

Comisiwn Brenhinol Henebion Cymru
Royal Commission
on the
Ancient and Historical Monuments of Wales



**Castell Malgwyn House and Tinsplate Works,
Cilgerran, Pembrokeshire**

County: Pembrokeshire

Community: Cilgerran

NGR: SN 214436

NPRNs: 404326, 21729

Date of Survey: March 2006

Surveyed by: Louise Barker, Susan Fielding, Dave Percival, Geoff Ward

Report Authors: Louise Barker & Susan Fielding

© Crown Copyright: RCAHMW 2006

Comments or Queries regarding the content of the report should be made to the authors:

RCAHMW, Plas Crug, Aberystwyth, Ceredigion SY23 1NJ

Tel: 01970 621200

World Wide Web: <http://www.rcahmw.org.uk>

CONTENTS

1. Introduction

2. Castell Malgwyn House

2.1 History

2.2 Architectural Description and Interpretation

3. Castell Malgwyn Tinplate Works

4. Methodology

5. Acknowledgements

6. Bibliography

1. INTRODUCTION

In March 2006, staff from the Survey Branch of RCAHMW carried out survey and analysis of Castell Malgwyn House (Grade II listed building) and the adjacent Tinplate works (SN 214436), situated 400m south-west of Llechryd in the Cilgerran community of Pembrokeshire. Both sites once lay at the heart of the Castell Malgwyn Estate, created at the turn of the 19th century by Sir Benjamin Hammet, a wealthy entrepreneur from Taunton in Somerset and a banker in the City of London (Fig 1). In 1791 Hammet purchased the established tinplate works (NPRN: 404326) and set about creating an estate centred upon a house (NPRN: 21729) (the current hotel), constructed on the site of, and incorporating an earlier farm complex. Surrounding the house, gardens and pleasure grounds were also established (NPRN: 265113 & 265251), the picturesque walks of which can still be followed along the contrasting valleys of the Teifi and Morgenau. These are of some significance as they represent the work of one of the few Welsh professional landscapers of the period, Charles Price of Llechryd (Cadw Register of Parks and Gardens: PGW (Dy) 32 (PEM)).

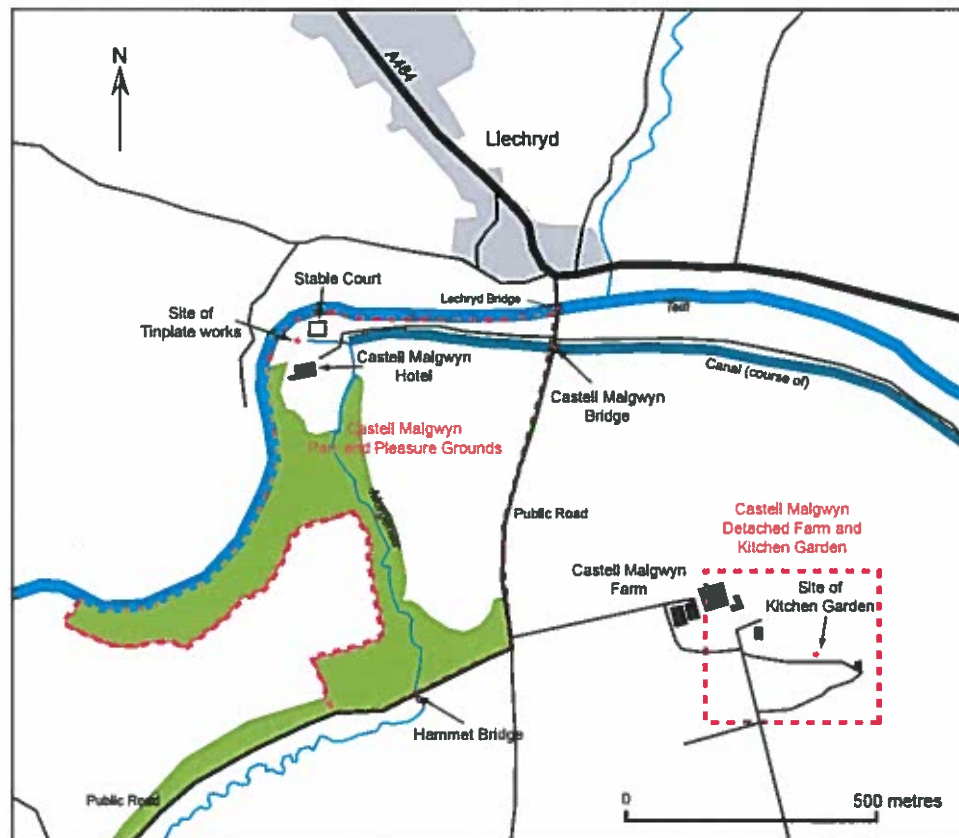


Figure 1:
Location Plan
showing the Castell
Malgwyn estate

The establishment of the estate required the diversion of the public road between Llechryd and Cilgerran, which originally passed in front of the house. In 1798 Sir Benjamin was granted permission to have a section of this road closed, and at his own expense, to build a new section skirting the estate grounds. This new road was opened in 1800 and required the construction of two new bridges. The 'Castle Malgwyn Bridge' (NPRN: 24247), is situated just south of the main Llechryd bridge across the Teifi, at the entrance gates to the hotel. This crossed the canal which brought water to power the tinplate works, and has two

cast iron keystones on either side of the arch, bearing Sir Benjamin's crest of a castle and crossed cannons, together with a construction date of 1799. The second bridge, known as 'Hammet Bridge' (NPRN: 23871), lies at the southern end of the estate and crosses the Morgenau. Here a commemorative slab details its opening on the 21st August 1800.

In addition to the main house and grounds, the estate also included a detached farm and kitchen garden, some 1.5 km to the south-east of the house (NPRN: 265250 & 21730). This survives in a much altered state; although its unusual formal layout is clearly shown on an 1820 estate plan (Fig 2).

2. CASTELL MALGWYN HOUSE

2.1 History

There is evidence for possible early occupation on the site of the house, with Fenton, who visited the house in 1810 describing how:

'The name of Castle Maelgwn has not been given to this mansion from it being built on the site of an ancient castle, or its having anything castellated in its appearance, but from it being part of an old farm of that name and which it bore with great propriety, as the old farm-house, like the present, a late erection occupied an elegant spot where Maelgwyn, the son of Rhys ap Gruffydd, Prince of South Wales, having found an ancient British earth-work encampment, strong by nature and well placed to keep in check the growing power of the Normans and Flemings in those parts.....In forming the noble farm-yard..many such traces and some foundations of buildings I am told were discovered' (1903, 207).

However there appears to be some confusion surrounding this tale, as there are a number of other contemporary sources who attribute the site of the encampment (and therefore the origin of the name), not to the main house now known as Castell Malgwyn, but to the farm of the same name which is located within the estate.

It is clear however, that the site that Benjamin Hammet chose for his house was already occupied by a farmstead, called from various sources Plas, Tycoed y Garth and Penygored (Cadw: Parks and Gardens Register: PGW (Dy) 32 (PEM), the latter coming from its proximity to a weir across the river belonging to the Coedmawr ironworks. Documentary sources for the farm state that c.1400 Luan Fychan resided here, passing the farm on to his son Owen. Owen Fychan subsequently left the property jointly to his two daughters, Elenor and Angharad, with Eleanor and her husband James Griffith-Howell residing here until 1555. Following James' death, 'Castle Maelgwyn' passed to Morgan Jones of Towyn (Cards), who was the grandson of Angharad, and in 1584 he granted a 32 year lease to David Morgan who had been living at Castle Malgwyn since 1576. By 1630 the property had passed into the ownership of David Thomas Parry of Noyadd Trefawr (Cards), and from 1634 was recorded as in the possession of his grandson, David Parry, who in the same year mortgaged it to a David Jenkins. The Parry's had disposed of the property by 1647, and in 1680 Castle Malgwyn is recorded as part of the estate of William Jenkins of Blaenpant (Cards). By 1740 was again occupied by tenant farmers, and by 1766 had been sold to the Symmons family of Llanstinan. Castell Malgwyn was subsequently bought by the Penygored Company who established the tinplate works here around 1771, with Daniel Davies as tenant (Jones 1996, 26-27).

Following Sir Benjamin Hammet's acquisition of the property in 1791, it underwent large scale alteration, and was consequently renamed Ty Mawr-y-Gwaith (Cadw: Parks and Gardens Register: PGW (Dy) 32 (PEM). As a consequence, when Fenton visited 'Castle

Maelgwn' (as it had subsequently been renamed) in 1810 he describes it as:

'..an elegant modern building, affording a suite of handsome apartments and most commodious offices, and is pleasantly situated on a beautiful projecting slope, lying between the navigable river Teivy on one side and a retired pastoral stream that murmurs through a most romantic valley, diversified with rock and wood, on the other. The intermediate space as well as the whole of this valley, forms a pleasure ground in the design and arrangement of which, the greatest taste is displayed.' (ibid)

By the time of Fentons visit, Sir Benjamin had died (in 1802) and his son John had taken over the estate, closing and demolishing the tinplate works in 1806 and 1808 respectively. John Hammett died in 1811, at which point the effects were sold but the house and estate were retained by his mother, Lady Louisa Hammett, Sir Benjamin's widow.

Upon her death in 1824 Castell Malgwyn and the estate were purchased by Abel Anthony Gower, owner of the nearby Glandovan estate, who subsequently let the property. The 'Particulars of Sale' from this time describe a house with a '*handsome entrance hall*' with drawing and dining rooms to either side, '*airy sleeping and dressing rooms on the first floor*' reached by the cast iron staircase, with a smaller staircase at the front of the building leading to the second floor where the children and nannies slept. In addition a coach house, stables and offices are described, probably relating to the four buildings between the house and the river marked on the Tithe Map.

On Abel's death in 1837, his nephew, Abel Lewis Gower, inherited the property and spent further sums of money on improvements, including the erection of the Jacobean lodge and grand entrance, comprised of massive rusticated gate piers, in 1845, the creation of a new garden and the construction of the stable court in 1842-44(?) on the site of the former tinplate works. The architect of these works was Ambrose Poynter, a London architect.

Following his death in 1849, his widow Elizabeth continued living here until her demise in 1876. A series of architects drawings dated to 1866, and accredited variously to William Burn and David Bryce, indicate that Elizabeth planned to enlarge the house, and remodel it in the '*castellated style of architecture*' including the addition of a Belvedere tower, but for unknown reasons the works were never carried out. After her death, the house and estate were inherited by her brother-in-law and owner of Glandovan, Robert Frederick Gower, and were passed down through the Gower family until it was finally sold by Erasmus Gower in 1948. It was converted to use as a hotel in 1962, and underwent renovations in 1978-80.

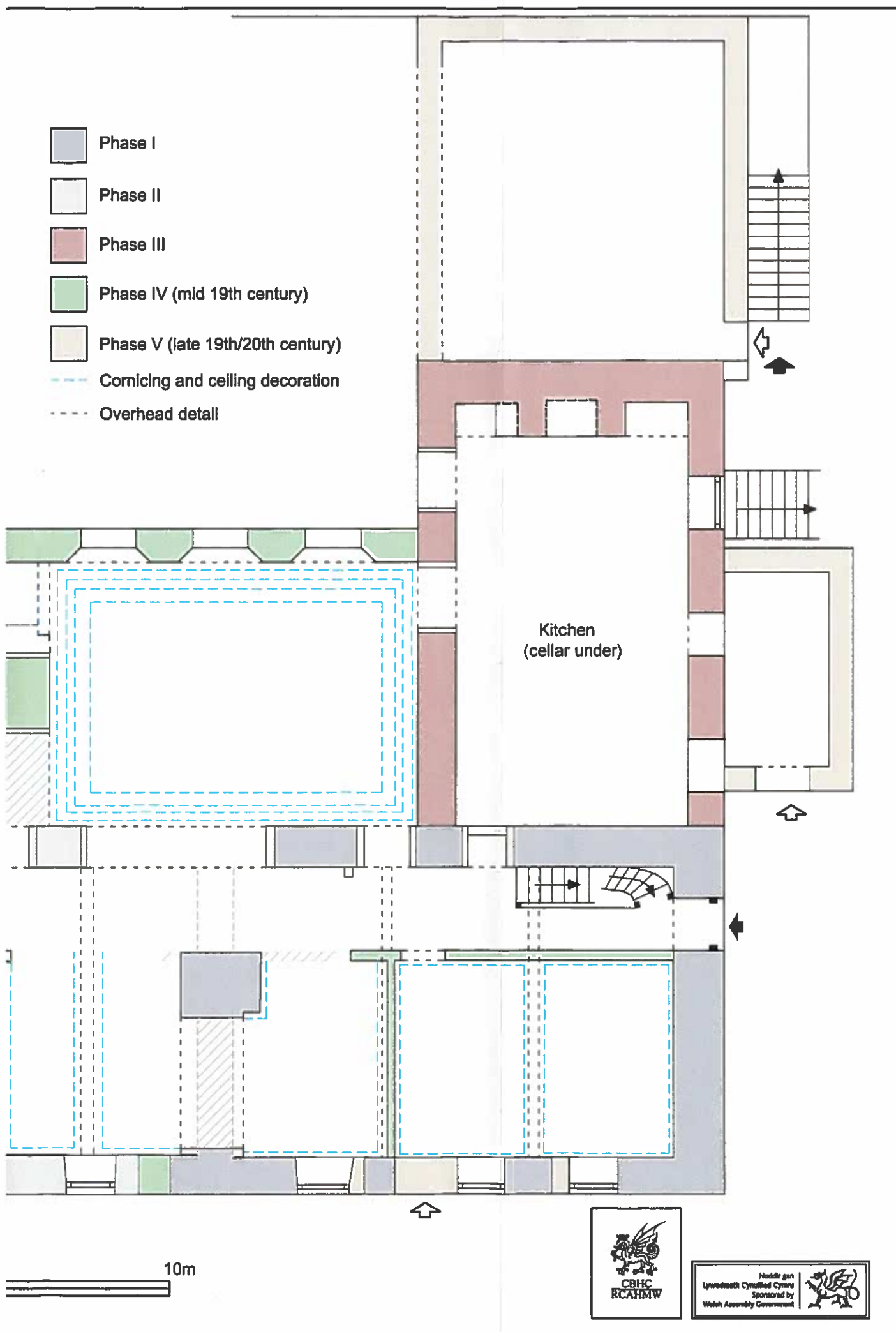







Fig. 3: Ground plan with suggested phasing



-  Phase I
-  Phase II
-  Phase III
-  Phase IV (mid 19th century)
-  Phase V (late 19th/20th century)

Castell Malgwyn House
 NPRN: 21729
 Surveyed by: SF March 2006
 Print scale 1:100 at A3



g.4: North elevation with suggested phasing

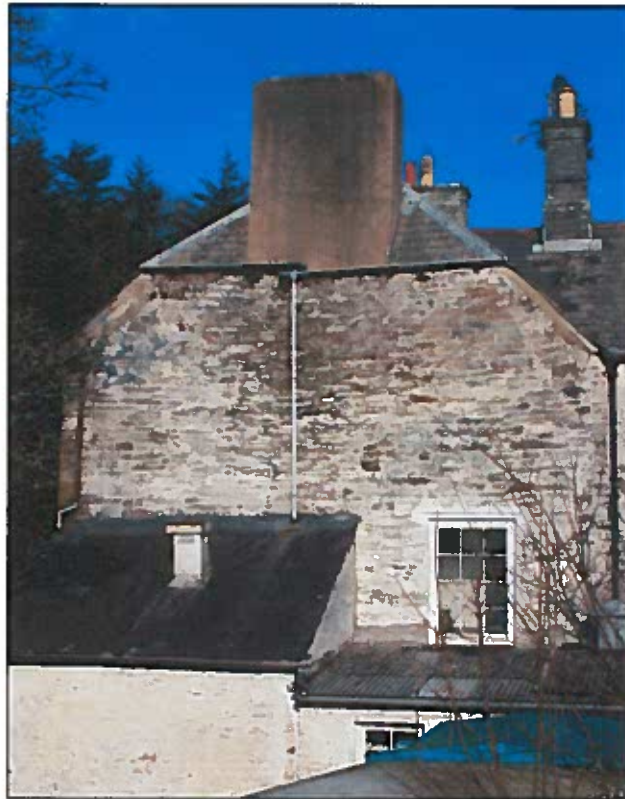


Fig. 5: West gable end of the Phase I building showing the steep pitch of the original roof line



Fig. 6: The east elevation of Sir Benjamin Hammet's house, constructed c. 1795 and later refenestrated

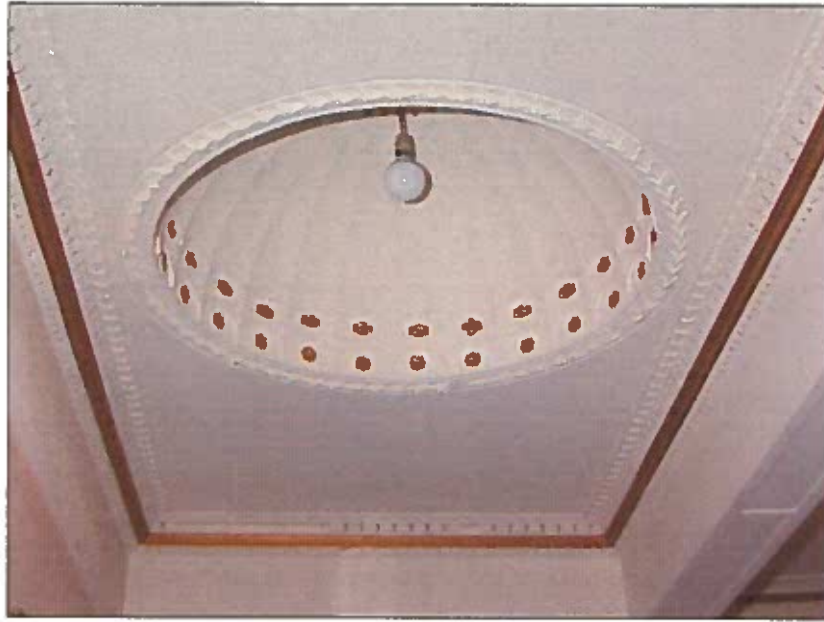


Fig. 7: The domed ceiling decoration and cornicing of the c. 1795 dining room



Fig. 8: Arched doorway with traceried fanlight at the north end of the hall, probably originally leading out into a courtyard area

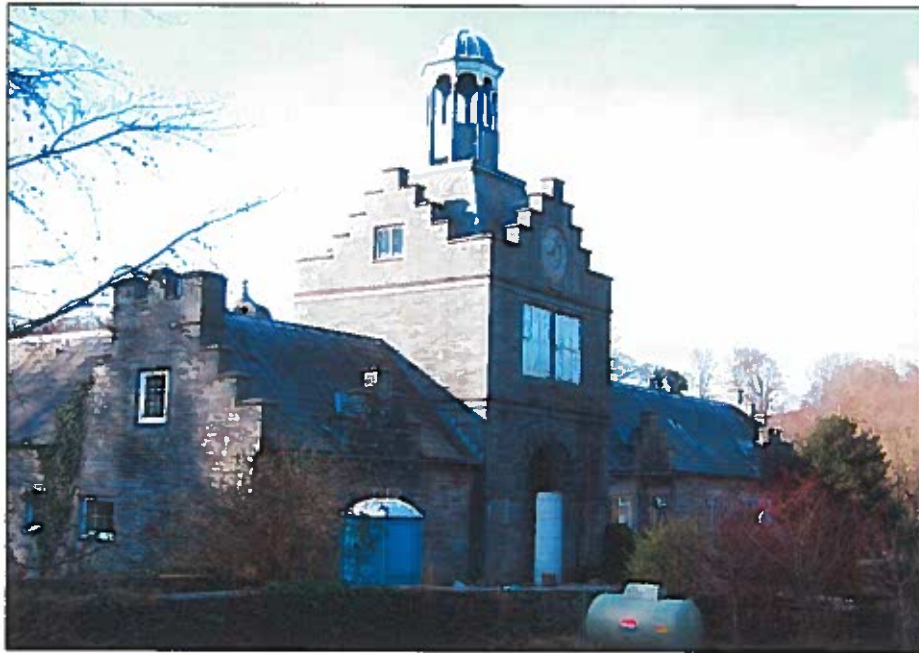


Fig. 9: The stable block with its offset entrance tower, constructed in the castellated style



Fig. 10: Castell Malgwyn from the south showing the east block and staircase bay to the right, and kitchen block to the left. In the centre is the mis 19th century 'infill' range, with the 20th century, single storey, ballroom at the front

2.2 Architectural description and Interpretation

Castell Malgwyn is a large house constructed of local Cilgerran rubble stone, built in the Georgian style but with extensive remodelling carried out in the later 19th century. It comprises a main block which faces east, two rear, parallel ranges, the southern of which is L-shaped, and 20th century extensions on the south side (Fig 3). To the rear is a service courtyard, partially cobbled, with service ranges on the south and west sides.

The earliest part of the present house is the long range which now forms the rear wing on the north side of the house, and which has been extensively altered and remodelled making its original form difficult to distinguish. The whole of this range is constructed of rubble stone with openings of various forms, including segmentally arched and round headed, with a number of blocks on different dates (Fig 4). The sequence of construction joints within the stonework of the north elevation of this range, together with the spacing of the openings, suggest that the wing can be divided into two individual units.

The western end of the range appears to have originated as a separate building with a symmetrical, three-windowed façade, possibly with a central door. The form of the windows can not be distinguished as there have been two phases of later re-fenestration, one involving the replacement of the window heads. However the profile of the bottom section of the original roof is visible in the west gable end of this range, the steepness of which may indicate that it was a gabled mansard roof (Fig 5). This structure has no surviving original features to allow dating, but its situation on the site in relation to the later house may indicate that it predates the construction of Sir Benjamin Hammet's mansion. Its internal plan gives little clue to its original function, although there is a possible fireplace located at its eastern end, and it could be postulated that this is either a survival of the farmhouse from Penygored farm, or a managers house dating from the tinplate works prior to Benjamin Hammets arrival. In the mid 19th century the walls were heightened to form a hipped roof with a gentler pitch, and the openings in north elevation replaced with rounder arch heads.

In 1791 Sir Benjamin Hammet bought the complex of tinplate works and house, and set about a programme of enlargement and improvements. The western part of the north range and the large, three block adjoining the east end of it can both be seen as being central to this programme of work. The west end of the north range is characterised largely by window openings with shallow segmentally arched heads, which have also been re-fenestrated at a later date. Similar windows openings are found in the north elevation of the east block, but a clear construction joint in the exterior stonework and the form of the roofs, indicates that the construction of the east block closely followed that of the west end of the north range, but was not contemporary with it (Fig 4).

The east block formed the new frontage of the house, which was orientated east in order to avoid looking over the tinplate works to the north. The new block was also constructed of local Cilgerran stone with a roughcast exterior, timber cornice and slate roofs, and the front elevation was a symmetrical, five windowed face, with a centrally placed arched entrance (Fig 6). The window openings in the east front have been altered in the later 19th century, but it is clear that the ground floor windows were originally full length to the floor.

The front entrance led into a small outer hall, following into a larger inner hall, both with cornicing and the inner with a plaster arch. A reception room was placed either side of the hall, being described in the sales particulars of 1824 as the drawing and dining rooms. That to the left of the hall, now used as the bar area, has a simple double band cornice and a marble fireplace decorated with fluted columns supporting a highly decorated frieze. The reception room to the right also has a marble fireplace, although of a simpler, corbelled, design, and an elaborate plaster cornice incorporating rosette and acanthus leaf motifs. At the rear of the entrance hall, to the left, is a dogleg staircase with a cast iron balustrade and newel posts, some of the balusters of an elaborate floral design, and moulded timber handrail, rose to the left to a large landing window before returning as a narrower stair.

Opposite the staircase a large arched opening lined with panelling, gave access to a large, high status room accommodated within the east end of the north range. The ceiling of this room was divided into a number of bays, the outermost two bays having very high quality plaster decoration comprising a central dome decorated with rings of floral motifs, a feather design at the apex and surrounded by a circle of bellflowers (Fig 7), flanked to either side by groin vaulting with a feather design at the apex. Each section has an elaborate cornice, equal in quality to that of the adjacent, front reception room, including bands of bellflowers and acanthus leaves, while between each bay is a beam covered with plaster imitation panel decoration. The central bays would almost certainly have been decorated in a similar manner, but this has probably been lost due to later alterations to the layout of this area. The quality of this work, and the status conferred upon the room by it, indicates that this was initially used as the dining room.

In the west wall of the hall, between the staircase and the entrance to the dining room, is another doorway. This has a similar panelled arch to the dining room entrance, in the top of which is a traceried fanlight of geometrical design (Fig 8). This would originally have been an external doorway leading to a garden area between the front block of the house and a two storey, rear kitchen range which was constructed against the south side of the north range at its west end, creating a U-shaped plan. At ground floor level this provided a kitchen with a deep fireplace in the south wall flanked by low, arched alcoves, entered from the east-west range through a door in the north wall. Below the kitchen is a two unit, barrel vaulted cellar with arched recesses and small arched window openings (later blocked) in the west wall. An external entrance to the west leads off the service courtyard.

The ground floor plan created within the new mansion is similar to designs that John Nash had been using in similar houses in the 1790s. Nash had developed an arrangement whereby the stair, instead of being directly encountered as soon as entering the hall, was concealed as a surprise until an inner hall or ante-chamber had been reached. Entry into any of the reception rooms was made impossible until this ante-chamber has been reached, and therefore the staircase revealed (Suggett, 1995, 55). At Castell Malgwyn it appears that this form was replicated, although rather poorly as entrance to the south reception room must certainly have been provided prior to the end lobby of the entrance hall being reached. However entrance to the most impressive room, the dining room, with its decorative ceiling is placed directly opposite the staircase. The quality of the detailing used in this phase of

construction is extremely high, as can be seen in the dining room ceiling, the panelled arches forming the entrance to the dining room and north external doorway, and in the design of the wrought iron balustrade for the staircase.

In the 1840s an entrance gateway with adjacent lodge was constructed, together with a stable block. The gateway comprised of large gatepiers of cut Cilgarran stone, with central double gates and a smaller pedestrian gate to the north, each flanked by a low, rubble built wall. The piers are decorated with rusticated pilasters over which is an entablature on the east and west sides, and have recessed niches, while the gates are of iron with spearhead finials, a dogbar and a scrolled midrail (Cadw listing description 25/L/7(1)). The lodge is similarly constructed of cut Cilgerran stone, in a Jacobean style. This is a single storey building with a stone transom windows, a large, canted bay window in the south elevation and the Gower coat of arms displayed on the north gable (Cadw listing description 25/L/6(1)).

In contrast the stable block is a quadrangle built in a castellated style, with a tall entrance tower offset to the left of the front (east) elevation. This contains an entrance arch with timber gates, over which is a stepped gable with a slate clock face (Fig 9). The gables to the bays of all ranges are stepped, and there are stone mullion and transom windows. In the angle of the north range is an octagonal turret topped by a slate ogee dome. The courtyard elevations have a series of ledged doors, and in the north elevation four, full height carriage entries (Cadw listing description 25/L/20+21(2)).

Similar in style and therefore contemporary in date to these buildings, a two storey block was constructed which largely infilled the courtyard formed by the U-shape plan. On the ground floor this included another high status room with a wide, heavily moulded cornice and a ceiling sporting two parallel bands of floral and foliate decoration. The walls were covered with imitation panelling formed of thin battens nailed to the wall in graded rectangles. In the south wall were three window openings, since converted to doors, and a probable set of French windows, now blocked. These openings all retain full length panelled reveals.

These new ground floor rooms were accessed via the arched door in the north end of the hall, while a corridor was inserted from the west end of the dining room along the south side of the north range rooms, creating a discrete access to the kitchens. The rooms to the north of the corridor were remodelled with new corning and panelled cupboards fitted. On the first floor of the infill block lay bedrooms with coved ceilings, reached from a corridor in the original range.

The estate plan of 1820 (Fig 2; NLW: Cilgwn 73) shows a small projection against the north elevation of the north rear range. The scale and accuracy of the map make it difficult to precisely locate its position or its size, but it may relate to the two vertical lines of brickwork seen on the ground floor of the north elevation.

It was probably also at this time that the east, south and north elevations of the house were re-fenestrated with the current horned sashes, the surrounds being replaced in brick. The ground floor windows in the east elevation were shortened in height, and internally they were furnished with panelled reveals, soffits and shutters. In the north elevation, three large,

round headed windows replaced the earlier openings, serving the dining room.

In the later 19th century, the easternmost of these windows was blocked, and a doorway inserted. At some point not clearly dateable, the arrangement of the dining room and front reception room was altered, with the dividing wall between the two removed and a new thinner partition built to the west of it. This incorporated the easternmost bay of the dining room into the front reception room in the current arrangement. A second partition wall inserted to the west formed a passageway accessing the door, an arrangement now forming the current reception area.

In the 20th century a number of single storey additions were built onto the rear of the house, enlarging the service areas. A larger extension was constructed on the south side of the house, forming the current 'ballroom'. (Fig 10)

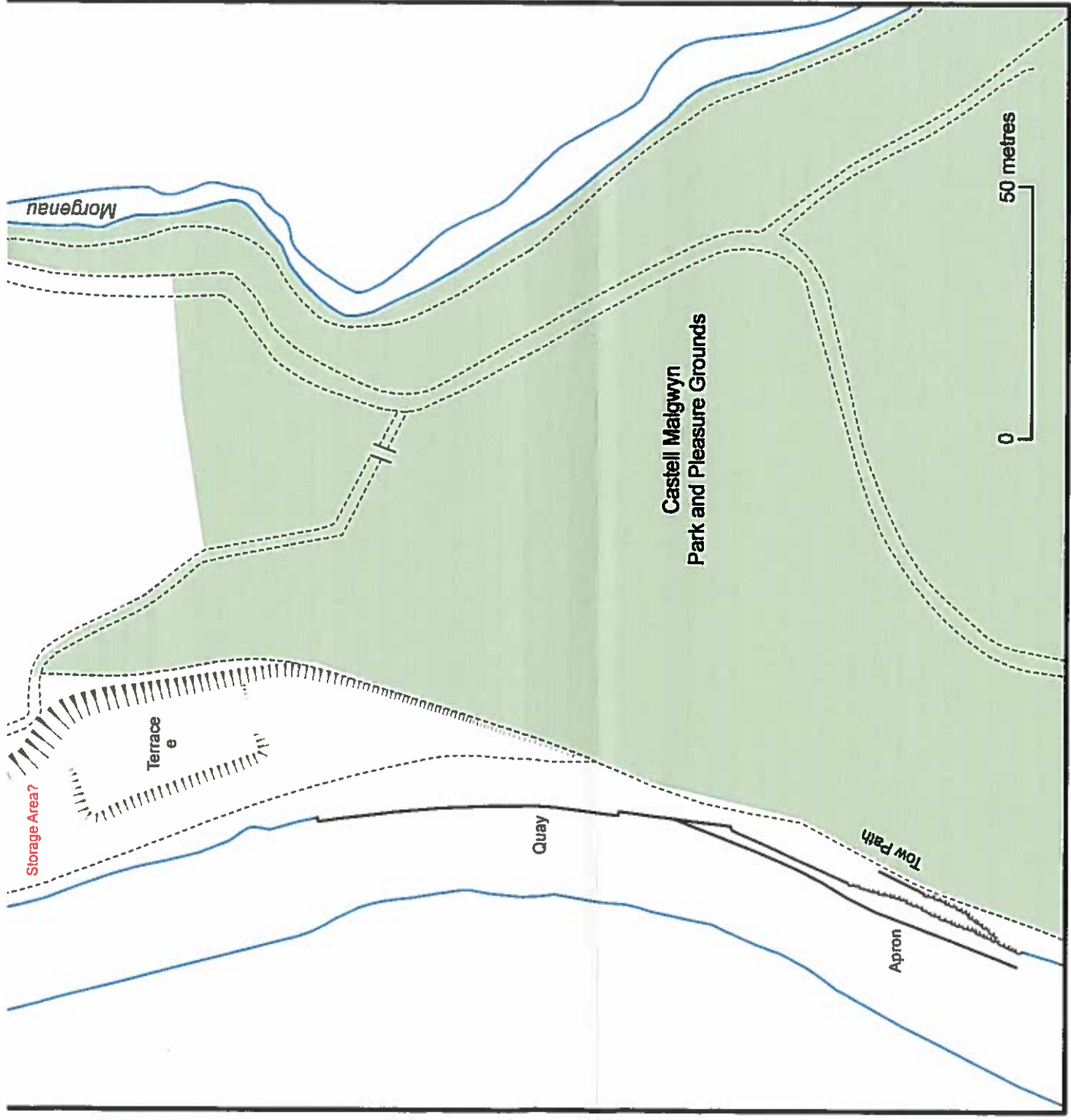


Fig 11: RCAHMMW Survey and Interpretation plan showing surviving features of the Castell Malgwyn Tinplate Works

3. CASTELL MALGWYN TINPLATE WORKS

Tinplate was first manufactured in Britain at Pontypool, with published notices of 1703 declaring the Hanbury's enterprise as 'The Pontypool Iron and Tinplate Company' (Jenkins 1995, 24). Wales soon became a focal point for the industry and of the 16 tinplate works in Britain at the beginning of the 19th century, 11 were in Wales, producing between them some 4,000 tons of tinplate. Of these Castell Malgwyn was noted as being one of the largest in the 'Kingdom', second only to the works at Melingriffith in Glamorgan (NLW: MS 1760A). Indeed, when the Rev Richard Warner visited the site in 1798, he noted the contrasting scene of what he called a 'fairy region' to the '...immense works of Sir Benjamin Hammet, where all is bustle, noise and business' (1800, 338).

The exact date of establishment of the works at Castell Malgwyn is unclear, one source credits its establishment to Cornish Manufacturers in 1764-70 (Cadw: Register of Parks and Gardens; PGW (Dy)32(PEM)). Perhaps more reliable however, is Walter Davies account, following his visit to the works in c1802, where he notes that they were first established in 1771 by the Penygored Company, based upon the following inscription engraved on a now lost stone tablet at the site (NLW: MS 1760A):

Penygored Company

James Walker, Walter Lloyd, William Dormer, Griff. Howel,

and Conductors

William Gines [?], Ebenezer Atkinson,

Joseph Nickolls Planner.

Richard Bowen, and Richard Bowen Junr. Architects,

William Jones and Isaac Bates Millwrights,

Thomas Philips, Assistant,

Silvanus Nugent, Clerk
First stone laid in this building was by R.B. Sep.r 6. 1771.

Walter Lloyd was local to the area, from Coedmore near Llechryd in Cardigan and there is a strong possibility that he was directly involved in the ironworks at Coedmore Forge, situated on the opposite side of the river to the tinplate works and which closed around 1750. This connection would provide one of the main explanations as to why the tinplate works were specifically established here. Furthermore the name, Penygored, head of the weir, is a direct reference to the structure which crosses the river behind the stable block, currently interpreted as a series of salmon traps, but probably originally a weir and presumably the limit of the tidal river (Fig 11; NLW: Castell Malgwyn Brochure). The other members of the Penygored Company were from further a field; James Walker was from Spitalfields in Middlesex, William Dormer was from Silverstreet near Woodstreet in London and Griffith Howell was from Thames Street in London (NLW Noyadd Trefawr MSS 1 36 1806).

The establishment of the works by the Penygored company in 1771 also ties in with a parliamentary act of 1772, giving permission for the construction of a canal to carry water from the Teifi to power the works, which at this point were said to be 'nearly perfected'.

Following the Penygored Company, the works were purchased by Holiday and Daniel and subsequently in 1791 by Sir Benjamin Hammet, whose son John took ownership following his father's death in 1802 (NLW: MS 1760A). By the time of Fenton's visit to Castle Malgwyn in 1810 the works had been 'taken down' (1903, 274). To what extent the complex was dismantled is unclear, as both an 1820 map of the Castle Malgwyn Estate (Fig 2; NLW: Cilgwyn 73) and the 1844 tithe map of Cilgerran show a series of buildings situated in the area where the 1844-45 stable court, built by Abel Lewes Gower now stands. Fenton adds that by the removal of the works '*..the banks of this beautiful river, have reasserted their original character*' (Fenton 1903, 274) and thus it seems likely, that whilst some of the buildings may have remained, much of the other infrastructure was dismantled or in-filled soon after closure.

Walter Davies noted that the Castell Malgwyn tinplate works were:

'Situating in a good country for charcoal, which was the reason for establishing the works here. Provisions are good and plentiful in the surrounding Country. And also cheaper than in most parts of Wales, at least South Wales, and of course, wages not high' (NLW: MS 1760A)

Aside from this and the local knowledge mentioned earlier, the river Teifi, also played a crucial factor in the works location. The Teifi was used both to power the works and to transport products to and from the major seaport at Cardigan at the mouth of the river. As Fenton noted on his tour, the river is tidal at this point and would thus have made the navigation of the rocky stretches of the river further downstream much easier (1911, 275).

Today very little survives of the Castell Malgwyn works, with the core of the complex situated adjacent to the Teifi, to the north of the hotel, in the area around the stable court (Fig 11). This area is defined by a 4m high, slab-built retaining wall (1) which runs south-west for some 140m, from bridge 1, to a pair of furnaces (Fig 12). The only marked feature along this wall is a 15m stretch of near vertical rock face, at the northern end of which there is a return in the retaining wall leading to a rectangular area, a, 3.2m by 1.8m, which has a rectangular, 0.27m square opening with slab lintel in its back wall. The function of this feature is unclear.

Despite the lack of surviving structural evidence, it is possible to build a relatively accurate picture of how the works may have looked and operated, based on a number of contemporary accounts. Whilst the art of manufacturing tinned plate has undergone many changes since it was first practiced in the Bavarian region of Europe during the 14th century, the basic procedure of flattening an iron (or later steel) base into sheet form, following which a coating of tin is applied, has remained the same. In essence the Castell Malgwyn works are likely to have been divided into two main departments, the mill and the tin-house, and it is here that the majority of the 350 employees recorded in 1802 would have worked (NLW: MS1760A). The mill would have comprised of the furnace and rolling machinery, where iron bars were heated and converted to sheet form via a series of rolling mills powered from water off the Teifi, which was brought to the works via the canal. Following this, the 'backplate' or untinned

sheets were 'pickled', 'annealed' and then cold rolled. Once this was complete the sheets would be ready for an application of tin in the tin-house. Other buildings such as stores for raw materials, warehouses and offices would also have been located on the site and some 200m further downstream, is a quay where the barges would have docked.



Figure 12:
*Retaining Wall (1)
which defines the
eastern boundary of
the works*

In his account of Castell Malgwyn, Walter Davies writes that pig iron was brought to the works from Carmarthen, Glamorgan and Monmouthshire, where it was subsequently forged into a more malleable wrought/bar iron (NLW: MS1760A). Charcoal would have been used to fuel this process, with the works ideally situated to exploit an apparently abundant local supply. It is interesting to note that whilst coke was also being used at this time and was seen as being particularly beneficial to the iron industry, it was not so to the tinplate industry, as iron produced in a coke smelting furnace had a high sulphur content, which in the early days adversely affected the quality of the finished tinplate. Charcoal was thus an essential fuel which reduced the level of the sulphur, with the term 'charcoal' tinplate often used to distinguish between the best quality tinplate from the 'coke' or standard quality tinplate (Donovan 1805; Jenkins 1995, 66, 69).

There were two forges documented at the Castell Malgwyn works, and at this period two different types were in use. The 'finery' and 'chafery', comprised open hearths, fuelled by charcoal with bellows behind. Here, the pig iron would first be placed behind the fire of the 'Finery' where it softened to form a lump, after which it was beaten into a thick short square. It was then put in the 'Chafery' where it was heated until red hot and subsequently hammered into bars. The downside to this process was that the iron, due to its direct contact with the furnace fuel, become contaminated through its absorption of impurities from within the charcoal and thus was not of a quality ideally suited to the needs of the tinplate workers. Thus by the end of the 18th century the 'reverberatory furnace' was increasingly used, which

separated the fuel from the iron and thus increasingly meant that mineral fuel could be used in place of the more expensive charcoal (Jenkins 1995, 67). There was obviously no scope in switching from charcoal to coal at Castell Malgwyn as the costs involved in importing coal to the site would have been prohibitive. Davies does note that coal was brought in from Neath, Swansea and Llanelli, but in what quantity and for exactly what use is unclear (NLW: MS1760A). The increasing use of coal in tinplate production is however likely to have been the primary reason for the demise of the works at Castell Malgwyn during a period when the industry was flourishing, with new works established next to the coal fields of South Wales, which became a world centre of the Industry.

Davies notes that there were three rolling mills at Castell Malgwyn, which converted the bars of wrought iron into sheet form. Up until the 17th century 'helves' or tilt hammers, relying on water as their power source, were the only available means of obtaining a relatively flat and thin sheet of iron, but inevitably produced sheets of uneven thickness and poor surface quality. Such a problem was overcome by passing the heated iron bars through a pair of polished cast iron rollers which improved the flatness of the sheets and reduced production costs by both speeding up the manufacturing process and improving the surface quality of the product (Jenkins 1995, 76). This technique was initiated in Britain by the Hanbury family at their Pontypool works between 1680 and 1720 and whilst at first it was just for the production of 'backplate', it was not long before the rolling method was used for tinplate manufacture, again first introduced at the Pontypool works. Edward LLwyd describes the process at Pontypool in 1697 and it seems likely that the process carried out at Castell Malgwyn would have been similar:

'They cut their iron bars into pieces about two feet long and, heating them glowing hot, place them between these rollers, not across, but their ends lying the same way as the ends of the rollers. The rollers (moved with water power) draw out these bars to such thin plates that their breadth (about 4 inches) becomes their length, being extended to about four feet. What was previously the length of the plate (two feet) becomes the breadth' (Edwards 1995, 13, Jenkins 1995, 24 & 80).

In essence, the iron was withdrawn from the furnace using a pair of tongs and was then 'boshed' in cold water to remove scale and dirt, before being passed through the rollers. The gap between the rollers was adjusted by the 'rolleman' to produce specific thicknesses, with the iron sheet passed through a number of times depending on the required gauge and length. Often the sheet was 'doubled', folded in two, and thus the end result was that sheets often adhered to each other and required separation before 'pickling', a job most often carried out by women employees (Jenkins 1995, 91-93).

Water was the earliest source of power utilised by the tinplate manufacturers, and at Castell Malgwyn this was from the river Teifi and to a lesser extent the Morgenau. The difference in ground and water levels, combined with the fact that the river was still tidal at this point, would have made it difficult to control water flow and rate directly from the river at the point of the works. Thus, a canal was built, beyond the weir some 1.5km upstream, the construction of

Figure 14:
*Bridge 2 with the
Stable Court in the
background*



themselves and their heirs and assigns'. As a section of public road between Llechryd and Cilgerran would have needed to cross the canal around this point, one of these bridges, most likely **bridge 1** probably served this purpose. It may be that the central span was the original parish road which was subsequently widened on either side when the structure was adapted to take the drive of the house. The 1820 estate plan also shows a direct link with **bridge 2** and what was originally a weir and possibly a second crossing point across the Teifi. It would appear that by this period **bridge 1** served as the main approach and drive to the house, whilst the track leading from **bridge 2** appears to serve the service quarters of the house (NLW: Cilgwn 73).



Figure 15:
*Remains of
retaining wall (2)*

It is possible to trace what appears to be a terminal of the canal on the ground today some 35m beyond the stable block at b, although there is a suggestion on the 1820 estate map that it may have continued further, ending approximately in line with the rear of the house (ibid). From the south-west corner of the stable block, running up to b, the remains of a second retaining wall (2), some 1.2m high, and constructed of large coursed blocks, mark the northern bank of the canal (Fig 15).



Figure 16:
*Outtake of the
culvert*

Some 8m along retaining wall (2) from the corner of the stable block is a culvert 26m in length, which currently feeds water from the Morgenau into the Teifi. The intake and outtake consist of a double arched portal, most clearly seen on the outtake side (Fig 16). This has stepped cutwaters extending 1m in front of the face of the portal and is constructed of coursed stone slabs, with segmental arches, 1.5m wide, the soldiers of which are formed of slabs on edge. The culvert is curved in plan and constructed of a brick vault on stone slab side walls. There are two possible functions for this structure, the most likely is that it functioned as an outflow for the canal water and the other is that it served as a leat to convey water to one or more of the water wheels which powered the three rolling mills. Wheel design fell into three basic categories at this period, over-shot, under-shot and breast, each one suiting the physical conditions of locality and layout of a works best, with the breast type the most favoured by tinplate makers (Jenkins 1995, 84). It is difficult to ascertain the type used at Castell Malgwyn although considering the topography of the site, the breast design seems the most likely. It is however interesting to note that there is a change in level between the canal and the Teifi, which is apparent when listening to the sound of water flowing through the culvert which indicates there is a waterfall at some point along its course. The most likely explanation for this is that it was concerned with the removal of water from the site, as it would have been essential to have a difference in level between the water feeding the

which and its use throughout the lifespan of the works was passed by an act of parliament in 1772. Although the term 'canal' is used here and in a number of documentary sources, there is no indication that the waterway was ever intended to be navigable and was for water-supply purposes only. The canal crossed an area known as 'The Great Meadow', which was part of the Glebe lands of the Rectory and Church of Manordeifi and is described as being 90 yards and 2 feet in length by 16 yards 2 feet 4 inches in width. The act stated that the owners of the tinplate works were responsible for the maintenance and repair of the canal and in compensation for use of the churches land, would pay the Rector of Manordeifi £2 10s per year, which was made in two payments one on the 25th March and the other on the 29th September (NLW Noyadd Trefawr MSS 1 36 1806).



Figure 13:
Bridge 1

The canal is no longer in use and has been substantially infilled and ploughed over, however it is still possible to trace the majority of its course in earthwork form, with the line becoming much clearer at the point where the Morgenau once fed into it. Here two bridges, 13m apart, cross the canal. **Bridge 1**, is the larger of the two, some 18m wide and carries the drive up to the house. It is constructed of dressed stone slabs with the soldiers trimmed to an even height and edged with a projecting drip course (Fig 13). It appears to have been constructed in three parts, with three parallel arches each 6.1m wide with a span of 11m metres. It is not clear whether this represents later widening of, presumably the centre arch, or if it is a quirk of the construction technique. **Bridge 2** is downstream of the first and measures 3.2m wide with a span of 11m and is constructed of coursed stone slabs with a soldiered slab arch of varying height (Fig 14). The exact construction date and explanation for why these two bridges are so close together is unclear. Both pre-date the 1844-45 stable block, as they are shown on the Estate plan of 1820. It would appear however, that one was built at the same time as the canal, as the act of parliament notes that the Penygored Company had 'erected a bridge over the same cut or canal for use and conveniency of

complex and that of the outflow area, due to the tidal nature of the Teifi, otherwise when the tide rose, water would have flowed back into the works.

Because the works have been comprehensively demolished with the site landscaped and in-part, built-over, the layout of the buildings can only be surmised. The re-heating furnaces and the rolling mills seem likely to have been at the upper end of the site, presumably where the stable block now stands. Further down may have been the pickling and annealing sheds. Here, once the iron had been through the rolling process, the 'backplate' would have been 'pickled' in a mild acidic solution to remove the film of iron oxide that had accumulated on the surface during rolling and thus make the tinning process more even, and affording more protection against corrosion (Edwards 1995, 14). At this period the process was carried out without any mechanical aids, with the pickler and his assistants using tongs, to immerse the individual sheets into a vat of solution for a given period, following which the plates were washed in water to remove the acid. This black pickling operation preceded the black annealing stage of the process during which sheets were subjected to a heat 'soaking' to remove all moisture, soften the backplate and release the stresses introduced during rolling. Here the sheets were stacked to a height of three or four feet on a shallow cast iron bed-plate and placed into a furnace. The reverberatory furnace was then sealed off and fired by coal to the temperature required, maintained at that temperature for a specific period and then allowed to cool, before being unloaded when cold. The sheets were then individually passed through three sets of cold rolling mills, which would improve the quality and properties of the sheet prior to tinning. Following the cold rolling the sheets were then annealed for a second time, although the furnace temperature and annealing time was shorter for this process than with the black annealing. After cooling, the sheets were subjected to a second pickling to release any traces of oxidation from the surface. The sheets were then ready for the application of a tin coating (Jenkins 1995, 101-108).

This final process would have occurred in the tin house, a separate building to the mill and which at Castell Malgwyn can be suggested to have been located at the southern end of the complex, near to the site of the furnaces. On a visit to the tinplate works in Carmarthon in 1804, Donovan notes that following pickling the plates were first 'scoured thoroughly with bran, so as to be quite bright and polished to enable the tin to adhere' (Donovan 1805). At the period the Castell Malgwyn works operated, before the advent of mechanised tin pots, great reliance was placed on the judgement of the tinner to determine the correct thickness (weight) of the tin coating (Jenkins 1995, 15). The Rev. Richard Warner describes well the tinning process following his visit to the Ynysygerwen works near Neath in 1798:

'The plates are plunged vertically into a pot containing melted tin, the surface of which is covered with pitch, suet or some fatty substance to prevent the calcinations of the tin, and to make the surface of the iron more inclined to receive its coating. By this immersion the tin immediately unites itself to the plates, and they are taken out completely tinned' (Warner 1800).

Donovan adds that 'the quantity of grease, prepared from linseed-oil and suet is constantly kept floating on the surface of the tin, and renewed as it evaporated off, which gives an

excessively nauseous stench' (1805).

Diderot's account of the process in the mid 18th century is also similar, adding that the cauldron of tin, which had been previously melted in a furnace was supported on masonry, under which a stove fuelled by wood (or charcoal) kept the tin fluid and at the proper heat (for when it was not hot enough it would not stick to the iron and when it was too hot the coating was thin and unequal) and over which was the chimney stack, through which the fumes generated by the tinning process were emitted to the atmosphere. He adds that at first the sheets were all dipped together, and were divided when immersed. Following this each sheet was removed individually and separately dipped in a separate chamber within the cauldron, separated from the main area by a plate of iron. Once this was completed the sheets were placed to drain upon parallel bars of iron. Diderot adds that girls then took the sheets from the drainer and checked them for completion, either returning then to be re-tinned if the tin had not taken or those that had were then rubbed with sawdust and moss to get the grease off (1750).

There were however significant changes to the process at the beginning of the 19th century during the final years of the Castell Malgwyn works, although it is not known if these were introduced here. These are detailed in a report by Dr Pococke, Bishop of County Meath in Ireland, following his visit to Wales in 1818. Pococke mentions a full battery of 6 tinning pots with the plates first placed in a pot of hot grease, then into a pot of molten tin, before being transferred into a third pot which had two compartments and known as the 'wash pot'. In the first compartment the plates were given a second coating of tin and upon removal were brushed on both sides with a hemp brush before being dipped in the second compartment, presumably the wash area. From here the sheet went to another grease pot, the temperature of which was set high enough to allow superfluous tin to run off. From the grease pot the plate was removed to the cooling pot and then on to a 'list' pot, which was a shallow pot of molten tin into which the plate was dipped for a few moments before being taken out and struck sharply with a stick which caused the 'list' or the bead of solid tin along the lower edge of the plate to fall away (Cartwright 1888).

At Castell Malgwyn it can be suggested that the pair of furnaces at the southern end of the complex may well be associated with the tinning process, possibly functioning as a furnace to melt the tin (Fig 17). The furnaces are set into retaining wall (3) which runs at right angles to retaining wall (1). The east kiln is the larger of the two, 1.6m wide by 1.85m deep with a segmental arch and at the rear of the opening in the roof, a small flue, which is square in section at the bottom, but becomes rounded and brick-lined towards the top and is topped with a slate slab, with a hole approximately the diameter of the flue through it.

Walter Davies notes that the Castell Malgwyn works were capable of making 2000 boxes of tinfoil per annum, with the boxes sent to Bristol, Birmingham and London where the tinfoils were used in the manufacture of domestic articles (NLW: MS1760A). There would obviously have been warehouses on site to store the finished product, ready for it to be loaded onto barges and taken down to Cardigan for distribution. A series of low slab built walls to the south of the furnaces at c and d, now utilised by a later glasshouse and maintenance



Figure 17:
Tinning furnaces

area, may well mark the remains of earlier buildings associated with the works, possibly those for storing the finished tinplate, and a large levelled terrace at e, m by m excavated into the hill-slope may also have been a storage area. These are close to the quay which is situated

150m further down stream.



Figure 18:
The Quay

The quay is marked by a revetment wall constructed of coursed slabs, some 1.5m above the winter water level (Fig 18). There is also a section of apron quay which is presently just below winter water level and running parallel to the main bank and quay wall (Fig 19). This arrangement is likely to have allowed flat bottom barges to rest on a

level bottom against the quay, even when the tide fell below the level required to float them. Adjacent to the quay and river bank is the towing path, now part of the riverside walk, which in places is supported by a revetment wall some 1.6m high.

Figure 19:
*Section of apron
quay below the
water line*



4. METHODOLOGY

The survey and field investigations were carried out by Louise Barker, Susan Fielding, Dave Percival and Geoff Ward. The house plan was surveyed using conventional graphical methods, with the elevation surveyed digitally using a Leica TCR1205 Total Station with TheoLT software. Surviving elements of the tinplate works were surveyed using conventional graphical methods based upon Ordnance Survey control. The final scaled plans were produced in AutoCAD.

The report was researched and written by Louise Barker and Susan Fielding, it was commented upon by Dave Percival and Richard Suggett.

The site archive has been deposited in RCAHMW's National Monument Record, to where applications for copyright should be made.

© Crown Copyright: Royal Commission on the Ancient & Historical Monuments of Wales
2006

5. ACKNOWLEDGEMENTS

Many thanks to the owners of Castle Malgwyn Hotel, Mr and Mrs Beale for allowing us access to the property.

6. BIBLIOGRAPHY

Cartwright, J C (ed) *The Travels through England of Dr Richard Pococke*

Diderot, M 1756 *Encyclopedie ou Dictionnaire Raisonne des Sciences, des Artes et des Metiers par une Societe de Gens de Lettres*

Donovan, E 1805 *Descriptive Excursions through South Wales and Monmouthshire in 1804*

Edwards, J 1995 *Tinopolis: Aspects of Llanelli's Tinplate Trade*

Fenton, R 1903 *A Historical Tour through Pembrokeshire* (* Edition)

Hoare, W E; Hedges, E S and Barry, B T K 1965 *The Technology of Tinplate*

Hughes, S 2000 *Copperopolis: Landscapes of the Early Industrial Period in Swansea* (RCAHMW)

James, D 1987 'A Tale of Two Mansions: Galindovan and Castle Malgwyn' *'Country Quest* 28/5, 16-17

Jones, F 1996 *Historic Houses of Pembrokeshire*

Jenkins, P 1995 'Twenty by Fourteen': *A History of the South Wales Tinplate Industry*

RCAHMW 1925 *Pembroke: An Inventory of Ancient monuments*

Rees, A *Rees's Manufacturing Industry (1819-20)* (ed. Neil Cossons, 1972)

Suggett, R 1995 *John Nash Architect*

Warner, R 1800 *A second walk through Wales by the author Revd. Richard Warner of Bath, in August and September 1798* (2nd Edition)

Wyndham, H.P 1797 *A Gentleman's Tour through Monmouthshire and Wales in 1774 and 1777* (2nd Edition)

National Library Wales, Aberystwyth

Noyadd Trefawr MSS 1 36 1806: Parliamentary act of 1772

MS 1760A: Walter Davies 'Notes taken during journeys for the Board of Agriculture', undated c1802

Cilgwn 73: Plan and particulars of Castle Malgwyn Freehold and Leasehold Estates. 1820

Tithe Map and Award Manordeify 1842

RCAHMW Survey Report

Castell Malgwyn

Tithe Map and Award Cilgerran 1844

Castell Malgwyn Brochure

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25