown on the 1:10560 OS maps of 1907 and 1964 remains. Some spoil marks the site of the colliery.

**Crosshands Colliery.** (PRN16290) The colliery site has been lost during the construction of the large Crosshands roundabout on the A40. Until recently large areas of coal tips survived west of the roundabout, but these have mostly been removed.

**Cwmbach Colliery, Pontnewydd.** (PRN 30649) Coal tips and the slant entrance of this colliery survive undisturbed in a parcel of woodland.

**Cynheidre No.1 & 2.** (PRN 16290) Site cleared. Beds of some railway tracks visible from road as well as concrete foundation slabs of buildings.

**Cynheidre No.3 & 4.** (PRN 16818) Buildings all demolished, rubble left on site.

**Emlyn Colliery and Brickworks.** (PRN 24080) A number of redbrick buildings survive on the site of the colliery, whilst the brickworks site is still in use, now owned by the Castle Brick Company. There is an extensive area of spoil around the colliery site. Fireclay from the colliery was used by the old brickworks, but this is now supplied by the nearby Gilfach Iago opencast mine.

**Ffou Colliery.** (PRN 30606). This colliery worked until the end of the 19th century. Little trace remains of the slant entrance, whilst only fragmentary traces of one building can be seen. The bed of the tramway which linked the colliery with the Gwendraeth Valley Railway at Pontiets survives as a grassy path.

**Glynhebog Colliery.** (PRN16821) Site cleared of all buildings. Only partially levelled spoil tips, access roads and site gates survive. A large tip remains as a prominent feature on the western side of the main road between Cwmmawr and Pontiets.

**Henllys Vale Colliery.** (PRN 5504) This site includes some stonework remains of colliery buildings, most significant of these is a the (complete) chimney stack of the boilerhouse. There is also an impressive bank of lime kilns which were supplied by quarries high up on the Black Mountain via a 2.5km long tramway. The colliery was served by the Cillie Mineral Railway, the bed of which is now used as a modern footpath. The Brynhenllys Colliery site, which lies just east of Henllys Vale (across the county boundary) still possesses its spoil tips, a rare example by now.

**Park & Blaina Colliery.** (PRN 28173) Site almost wholly cleared and largely grassed over. A few small brick built buildings which appear to be former colliery buildings survive, now used as garden sheds or garages by nearby houses. The line of the colliery tramway to Ammanford survives as a footpath.

**Pentremawr Colliery** (PRN 16373). This colliery worked until the 1980's but the whole of the site has been levelled and is now partly wooded. The only exception is the pithead baths and its associated boiler house and chimney stack, which survive. This building has been badly vandalised, though its main structure remains more or less intact.

**Gwendraeth Colliery** (PRN 23440) One brick building stands at the former colliery entrance, probably a former office building (telegraph wires can still be seen affixed to an exterior wall). It is now used as an animal shed.

**Plasbach Colliery.** (PRN 16288). Site landscaped, now partly covered by a small lake.

**Pontyberem Slants Colliery** (PRN 24239). Now a wooded grove surrounded by green fields. Little evidence of industrial activity, no buildings survive. A short lane leading from the main road towards the site is probably the course of a tramline or railway siding linking the colliery to the Gwendraeth Valley Railway, some 100m away.

**Pontyberem (Coalbrook) Collieries** (PRN 24604). Working at the time of the 1891 OS map, the colliery site is only recognisable by its extensive levelled spoil tips. Most of the area is now wooded or grassed over. A stone lined leat was noted running along the western side of the colliery area. This was formerly fed via a small reservoir in turn fed by water draining from what appears to be a drainage adit upslope from the colliery. The well built, circular, stone portal of this adit survives in excellent condition, but the concrete dam wall which held back the reservoir has collapsed. The leat runs towards a coalyard alongside the main road where several red brick buildings which may well have been associated with this colliery remain. No other buildings survive on the colliery site. Coalbrook South Pit. (SN508108) Now a greenfield site. No trace of colliery workings.

**Ponthenry Colliery.** (PRN 23963) This colliery was located alongside the BP&GVR line and some fragments of colliery buildings survive on the parts of the site nearest the railway. Otherwise the site is overgrown and has been cleared of buildings and ancillary features. A nearby house (Woodlands) was originally a colliery office building, but it has been completely renovated and little remains of its original architectural character.

**Tiryddail Colliery** (PRN 4875). One ruined wall of a colliery building and extensive, partly levelled spoil tips remain of the colliery site. A small steel bridge, now unsafe, which crosses the Afon Lash once linked the colliery with the Mountain Branch of the Llanelli & Mynydd Mawr Railway. A larger steel girder framed bridge, which carried the Mountain Branch line over the Lash is still in use as a pedestrian bridge.

**Ystradowen Colliery.** (PRN 19974). The red brick arch of the slant mouth is still visible, though the slant is blocked only a few metres in. Concrete foundation slabs mark the site of some colliery buildings, but the colliery area is now essentially a woodland clearing under pasture.

## 8.5 Other industries

**Aberlash Tinplate Works.** (PRN 28175). This large building survives, though now stripped of its slate roof and used as a car spares yard. Its southern facade is impressive, including a large central arched doorway and five stepped lancet windows. All chimneys and the tinning bays have been demolished.

**Ffwrneis Pontiets.** (PRN 30707). The demolition of this early charcoal iron furnace was recorded by D. Thomas (1904). The site is very overgrown but considerable amounts of slag remain on site and several leats and the remains of an associated dam across the Afon Hafren further upstream indicating that an iron furnace did indeed stand here.

**Ynyshafren Brickworks.** (PRN30716). The site is overgrown and appears to have been wholly cleared at some time.

## 9. RECOMMENDATIONS FOR FUTURE ACTION

### 9.1 Future Publications

It is worth noting the increasing value placed by local authorities and communities on the industrial heritage and social history of the south east Dyfed coalfield, as well as a general widening of interest in these and environmentally related subjects. In this context, the surviving industrial archaeology of the area, its significance and the background history of the coal, millstone grit and limestone areas of south east Dyfed should be considered as the subject of a short, illustrated publication which should be widely circulated in order to publicise the resource and promote a better framework for all available conservation initiatives and policies.

### 9.2 Listing & Scheduling

Consideration should be given to the listing or scheduling of surviving buildings and features. Further field survey work might also be considered in those areas which were too extensive to be properly covered during the relatively short time available to this project. The following sites are considered to be of particular value;

- \* Ynyshafren Wood, Pontiets, which includes early iron smelting and coal mining sites and a 19th century brickworks site.
- \* Rhasfach, Pontiets, which includes a number of sites associated with pre-20th century iron and coal mining.
- \* Mynydd y Betws, Betws, which is an extensive area which includes numerous early mining sites.

\* Betws Colliery, which is probably the last working colliery in south east Dyfed to possess functional pre-20th century mine buildings. It should be noted, however, that Cadw have recently examined the colliery complex (Peter Wakelin, pers. comm.) but it was decided not to recommend statutory protection for any of the buildings.

\* Pentremawr Colliery Pithead Baths, Pontyberem, The impressive, but vandalised, pithead bath complex is the only standing building left on the colliery site. Its preservation and restoration might provide the area with a significant monument in commemoration of the virtually dead coal mining tradition of the Gwendraeth Fawr valley.

### 9.3 Underground features

During the course of the project it became apparent that old deep workings are being regularly exposed in active opencast mines and that some retrieval of artefacts is occurring. It is strongly recommended that some provision for monitoring and recording such finds is made.

### 9.4 Oral evidence

Although it is beyond Cadw's remit, it is quite clear that an substantial amount of oral evidence pertaining to the coal industry and other extractive industries covered is in urgent need of recording in south east Dyfed.

The permission of the Committee of the Stock Exchange for dealing in the Shares now issued will be applied for and application for an official quotation will also be made.

*The Subscription List will close on or before the 2nd day of July, 1924.*

## United Anthracite Collieries, Limited.

*(Incorporated under The Companies Acts, 1908 to 1917.)*

*(Embracing The Great Mountain, Ammanford, Pontyberem and New Dynant Collieries.)*

### SHARE CAPITAL £2,500,000.

Authorised.		To be Issued.
£1,000,000	in 7% Cumulative Preference Shares of £1 each - - - - -	£800,000
£1,500,000	in Ordinary Shares of £1 each - - - - -	£875,000
<u>£2,500,000</u>		<u>£1,675,000</u>

## PROSPECTUS.

#### Objects of Issue.

The Company has been formed to acquire as going concerns and actively develop the following anthracite collieries ranking amongst the foremost in the Swansea district, and being well known throughout the world for the highest quality anthracite produced, viz. :-

The Great Mountain Anthracite Collieries (including the coal business of John Waddell & Sons, London, and the wagon repairing business of John Waddell & Sons, Llanelly).

The Ammanford Anthracite Collieries.

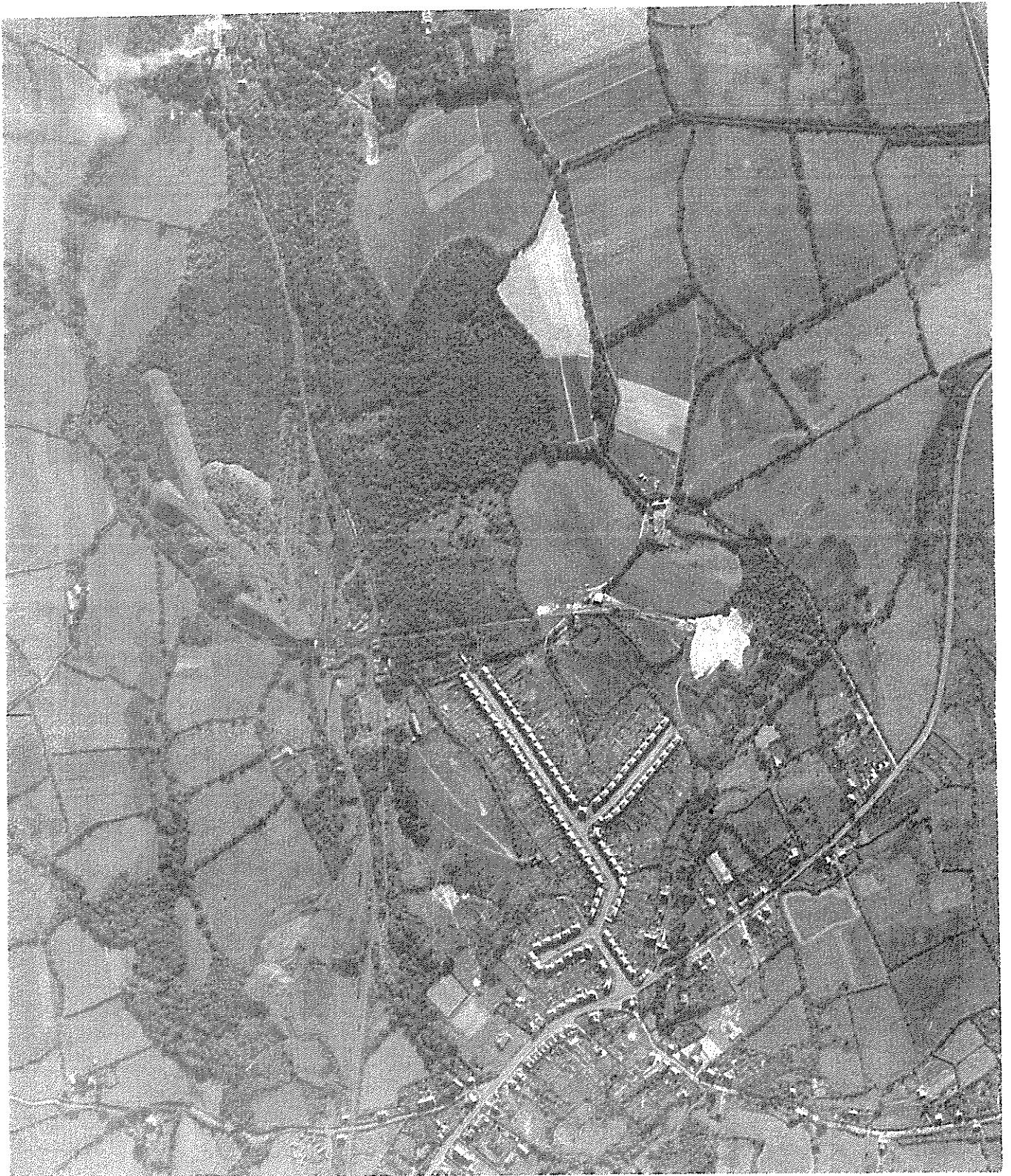
The Pontyberem Anthracite Colliery.

The New Dynant Anthracite Collieries.

#### Properties.

These Collieries are so situated as to afford exceptional opportunities for centralised management and control. They have, until recently, been worked under independent ownership, but great advantages have already accrued since unified management with attendant economies and increased efficiency were introduced.





*Plate 6; This vertical aerial photograph shows the eastern side of Trimsaran village, east being to the top edge of the photograph. The woodland and farmland to the east of the village has now largely been lost to the huge Ffoslas opencast mine. The finger-like coal tip above the village belonged to Trimsaran Waun-hir Colliery, whilst the plume of smoke rising at the top left hand corner of the photograph is produced by Trimsaran Upper Colliery and brickworks. The line of the dismantled Trimsaran Colliery Railway is visible running from the bottom of the photograph towards the above named collieries. The former Trimsaran Wood, east of the village, is comparable to a number of similar surviving fragments of woodland along the Gwendraeth Fawr valley which have significant industrial archaeological potential, possibly masking early mining and quarrying activity. The morphology of Trimsaran village is indicative of the effect industrial boom of the latter 19th and early 20th century on population and settlement. The straggling settlement along the main roads developed before the latter half of the 19th century, but has been significantly extended by the addition of planned streets of semi-detached houses in order to house the burgeoning population. (RAF, 1947, 106G/UK/1400/Print No.3183).*

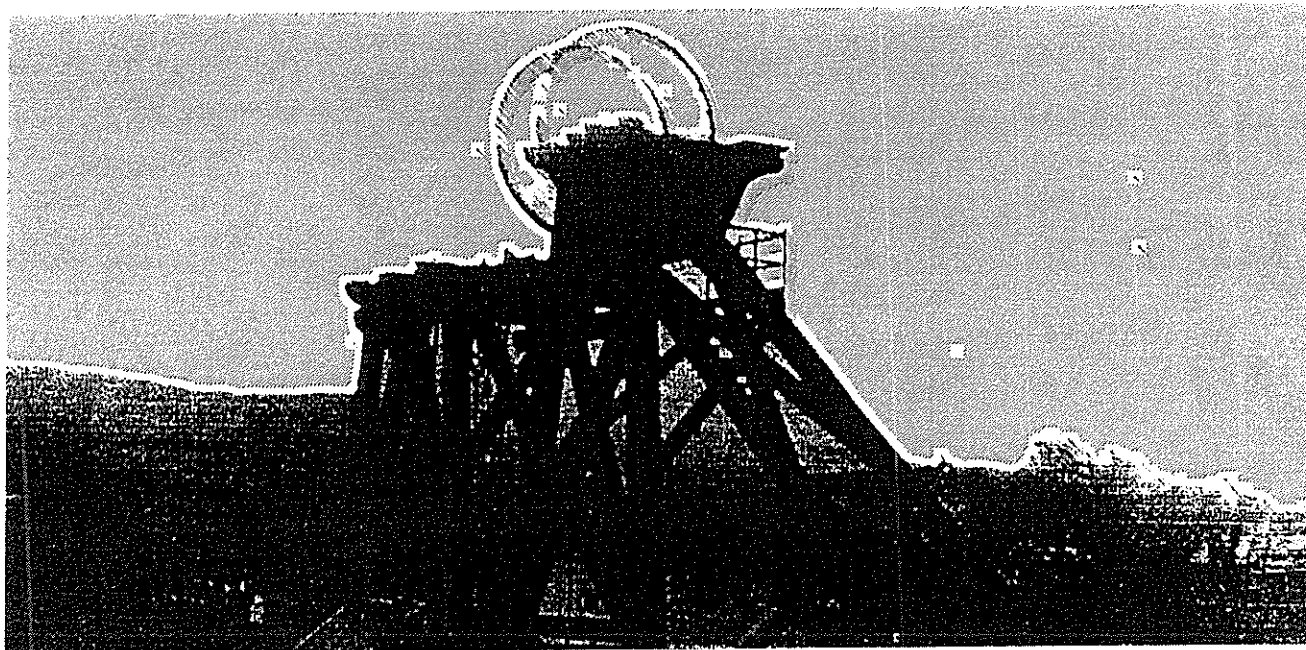
## APPENDIX

### 1.1 Coalmines in Carmarthen District\*

PRN	NAME	NGR	PRN	NAME	NGR
16291	Carway	SN461069	27742	California Colliery	SN580137
16807	Clos-yr-yn Colliery	SN535131	27743	Cwm-y-nant Colliery	SN579144
22073	Gorsgoch Colliery	SN572132	27783	Pontlash Colliery	SN610141
23973	Penllain	SN467091	28166	Hendre Colliery	SN600114
24181	New Cwmmawr Colliery	SN526125	28173	Park & Blaina Colliery	SN613124
27726	Clos-uchaf Colliery	SN521126	30620	?Brynglas Colliery	SN697109
30602	Cwmmawr Colliery	SN541134	30621	Brynlloi Colliery	SN674132
			30622	Cawdor No.1 Colliery;	
				Blaengrenig Mine	SN675114
			30623	Cawdor No.2 Colliery;	
				?Brynglas Colliery	SN692116
			30624	Cilwern Colliery	SN610138
			30625	Duffryn Amman Colliery	SN667127
			30626	Dynevor & Maesquarry	
				Colliery	SN640115
			30627	Glynmoch Colliery;	
				Ystrad Mine	SN660130
			30628	Gors-y-garnant Colliery	SN693129
			30629	Park Colliery	SN620121
			30631	Raven Colliery	SN688131
			30632	Tir-hen Colliery	SN725140
			30633	Ty-llwyd Colliery	SN677139
			30634	Ty-uchaf Colliery	SN613138
			30635	Ysgubor Fawr Colliery	SN608132
			30636	*	SN663106
			30637	Waunhir Mine	SN633106
			30639	Glyncowarch Mine	SN647117
			30640	Glynmeirch Mine	SN655136
			30642	Bodyst Uchaf Mine	SN655122
			30644	Fullmoon	SN653107
			30646	Pwll-y-lord;	
				Pwll-y-balance	SN5911;6011
			30730	Pantyreithin Slant	SN692108

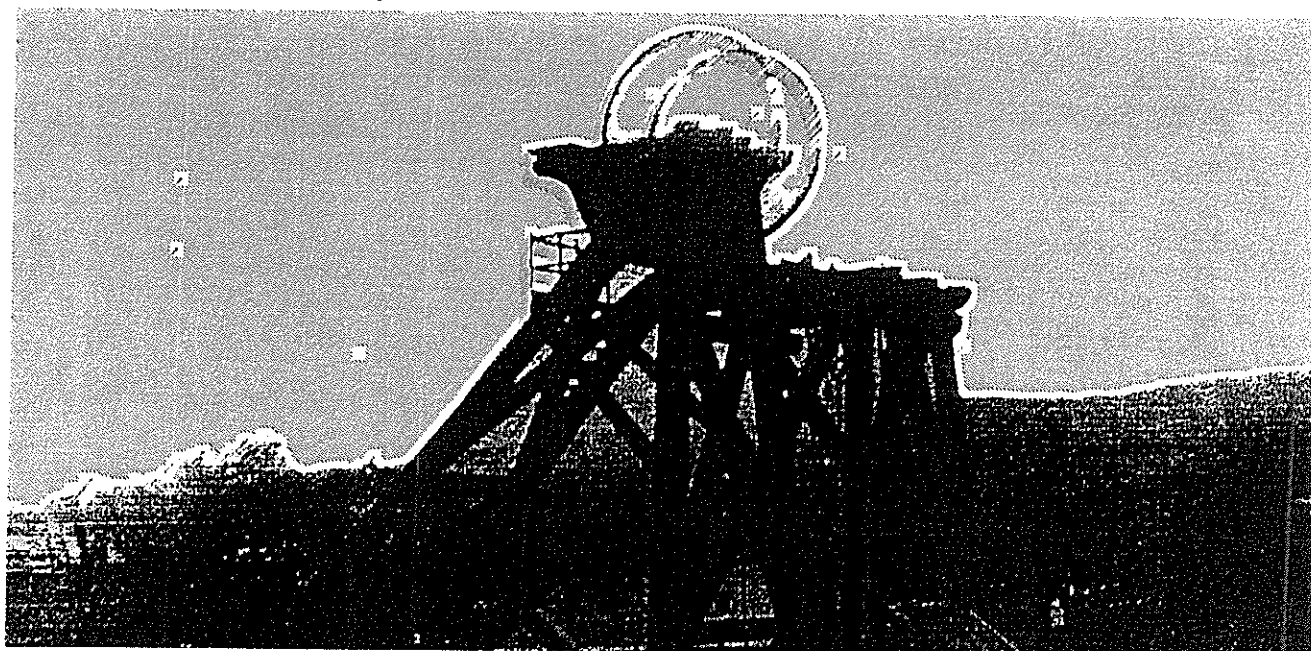
### 1.2 Coalmines in Dinefwr District\*

PRN	NAME	NGR	PRN	NAME	NGR
4875	Tiryddail Colliery	SN620132	30624	Cilwern Colliery	SN610138
5504	Henllys Vale Colliery	SN762137	30625	Duffryn Amman Colliery	SN667127
7676	Llandybie Colliery	SN609153	30626	Dynevor & Maesquarry	
7679	Ynys Amman Colliery;			Colliery	SN640115
	Ynys Dawela Mine	SN703137	30627	Glynmoch Colliery;	
7680	Rhos Colliery	SN600114		Ystrad Mine	SN660130
7484	Nantyci Colliery	SN604121	30628	Gors-y-garnant Colliery	SN693129
16862	Cae'rbyn Colliery	SN594137	30629	Park Colliery	SN620121
17316	Banc y Bryn	SN6811	30631	Raven Colliery	SN688131
18398	*	SN646103	30632	Tir-hen Colliery	SN725140
18401	*	SN637114	30633	Ty-llwyd Colliery	SN677139
18405	Ammanford Colliery;		30634	Ty-uchaf Colliery	SN613138
	Betws Mine	SN6411	30635	Ysgubor Fawr Colliery	SN608132
18497	Gelliceidrim Colliery;		30636	*	SN663106
	Middle Amman Colliery	SN6713;6813	30637	Waunhir Mine	SN633106
18499	Garnant Colliery	SN6912;6913	30639	Glyncowarch Mine	SN647117
19974	Ystradowen Colliery	SN753122	30640	Glynmeirch Mine	SN655136
21969	Rhos Amman Colliery	SN731140	30642	Bodyst Uchaf Mine	SN655122
24080	Emlyn Colliery	SN582133	30644	Fullmoon	SN653107
24100	Gilfach Colliery	SN575136	30646	Pwll-y-lord;	
24374	Henrhyd	SN680098		Pwll-y-balance	SN5911;6011
4629	Baenau Saron Colliery	SN600129	30730	Pantyreithin Slant	SN692108



## 1.3 Coalmines in Llanelli District\*

PRN	NAME	NGR	PRN	NAME	NGR
4876	Panttyffynnon Colliery	SN621113	30606	Ffou Colliery	SN481081
11093	Pwlllygod Colliery	SN448067	30608	Llwynywiwer Colliery	SN466085
16818	Cynheidre Colliery (No.3 & No.4 Shafts)	SN526106	30609	New Carway Colliery	SN465064
16249	Star Colliery	SN4504	30610	Rhydyccerrig Colliery; New Dynant Colliery	SN529125
16288	Plas-bach Colliery	SN468078	30611	Old Pentremawr Colliery	SN502108
16290	Cynheidre Colliery (No.1 & No.2 Shafts)	SN4907	30613	Pumcwart Colliery	SN460080
16373	Capel Ifan Colliery; Pentremawr Colliery	SN494105	30614	Llechfedach Colliery	SN549126
16790	Penllwyn Drift Mine	SN525089	30615	Tumble Colliery	SN535117
16821	Glynhebog Colliery	SN5111;5112	30616	Ty'n y Cwm Colliery	SN500095
16883	Cwmgwili Colliery	SN575102	30617	Ty'n y Waun Colliery	SN481096
18373	Tycroes	SN601100	30619	Brynfforest Colliery; Hansard's Slope No.3	SN448066
18376	Wernos Colliery	SN614112	30630	Berkenshaw's Colliery	SN454079
23440	Gwendraeth Colliery	SN472073	30638	Brynhwthan Colliery	SN439044
23858	Graig Lon Colliery	SN419022	30641	Caedean Slant	SN453048
23933	Trimsaran Drap Colliery	SN460049	30645	Moat	SN439051
23934	Cae'r Plwmp Colliery	SN455049	30647	Cilrhedyn Colliery	SN437053
23939	Trimsaran Waun Hir Colliery	SN456050	30649	Cwmbach Colliery	SN452077
23941	Trimsaran Upper Colliery	SN467053	30652	Danybanc; Pwll-y-gin	SN478075
23951	Cae Pontbren Colliery	SN474083	30653	Gwaith Bach, Pontiets	SN476083
23963	Ponthenri Colliery	SN483096	30654	Hansard's Slope No.2	SN452066
24195	Nant Ddu Colliery	SN527115	30655	Hirwaun-ole	SN549128
24239	Pontyberem Slants	SN513115	30656	Lefel Hay	SN424025
24604	Coalbrook Colliery; Pontyberem Collieries	SN511112	30657	Maesmawr Pit	SN513118
28157	Pencrug	SN588093	30659	Ty Gwyn Colliery; Everett's Colliery?	SN486077
28332	Bryndias Colliery	SN433033	30660	Glyn Abbey Colliery	SN446075
30600	Blaenhirwaun Colliery	SN548131	* This list should not be considered in any way to be comprehensive. There are numerous minor, unnamed coal mines dotted throughout the study area, the inclusion of which is beyond the scope of this study. Some of these are however recorded on the regional SMR and others may be noted in other published works (e.g. Archer, 1967 and Treharne, 1995).		
30601	Crosshands Colliery; New Crosshands Colliery	SN521118			
30604	Glan Gwendraeth Colliery; Evans' Colliery	SN469085			
30605	Fforest Fawr Colliery	SN4507			



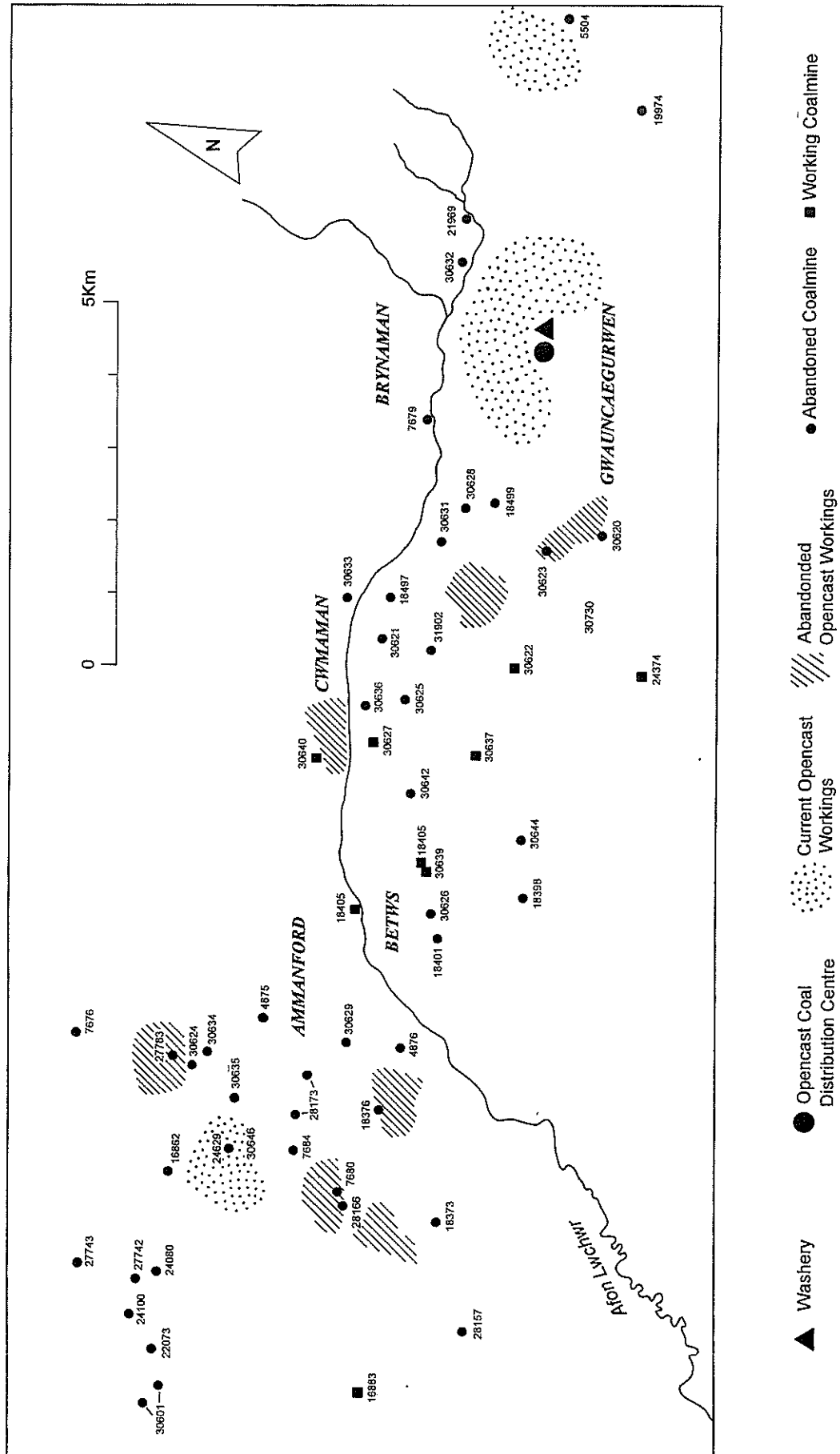


Fig. 6; Coal mines of the Anman Valley and Ammanford



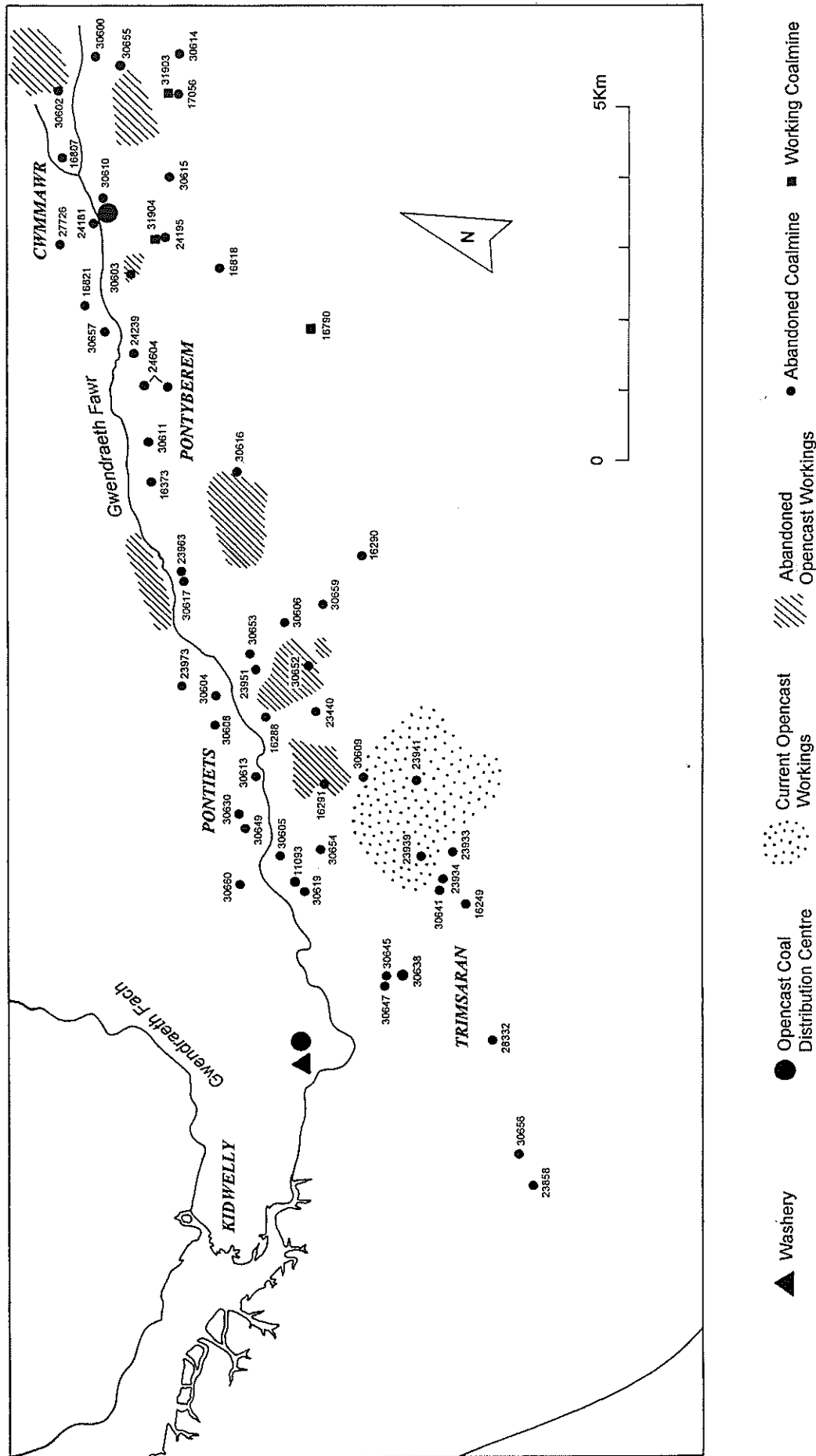


Fig . 7; Coal mines of the Gwendraeth Valley

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