Cleft from the Hills

Why was the slate industry of Blaenau Ffestiniog more successful than the Charnwood Forest quarries?

Alex Hando

Introduction

The former slate industry of North Wales is well recognised. Hundreds of years of quarrying has had a significant impact upon the landscape and culture of immediate communities and has also influenced areas far beyond. Buildings across the United Kingdom are still roofed with tiles that were cleaved from mountainsides of Snowdonia.

The legacy of slate quarrying in the Charnwood Forest remains a far humbler affair. Most evidence of the industry has all but disappeared, and while tiles produced by the quarries remain upon the roofs of buildings across Leicestershire and the bordering counties, the slate industry of the Charnwood Forest has limited recognition among the population of the region.

Slate quarrying in Britain has taken place since as early as the Roman occupation. Substantial Roman buildings nearby to local quarries often had slate roofs. Tiles have been found in various archaeological excavations in western Leicestershire and in Leicester itself (Ratae Corieltauvorum). Excavations in Caernarfon (Segontium) in Gwynedd, have also yielded examples of Roman slate roofing, in relatively close proximity to deposits around Nantlle. Slate remained a popular building material for hundreds of years. Its weather resistance allows it to be left outside, exposed to the elements, for long periods of time without need for repairs or replacement. In addition to its durability, slate is able to be split fairly easily into thin sheets and slabs, due to the layering of very fine quartz and mica crystals within. The combination of durability and thinness meant the material was ideal for use as roofing tiles. Due to such desirable physical properties, slate was also used for gravestones, blackboards, writing tablets, billiard tables and a whole host of other products including cheese presses and dairy shelves.

At the beginning of the nineteenth century, slate quarries in both Leicestershire and Wales began to produce slates on a semi-industrial scale, selling material beyond their immediate customers of nearby villages. In Leicestershire, Swithland Slates can be seen on the roofs of houses across the county to its very edges, with some examples further afield in Nottinghamshire, South Derbyshire and in West Lincolnshire; in and around Grantham. Similarly in North Wales, almost all houses in the villages around Blaenau Ffestiniog are roofed with locally-produced tiles.

Slate tips, tramways, and inclines above the Llechwedd slate mines, looking due west towards Gloddfa Ganol. (Steve Riggs)

The first immediate difference between the two industries is best observed through comparing the visible effects of quarrying upon the landscape in each region. In Leicestershire, some sizeable pits and quarries can be found lying disused around the eastern and southernmost edges of the Charnwood Forest. ‘The Brand’ quarries and Swithland ‘Great Pit’, nearby to Swithland village, are particularly noticeable. These former workings are miniscule however, when compared to the remains of the

Ffestiniog slate industry. The effects of slate quarrying upon the landscape around Blaenau Ffestiniog are dramatic. The northern and eastern mountainsides above the town are punctured by the enormous quarries of Maen-offeren, Llechwedd, Cwmorthin, Graig-ddu, and Oakeley (once host to the largest slate mine in the world). Littered with huge waste tips, dotted with inclines, and lined with the remnants of narrow-gauge tramways, the industrial heritage of the Ffestiniog is plain to see.

Slate quality

The formation of slate requires very specific conditions and millions of years of change to take place. Slate is a metamorphic rock, created when the chemical structure of another rock changes. Slate is formed during an orogeny, where pressure from the mantle acting upon the earth's crust causes it to fold, creating mountain ranges. During such a period, enormous amounts of pressure are exerted upon beds of shale over the course of millions of years, causing the chemical structure of the rock to change, forming slate. Shale, on the other hand, is a sedimentary rock made up of very fine clay formed in layers over several million years in large, calm bodies of water.

Slate's key characteristic is that it can be easily split into sheets and slabs. Not all slate is made equal however, with the quality of the slate dependent on how fine and how consistent the layering of the sedimentary material was that eventually formed the shale.

The geological age when the slate was formed has an effect on the physical properties, determining the uniformity of the cleavage (the layering of the minerals of within the rock). Blaenau Ffestiniog's slate was formed during the Ordovician era, whereas Swithland Slates were older, created during the Cambrian period. The Ordovician slates of Ffestiniog are of a homogenous group, with the material maintaining the same physical and chemical characteristics regardless of location, whereas Swithland Slates comprise of two different groups: Groby 'grey' slates (stone well-liked by the famous architect Sir Gilbert Scott) and Swithland 'blue' slates.

In terms of quality, the Blaenau Ffestiniog slates trump those of Charnwood, as the cleavage of the Ffestiniog and other Welsh slates is much better developed, such to a degree that the material garnered international acclaim for its properties. At the London Exhibition of 1862, John Greaves, founder of Llechwedd quarry, won a medal for his slates, one of which was ten feet long, a foot wide and just $^{1}/_{16}^{th}$ of an inch thick (3048 x 305 x 1.56 mm).

Swithland slates are much more durable than their Welsh counterparts, but they were difficult to produce, requiring sawing down the rock – by hand – into sheets. In contrast, splitting blocks of Welsh slate into smaller slabs or tiles then trimming to shape required only a hammer and chisel. On the other hand, when making roofing tiles out of Swithland slates, a handsaw was be needed to break the large blocks of rock down into decently sized pieces. A consequence of this was that the edges of Swithland slates were often rough due to the awkwardness of the stone's cleavage.

Extraction

Initially, Ffestiniog slate was excavated from open-air quarries, with each quarry divided into multiple terraced 'galleries': separate working levels, as much as 75 metres apart. These excavations were on a vast scale compared to the paltry workings in Charnwood Forest, small concerns with only a dozen or so men working at the face during the industry's peak at the turn of the eighteenth century.

In both North Wales and the Charnwood Forest, gunpowder blasting was an integral part of slate quarrying. Holes would be drilled into the bottom of a ledge, which were then filled with explosive charges so, when detonated, large faces of rock were lifted from underneath. This way huge amounts of stone were able to be dislodged and taken away to be made into tiles and slabs.

Although the method of quarrying until the mid-nineteenth century was exactly the same for the Charnwood Forest and Ffestiniog slate industries, there were clear differences in the extent of quarrying in either industry, demonstrating the contrast in demand for slates between the two. Swithland slate sales remained localised with few orders made beyond the borders of Leicestershire.

Around the mid-to-late nineteenth century, slate quarrying in the Ffestiniog locality had mostly resorted to mining underground. Surface quarrying had exhausted all

easily accessible slate in the locality. The slate deposits slanted at 30^0 to 45^0 angles in anticline so an enormous quantity of overburden needed to be removed for open excavation, work which was not financially viable. Demand for Ffestiniog slate was particularly high at the time, as the industrial towns of England continued to rapidly expand.

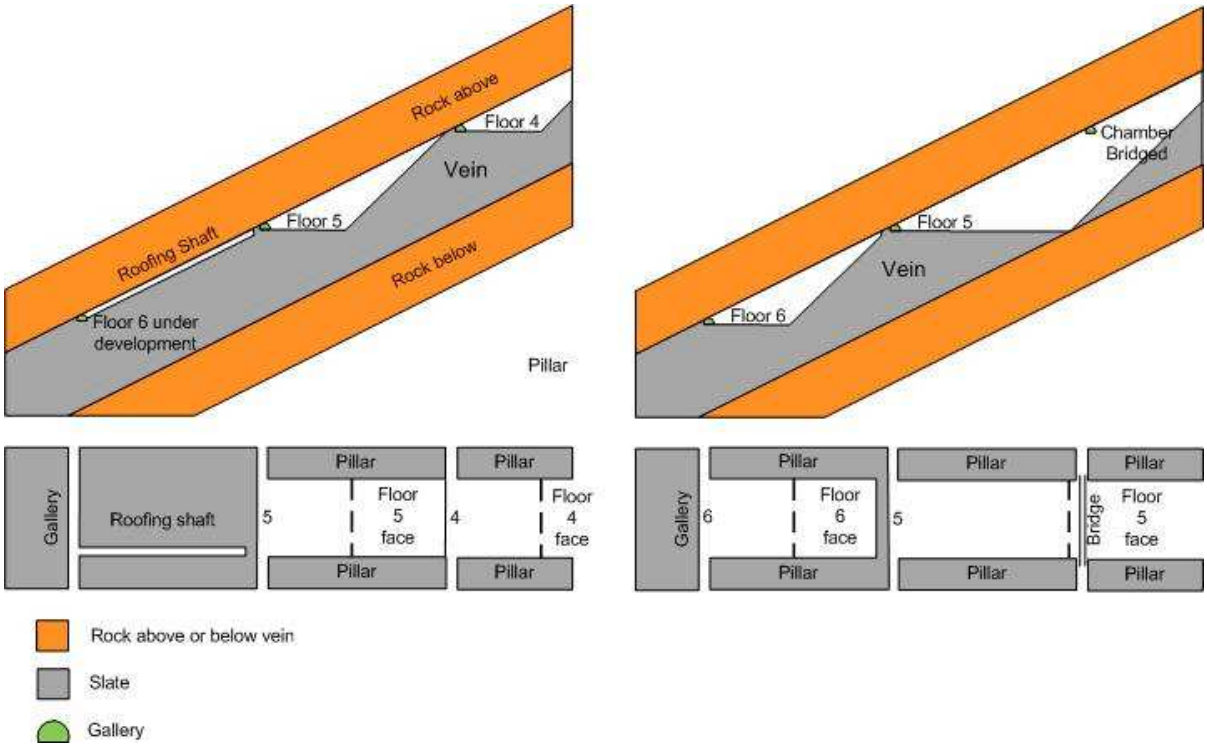
The anticline of the slate deposits meant that usually water could be drained from the mine via an underground drainage channel or sough. However, most slate mines in the Ffestiniog area were excavated to areas below the water table or were deep enough that to a dig a sough to the surface was financially unfeasible. As a result, steam and, where possible, waterpower was required to pump water from the levels as well as haul slate and waste to the surface up long inclines from deep below.

The "Great pit" in Swithland Wood. (John Darch)

Likewise at the Brand quarries near Swithland, in 1851, the Ellis brothers installed a pumping engine, with a decorative tower to house it. This replaced the horse-drawn winding gin that had previously drawn water from the pits. Unlike the horses it supplanted, the engine was able to raise water almost constantly, only requiring coal

to be shovelled and water to be injected every so often. Not only was a pumping engine far more efficient and less labour intensive, but it was also cheaper, as multiple horses had been needed, requiring regular rest and upkeep.

The pumping engine at the Brand allowed the operation of the quarry to be streamlined and required only one man to attend it. A winch was also introduced on a ledge in the cliff face so as to lift slabs up to the top for transportation as the pit continued to deepen. Meanwhile, the reopening of Swithland ‘Great Pit’ with the use of ‘modern methods and machinery’ in 1859 would see the quarry drop to a depth of around 150 feet (46 metres) by 1877. Once excavation of the pit ceased in the late 1880s, the quarry was around 200 feet (61 metres) deep, almost the average depth of just one gallery in a Welsh quarry, evidence that the Swithland slate industry had been far surpassed in slate extraction by its Cambrian competitors.



The method used by the Blaenau Ffestiniog slate industry to mine slate. Upper diagrams show cutaway view of the extraction process. Lower diagrams show top-down view of the workings. (Bob Stevens)

As the quarry companies of Blaenau Ffestiniog were forced to pursue slate underground; the method in which slate was extracted was forced to change.

Gunpowder blasting, whilst safe on the surface, was unsafe underground. A technique similar to the ‘pillar and stall’ used by colliers was soon applied in the slate mines. Yet, the most effective method of systematic slate extraction underground was the ‘chamber and wall’ method where thick veins of slate were removed leaving chambers around 40 feet in width, with walls of slate the same thickness to support the ‘roof’ of overburden. Levels were dug vertically in intervals of 40 to 50 feet, each provided with a tramway that went to the incline up to the mine entrance to bring up slabs and waste to the surface for dressing or disposal.

Through the 1860s into the 1880s, the output of slate from Ffestiniog swelled. At the same time, the Charnwood Forest slate industry was in terminal decline and was still in a primitive state of technological development with limited mechanisation of the industry. Conversely, the cost of mining around Blaenau Ffestiniog had gone up as the levels ever-deepened.

Llechwedd quarry's hydroelectric power station next to the Votty and Bowydd tips. (Eric Jones)

In the 1890s, Welsh slate sales shrank as employment costs rose and competition from ceramic tiles in England cornered the market for roofing materials. Despite the successes of mechanisation and standardisation, slate production was still an extremely inefficient and demanding industry that was unsuited to mass-production.

On average, 90 percent of stone excavated from quarries and mines was unusable and was disposed of, resulting in the growth of huge waste tips on the sides of the Blaenau Ffestiniog valleys. By the turn of the century, quarry companies began experimenting with electric power in order to economise the trade. In 1899, the Yale Power Company began generating electricity at Dol Wên, near Tanygrisiau, for the Votty and Bowydd mines. With increasing technological innovation, the Ffestiniog slate industry consistently made high returns on investment during the nineteenth century.

Uses

*Slate splitters (*circa *1910).*

Ffestiniog slate was mostly quarried for roof tiles although slabs were also produced. Unlike Swithland slates which were simply sawn to a requested size, Ffestiniog slates were split and cut to standardised sizes; each named after female nobility in ascending status, or a size of header. The smallest tiles were ‘Singles’, which were

10 by 5 inches, while the largest slates, ‘Empresses’ (used for significant architectural projects), measured 26 by 16 inches. By standardising tile sizes, production of slates in the Ffestiniog quarries was more streamlined; with tiles manufactured continuously, rather than being made on demand like they were at Swithland and Groby.

Ffestiniog slate was also able to be cleaved into sheets with extraordinary slender thicknesses unlike its Leicestershire equivalents. In 1872 a slate-splitting competition saw a Llechwedd quarryman split a block with a thickness of 2½ inches into 45 layers.

Because of their heavier weight and greater durability, Swithland slates had a greater variety of uses. Although primarily used as roofing tiles and gravestones, Swithland slates were also used as building stone (for window lintels, mantlepieces etc.), sundials, clockfaces, milestones, datestones, paving slabs, cheese presses, fireplaces, salting troughs, sinks, dairy cupboards, milk cisterns and gateposts. This allowed the Swithland slates to sell to a more diverse collection of markets than the Ffestiniog slates. Despite being limited by their usage, Ffestiniog slates had the advantage in being sold in significantly greater amounts and over much further distances than their Leicestershire equivalents.

An elaborate and detailed early-nineteenth century Swithland slate headstone in St Helen's churchyard, Plungar. (David Lea)

The oldest-surviving Swithland slate gravestones bear dates from the 1630s, though it was not until the 1720s when such gravestones begin to appear in churchyards outside the immediate Charnwood Forest area.

Swithland slate gravestones were initially rather crudely inscribed. However, by the end of the eighteenth century, such memorials had become highly elaborate, detailed with incredibly intricate carvings. The calligraphy and figurative carvings required considerable skill, being inscribed by full time masons. While most inscriptions were produced by professional masons, there is evidence to suggest that they were also carved on a part-time basis by schoolmasters.

As for the actual carvings themselves, the figurative cartouches produced during the later period of the Charnwood Forest often feature Faith, *momenti mori* (usually in the form of the 'Grim Reaper', a skull or an hour-glass) and so-called 'Belvoir Angels', named for to their prevalence in the Vale of Belvoir, which appear to be round-faced cherubim with wings. The 'angels' in question, are actually examples of *spiritus*, a stylised depiction of the deceased's soul. South Leicestershire and north-west Northamptonshire also have a local idiosyncratic carving in the form of 'tulip slates', so named due to the floral embellishments on the bottom of the slate or surrounding the initial (the first letter of the epitaph) such which were often depictions of tulips as these were very fashionable in the mid-seventeenth century.

Changes in production

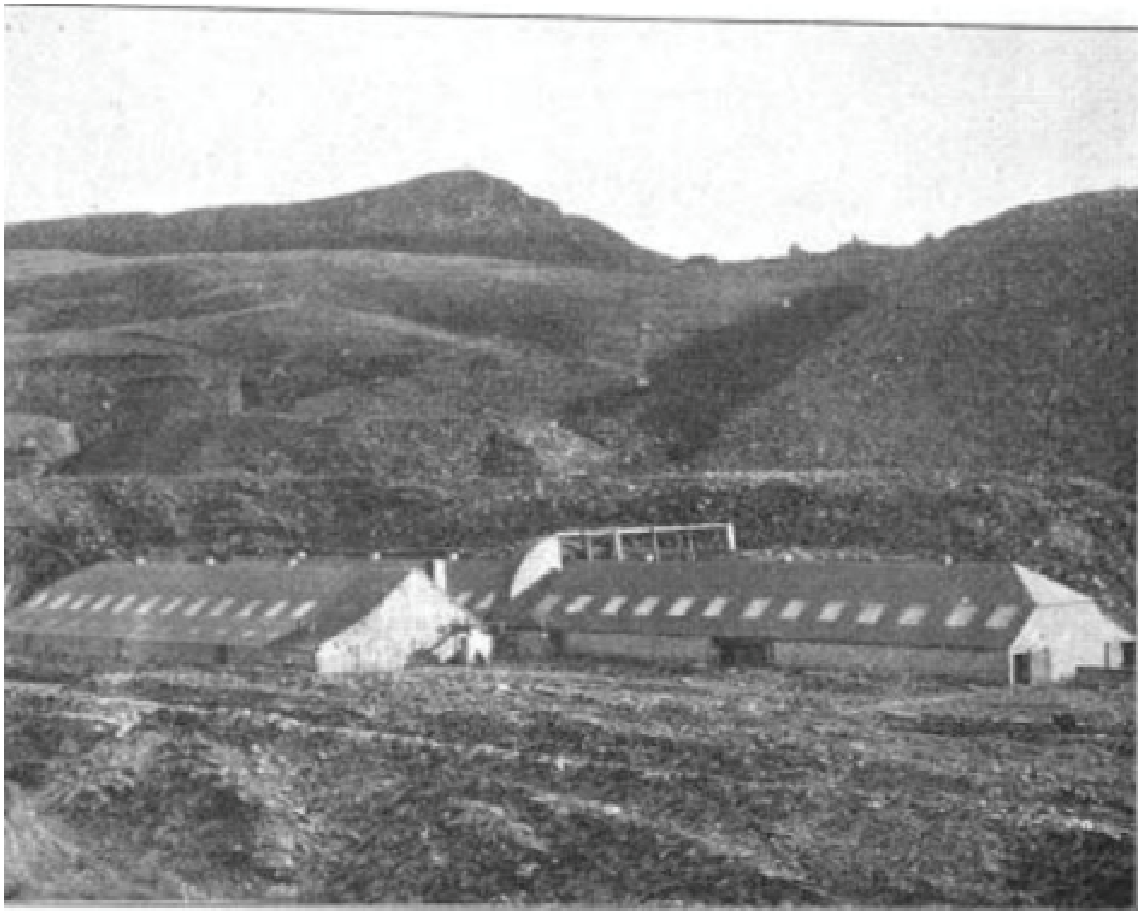
By the early-to mid-nineteenth century, the Charnwood Forest slate trade began to undergo a small level of industrialisation. On the 1813 map of the Brand Quarries by John Iveson, cranes are depicted at Pollards' Quarry.

In 1833 the Groby Slate Works was opened, funded by the Earl of Stamford's Estate. These works were intended to revitalise the Charnwood Forest slate industry, opening up new markets and increasing profits. There was a weighbridge and housing for workers nearby. Within the works was the first steam engine to be installed in the Charnwood Forest slate industry, which powered the circular milling saws.

Although the Groby slate mill was unsuccessful as a financial venture, slate milling significantly increased the number of slates cut daily which stabilised annual profits

as the annual output of goods from the Groby quarries had increased. This had the effect of delaying the decline of the industry for a couple of decades, remaining solvent, but not wealthy. Unfortunately, the milling engine did not last, as in 1858 it suffered from a boiler explosion. A replacement was procured, as the 1877 *History and Gazetteer and Directory of Leicestershire and Rutland* states that the 'Groby Slate Pits slate… yields excellent slabs, into which it is sawn up by. The quote from the *Gazetteer and Directory* shows that by the mid- to late-nineteenth century, the mechanisation of the Groby quarries had led to an increase in the quality and quantity of its products.

*Inside the then newly-built Maenofferen quarry slate mills, 1896. (*Timber and Plywood Magazine*, vol. 24)*



*Maenofferen quarry slate mills, 1896. (*Timber and Plywood Magazine*, vol. 24)*

Around the 1850s in Blaenau Ffestiniog, the local slate industry observed widespread adoption of mechanical saws, although Diffwys quarry had introduced some around 1800. Around the same time, slate dressers were developed. These were designed to cut off the rough edges from slates, squaring them into standard sizes as mentioned earlier. Both saws and dressers were housed in 'mills'; initially smaller sawing sheds made from stone blocks. Later mill buildings, on the other hand, where much larger, around 300 feet in length and 70 feet breadth, and made from waste ends of slate slabs. The Ffestiniog slate industry owners were clearly willing to invest to continue the rapid growth.

As with the Groby Slate Works, the mechanisation of slate sawing slashed the time taken to cut tiles and slabs and led to a surge in sales for the slate quarries of Blaenau Ffestiniog. Unlike the stagnation of the industry in Leicestershire, the Ffestiniog quarries experienced a very profitable period as demand continued to rise from the quarries' expanding customer base.

Improvements in transport

Roads

From the quarries around the Blaenau, carts and sledges would take slates down the main road (what is now the A496) through the Vale of Ffestiniog to the wharf at Maentwrog, on the Afon Dwyryd. As the slate quarries in Ffestiniog grew, the network of narrow bridle paths from the quarries down to the Blaenau Ffestiniog-Maentwrog Road was found to be increasingly inadequate for the quantity of slate that was intended to be conveyed. In order to improve the rate in which slate was taken to the Dwyryd, several quarries invested in private road-building schemes, the first of which being the Diffwys partners' road in 1801, constructing a highway from the existing Cong y Wal road to Diffwys Quarry. Further ventures followed and by the 1830s a dense road network was formed in the Blaenau Ffestiniog, forming the basis of the main roads for the new town.

The situation in the Charnwood Forest was somewhat similar. Originally horses and traps took slates across the county from the quarries in Swithland and Groby. Groby quarries, in contrast to those in Swithland, benefited from being situated close to the Leicester–Ashby turnpike and so able to access a route with a decent, maintained road surface.

In contrast to the Ffestiniog slate industry, the Swithland quarries were disadvantaged by steep and often neglected roads along with a minimum distance of two miles from the nearest Loughborough to Leicester turnpike. Despite better road surfaces than winding country lanes, turnpikes were only slightly faster for transporting slate. The transportation of Swithland slates by road was not as efficient as in North Wales.

However we should not under-estimate the extent to which slate was transported by road. Charnwood Forest slates were used as a return load by carriers to increase the profitability of their journeys. David Ramsey has suggested that the slate gravestones in north Northamptonshire were return loads by carriers bringing oolitic limestone into Leicestershire (as there is no source of freestone in Leicestershire). The slate gravestones in south-west Lincolnshire are located close to a salt way from

Kings Lynn (a known salt-making area) heading through Grantham in a direct line to Barrow on Soar, which is close to the Charnwood Forest quarries.

Waterways

The Ffestiniog slate quarries had a clear advantage over those of the Charnwood Forest as they had almost-direct access to the sea. The Charnwood Forest slate quarries, in stark contrast, were between 50 to 60 miles (as the crow flies) from the nearest coastline. Slates in carts from Ffestiniog were loaded onto small boats at a wharf at Maentwrog on the Afon Dwyrd (the distance from Blaenau Ffestiniog to Maentwrog is just under four miles as the crow flies). From Maentwrog barges then took the slates downstream to quays close to what is now Porthmeiron. There slate was then transferred to larger seaworthy vessels which shipped slates to ports around the coast of Britain and also worldwide. From the coastal ports slates were often taken inland by canal.

The Charnwood Forest slate quarries, on the other hand, only had access to inland waterways. The only natural watercourse close to the Charnwood Forest quarries was the River Soar, although this had become impassable to boats. It was only with the opening of the Soar Navigation and the Charnwood Forest Canal in 1794, that Swithland Slates be sold more easily over longer distances.

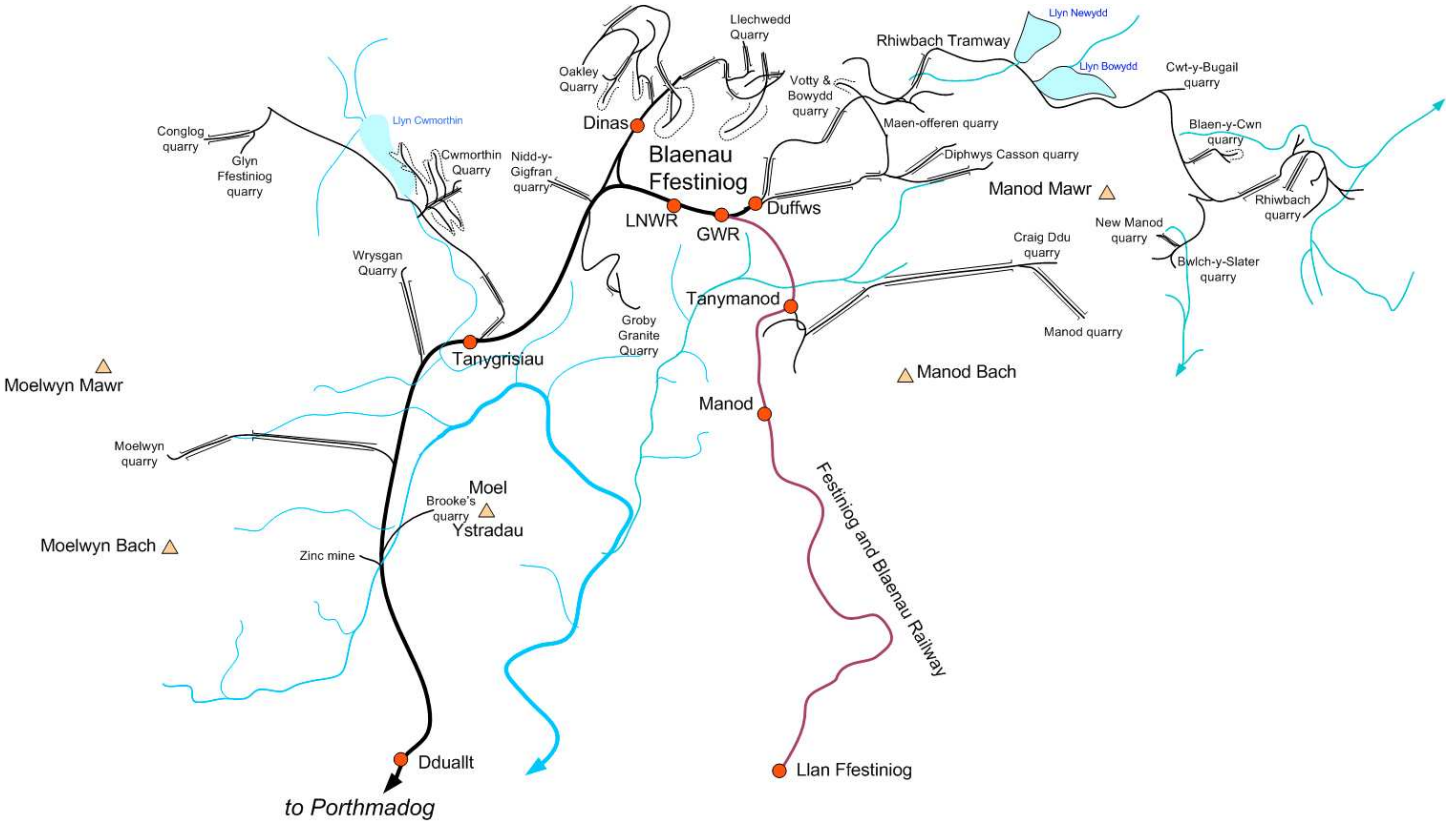
At this time, slate production in Leicestershire was undergoing its renaissance, with the quarries benefiting from improved production methods. The quarries increased their sales thanks to the new efficiencies which enabled prices to be reduced.

Overall, the introduction of the canal to Leicestershire seems to have been particularly disadvantageous to the Charnwood Forest slate industry. For the first time, Welsh slates penetrated the market of the midland counties. Welsh slates were lighter (because they were thinner), cheaper, and were sold in larger quantities than Swithland slates. Although it took a few decades for Welsh slates to become well-established in the area, the slate industry of the Charnwood Forest began to decline as a result of the increased competition.

William A Madocks, Esq. (National Library of Wales)

Between 1808 and 1813, a large land reclamation project took place around ten miles from Blaenau Ffestiniog. Under the direction of William Madocks MP, a stone embankment, known as ‘The Cob’ was built across the estuary of the Afon Glaslyn. Madocks had sluiced the river at its mouth, unexpectedly causing it to scour a hollow in the bed of the inlet, forming a small, suitably sheltered harbour. Taking advantage of this stroke of fortune, Madocks constructed several quays along the edge of the newfound harbour in 1824. Quarry companies soon found that the new harbour made for a better transhipment point than the quays at the mouth of the Dwyryd, as larger ships could moor in the new harbour. Madocks’ project laid the groundwork for a new era for the slate industry of Blaenau Ffestiniog which would unknowingly contribute to the downfall of the Charnwood Forest quarries.

Railways



A map of the quarry feeder lines to the Ffestiniog Railway as of 1870. The stations marked "LNWR" and "GWR" would not open until 1879 and 1883, respectively. (Dan Crow)

When it came to railway provisions, the Ffestiniog slate industry was blessed by its connections to four railways: the Ffestiniog Railway, the Cambrian Railways, London and North Western Railway and the Great Western Railway (who operated the Bala and Ffestiniog Railway, who in turn had acquired the Ffestiniog and Blaenau Railway in 1883). Meanwhile, the Swithland and Groby quarries had no railway connections whatsoever; with the closest station to any slate quarry in the area being at least one mile away.

Leicestershire's first railway, the Leicester and Swannington Railway (L&SR) was completed in 1832, after two years construction which was overseen by the engineer George Stephenson. The Railway connected the Leicestershire coalfield with the Leicester Navigation. Most probably Groby slates were transported on this line as

the quarry was in close proximity to Ratby Railway Station and the Groby Granite Railway.

While the L&SR was hugely important to the growth of Leicestershire's coal trade, it had limited effect on the scale of the county's slate industry. Furthermore, the L&SR acted as a feeder to the Leicester Navigation, rather than any fully-fledged main line railway This meant slates from Swithland and Groby continued to be confined to sales within Leicestershire and the neighbouring counties like they had prior to the L&SR's establishment.

Gravity train on the Ffestiniog Railway during the "Steam 150" event, 5th May 2013. (Peter Trimming)

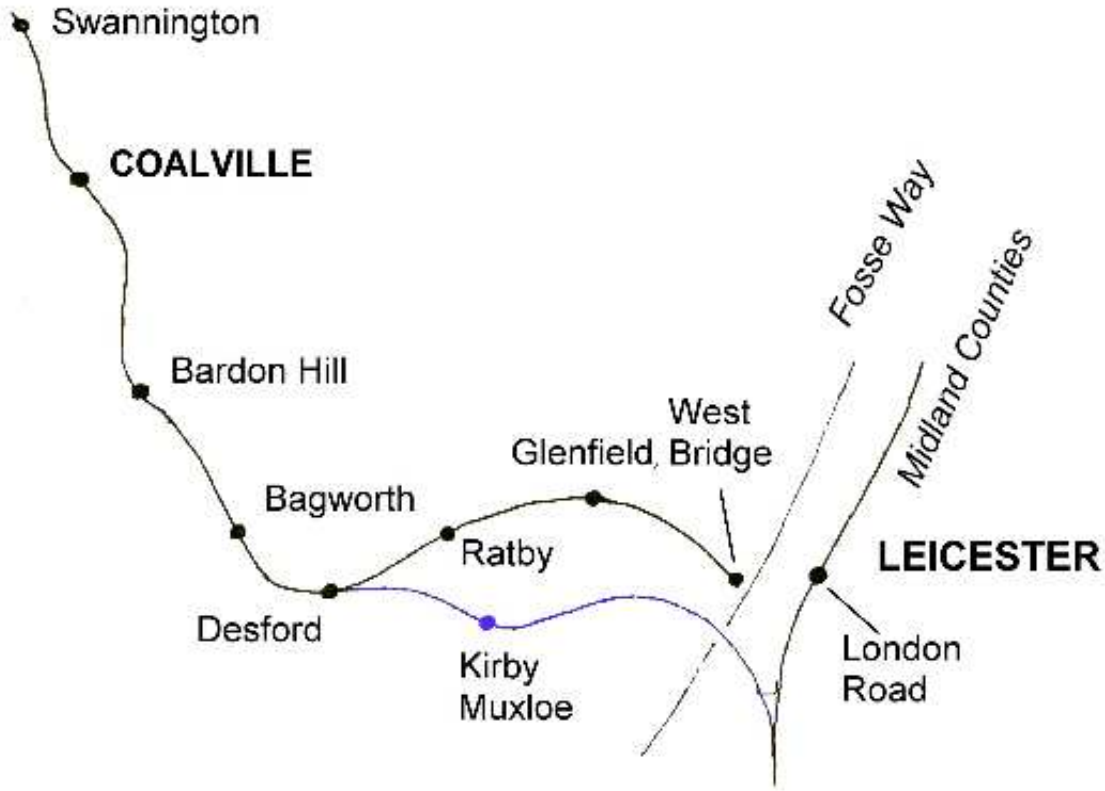
In 1836, the Ffestiniog Railway was opened. With high demand for Ffestiniog slate from Dublin, the speed in which the finished product was transported from the quarries down to the port was found to be too slow. In response, several schemes were proposed to construct a railway between the quarries and the quays at the new harbour on the Afon Glaslyn (what would later become Porthmadog).

The Ffestiniog Railway (FR) was initially intended only for taking finished slate from the quarries around Blaenau down the mountainside to the coast at Porthmadog. The difficult terrain the line had to undertake was the cause for the adoption of a

narrow gauge of 1 foot 11½ inches (597mm), similar to lines previously constructed from the Penrhyn and Dinorwig quarries to ports at the Menai Strait. Such a gauge allowed the railway to be constructed more cheaply, requiring less heavy engineering as the line followed the lay of the land, with trains able to undertake sharper curves thanks to their smaller gauge. Furthermore, the railway was operated by gravity, with horses only needed to draw the empty wagons back uphill to Blaenau. However, a nonstop gravity run from Blaenau to Porthmadog would not be able to take place until the 24th of May 1842, when the construction of Moelwyn Tunnel would finally be completed. Until then, trains had to ascend and descend two inclined planes, creating a bottleneck that lengthened the journey times from Blaenau to Porthmadog and back.

The railway was a success and by removing the 'middleman' of having to transfer the slate between three forms of transport (from cart to barge and then ship) even larger quantities of slate were able to be transported from the quarries to the sea at faster speeds than ever before. The Ffestiniog quarry companies were slow to adopt the new method of transport, however. Initially, only Holland's Quarry (owned by one of the railway's original promoters) sent slates down the railway to Porthmadog, while the other quarry companies obstinately continued to use carts between Blaenau and Maentwrog and barges up and down the Afon Dwyryd until the 1860s. The Blaenau Ffestiniog area then saw a huge growth in the number of internal quarry railways, tramways and inclines connecting to the FR as Blaenau Ffestiniog's quarry companies looked to take full advantage of the swift new method of transport.

In 1840, Leicestershire's first main-line railway was completed by the Midland Counties Railway (MCR), running between Trent Junction and Rugby, connecting with the London and Birmingham Railway. Because of the Charnwood Forest slate quarries' isolation from the railway they never fully reaped the benefits of the MCR's swift, long-distance services.



A map of the former Leicester and Swannington Railway following the opening of the connecting line with the Midland Railway's main line (Creative Commons)

In 1845, the Leicester and Swannington Railway was bought out by the newly formed Midland Railway (MR). Four years later, a connection with the company's Trent–Rugby main line was provided between Desford and Knighton, turning the Desford to Leicester West Bridge section of the former L&SR into a branch line. A consequence of this arrangement meant that the increasing volumes of Welsh slates brought by train had intruded into its immediate vicinity. The already declining slate industry of Leicestershire rapidly accelerated as a result of the influx of material, which was already poaching sales through its access to Leicestershire, Nottinghamshire, and Derbyshire markets.

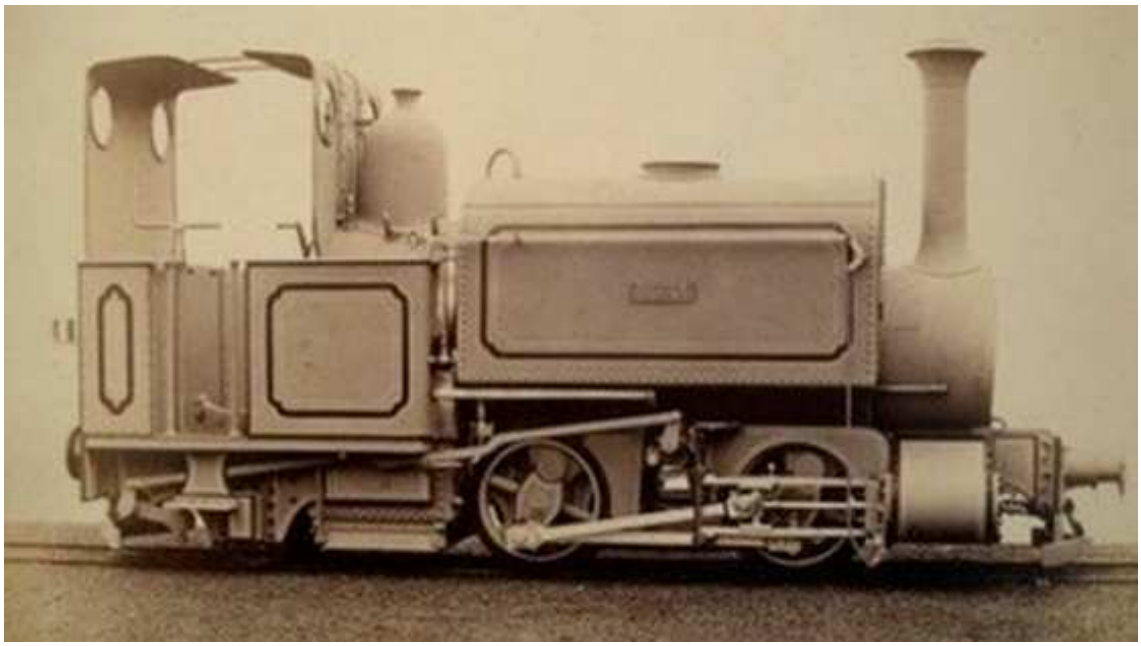
The Ffestiniog Railway's first double Fairlie locomotive "Little Wonder" with a long mixed train - consisting of loaded goods wagons, passenger carriages, and empty slate wagons in the distance - rounds Cei Mawr. (Ffestiniog Railway Archive)

Over the first thirty years of its existence, the FR handled a steady increase in the output from its growing patronage of the Ffestiniog quarry companies and by the 1850s, the line was reaching its carrying capacity as the horse-drawn trains back to Blaenau slowed the line. Addressing the issue, the Festiniog Railway Company requested engine builders to assemble a locomotive to displace the railway's inefficient horse-drawn operation. In 1863, the railway received its first locomotives, two four wheeled saddle tank engines built by George England and Company named *Mountaineer* and *The Princess.*

With the introduction of steam motive power, slates were able to be transported down the line for shipment at faster speeds and far greater quantities than ever before. The quarries' output once again soared to almost 90,000 tonnes of slate produced in 1865, and with the FR once again reaching near its maximum operational capability. With the only railway overburdened by the enormous volume of slates it conveyed, several railway schemes were proposed to provide new,

alternative connections to the slate quarries at Blaenau Ffestiniog. The FR, meanwhile, proposed a doubling of its line in 1869, allowing both full and empty trains to run simultaneously; this was never implemented.

In 1867, Cambrian Railways' Cambrian Coast railway was completed, with a slate wharf constructed at Minfford station. This caused the FR's revenues to be partly divided, as a fraction of the slates were transferred to Cambrian Railways from the FR. Whilst causing the profits of the Ffestiniog Railway to decrease slightly, the earnings of the Ffestiniog quarry companies increased, as their products were provided with indirect access to the interconnected standard gauge railway network that stretched across the country. As slate continued to be taken into the area by the MR, the quantity of Welsh slates sold in the East Midlands is likely to have increased slightly (as it did nationally), worsening the plight of the Charnwood Forest slate industry.



Works photograph of Manning Wardle 0-4-0ST No.1, built for the Ffestiniog and Blaenau Railway. (Manning Wardle and Company)

The second railway built to Blaenau Ffestiniog was the Ffestiniog and Blaenau Railway (F&BR), completed in 1868. Intended as a stopgap to alleviate the pressure upon the FR to transport high volumes of slate for shipment, as a result of its connections to the Manod quarries the line instead did the opposite and exacerbated

the quantity of slate conveyed on the FR. Like the FR, the F&BR was built to the gauge of 1 foot 11 and ½ inches, operated with steam locomotives. Unlike the FR, the F&BR had a public passenger service and was effectively a commuter line, providing quarrymen in the dormitory town of Llan Ffestiniog with a travel connection to their workplace at the quarries surrounding Blaenau and back.

The F&BR would be short-lived however, with the line being bought out by the Bala and Ffestiniog Railway in 1883. The newly-bought F&BR was soon converted to standard gauge. The Bala and Ffestiniog Railway did not have its own rolling stock but was instead operated by the Great Western Railway, providing a new link to the standard gauge railway network, and allowing the slates to be sent and sold across much of the country more quickly, further increasing the degree to which Welsh slate was sent and sold in the East Midlands.

The former Midland Grand Hotel; exterior to St Pancras Railway Station. To the left is the brick exterior supporting William Barlow's train shed. (Creative Commons)

In 1876, the Midland Grand Hotel was completed, along with the famous façade of the Midland Railway's London Terminus. Designed by Sir Gilbert Scott, the building was intended to be a showpiece displaying the industry of the East Midlands, with one side roofed with slates from Swithland and the other side with those from Groby. Sir Gilbert Scott was reported to favour the colour of Charnwood Forest slates and also used the material for other projects. In addition, the Director of the Midland Railway at that period was Edward Shipley Ellis. Ellis was owner of the Swithland and Groby quarries at that time, and the slates were sourced through him. The slating of the Midland Grand Hotel was very likely the single largest sale made by the Charnwood Forest slate industry in its history.

However, the costs for the Leicestershire slate were so high that for the construction of the exterior buildings supporting William Barlow's famously colossal train shed had to be slated with Welsh slates to reduce expenses. Reportedly, the Swithland slates that were provided to roof the hotel were not taken down to London by train but by canal barge.

One of the two air vents of Ffestiniog tunnel; constructed in 1879 by the London and North Western Railway for the Blaenau Ffestiniog extension of the Conwy Valley Railway. (Rudi Winter)

The third railway to reach Blaenau Ffestiniog was the London and North Western Railway (LNWR) in 1879, which had extended their Conwy Valley Railway from Llanwrst up the Lleder Valley to Blaenau Ffestiniog via a two-mile tunnel under mountain pass known locally as the 'Crimea'. The LNWR had originally intended to build a narrow-gauge railway to Blaenau, but after receiving parliamentary authorisation, the decision was made that the railway should be a through-line, avoiding an arrangement that would require transhipment at Llanwrst from standard gauge to narrow and vice-versa. The two standard gauge railways were ultimately responsible for the gradual decline of the Ffestiniog Railway and the shipping of slate from Porthmadog.

Revenue

Profits

The gradual decline of the Charnwood Forest Slate Industry is made clear in the sales figures in the Bradgate Estate rental books of the Earl of Stamford. In terms of sales, the Groby quarries were much more successful than the Swithland quarries, making a profit around £100 annually between 1837 and 1847 (between £10,000 and £11,000 at 2020 values), the highest of which was in 1838, with a return of £236-11-6d, although this is nowhere near what was made when the industry peaked thirty years earlier. The higher revenue generated by the Groby quarries is likely as a result of the transportation of slate by the goods trains of the nearby Leicester and Swannington Railway, which had opened in 1832, and the increased speed of production by the steam-powered saws at the newly built Groby Slate Works a year later.

The profits made by the Groby quarries were in reality paltry, and pale in comparison to what the Ffestiniog slate industry made in 1835, with around £13,500 (~£1.7m as of 2020).

The first recorded figures for the Swithland quarries are for 1840, which show a trivial revenue of £39-17-5d (~£4,000 as of 2020). By 1847, their sales had dropped to just £11-6-5d (~£1,000 as of 2020).

Between 1852 and 1853, the Swithland and Groby quarries made £254-12-4d and £325-16-6d. respectively; collectively the quarries under the ownership of the Ellis brothers earned £580-8-10d (~£75,000 as of 2020). While the annual profits for each quarry had improved to around £100, they were still completely inconsequential compared to the enormous profit of £12,000 (~£1.3m as of 2020) made by the Ffestiniog Quarries two years later.

Employment

The Charnwood Forest slate industry was never a significant employer during the last century of operation. Census returns between 1841 and 1871 give an average of seven quarrymen living in Swithland. In 1851, the census for the nearby village of Woodhouse Eaves also gave a single-digit workforce, listing nine men working as quarrymen.

In Groby, a more significant workforce of around thirty men were employed at the Slate Works there until the boiler explosion in 1858, when production halted until the engine was replaced.

Around Blaenau Ffestiniog in 1873, the Welsh Slate Company employed 700 men, Holland's Quarry, around 500 men, and Llechwedd Quarry about 300.

By 1897, Swithland and Groby were listed as having just one quarryman each. The last quarryman of Swithland was Charles Wesley, who finished working in May of the same year.

Sales

North Wales was once known as the 'roofers of the world' and for good reason, as slates were sold across vast distances, having a huge market both at home and abroad. It was the extraordinary demand from the growing cities for high-quality slates that prompted the creation of the Ffestiniog Railway; in order to improve the speed in which finished products were transported from the quarries at Beddgelert to the quays at Porthmadog.

Moreover, interests in Dublin had financed the line's construction, with the Ffestiniog Railway's offices initially located on Dame Street. In 1831, export duties on slate were lifted, allowing Ffestiniog slate to be sold unrestricted internationally. In 1835, the total output of the Ffestiniog slate industry was 18,000 tons. By 1855 this had

risen to 48,000 tonnes. The introduction of the first steam locomotives on the Ffestiniog Railway in 1863 saw the production of the Ffestiniog slate industry soar dramatically to 89,000 tonnes. And by the following decade, over 116,000 tons (117,800 metric tonnes) were shipped from Porthmadog, most of which had been produced in Blaenau Ffestiniog.

Ffestiniog slates were notable for becoming the choice roofing material in Germany from the 1860s onwards, following a fire that damaged much of Hamburg in 1842, which led to the city being rebuilt with slate roofs.

As sales continued to rise into the 1880s for the Ffestiniog slate industry, the profits made by the Charnwood Forest slate trade maintained a continual decline as the sales remained confined within Leicestershire, Rutland and neighbouring counties. In the Bradgate Estate Rental books, the 1852–53 slate sales records give the addresses to which the quarry's products were distributed that year. The list showed that deliveries were made exclusively within Leicestershire and Rutland, except for Calverton in Nottinghamshire; to which a cheese press and a small cattle trough were sent.

Conclusion

Several factors led to the Welsh slate industry becoming muchmore successful than the Charnwood Forest quarries.

Firstly, the quantity of the slate products manufactured by the Ffestiniog Slate industry were far greater and of much higher quality than those of the Swithland slate industry.

Secondly, the Ffestiniog slate industry was initially more successful than the Charnwood Forest slate industry as a result of its location being nearby to the sea, providing access both international and home markets, whereas the Charnwood Forest slate industry was landlocked and several miles from a navigable waterway.

This initial advantage of seaborne transport was augmented by a far more developed road transport system in north Wales compared to the Charnwood Forest region. When canals and national railways were sufficiently developed to aid the

Leicestershire quarries, such improvement was greatly offset by the ease of transporting Welsh slates to the midlands.

Overall, the combination of factors allowed the Ffestiniog slate industry to develop into a much larger industry than that of the Charnwood Forest. Slate from North Wales was exported worldwide, whereas the Charnwood Forest quarries made sales only within an increasingly small distance.

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