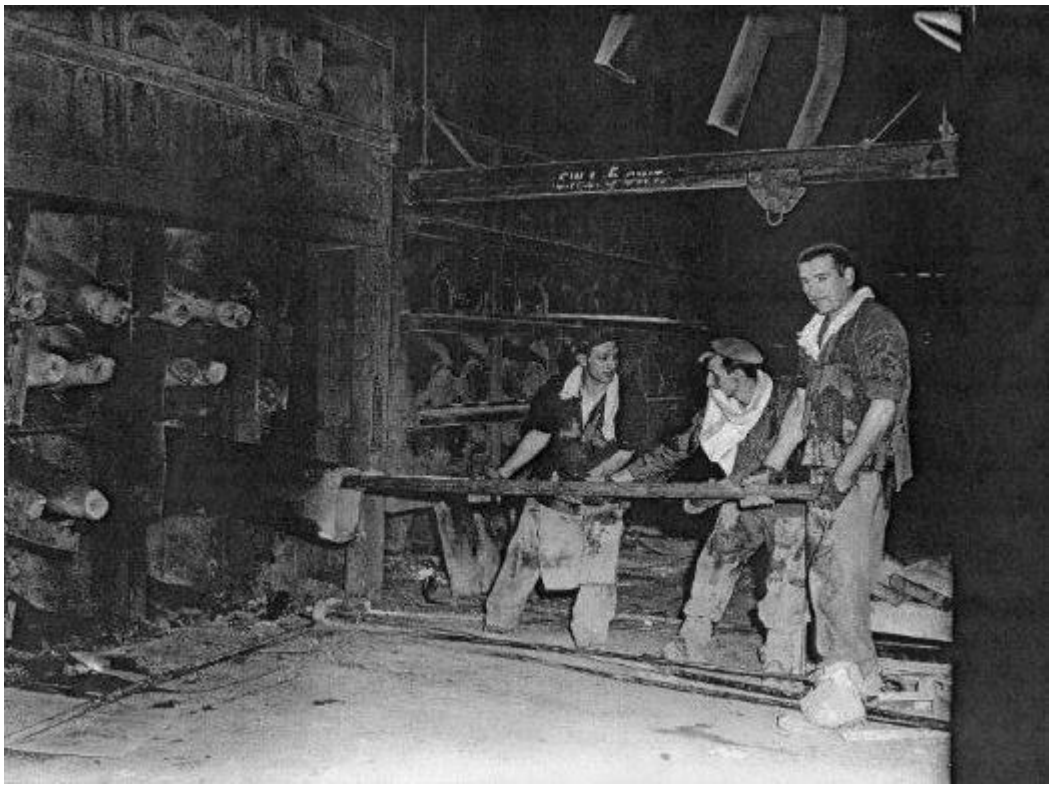
MA Local History south west Wales

Dissertation

# The speltermen of Swansea



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*Cover picture Speltermen at work early c.20th (courtesy of National Waterfront Museum)*

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## In memory of

Heinrick Wilhelm Schramm,  spelterman

Born 1833 in Dortmund, Prussia

Died 1908 in Swansea, Wales

## Acknowledgements

First of all I would like to thank my tutor Conway Davies for his enthusiasm, advice and long-suffering patience.

I am indebted to Robert Protheroe Jones, Curator at the National Waterfront Museum in Swansea, for his interest in this project and motivating me to navigate these unchartered waters

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The archivists at the Richard Burton Archives at Swansea University, West Glamorgan Archives and the Cornwall County Record Office and the librarians at the National Library of Wales have all been patient and helpful in assisting me to locate primary materials.

And finally to my family for their patience, encouragement and endless supply of coffee.

# The Speltermen of Swansea

## Summary

This is a study of the spelter (also known as zinc) industry in the Swansea area between 1860 and 1930. A large histiography of the contribution of copper, and later tin and steel, to the Swansea area exists but spelter is virtually ignored despite Swansea being the centre for British production at that time. With the exception of research into the non-ferrous industries by R. O. Roberts of Swansea University and a technical history of Zinc Smelting in Britain by E. J. Cocks and B. Walters information is scarce. However, examination of contemporaneous journals and newspapers reveal a story of great industrial rivalries, larger than life characters, a volatile market leaving behind a devastating trail of bankruptcies and shattered dreams, betrayal by successive governments and polluted landscapes complete with dying horses. Furthermore at the turn of the twentieth century the "Speltermen of Swansea" became a national cause célèbre with the unenviable reputation of working longer hours in more arduous circumstances with a resulting higher mortality rate than any other industrial occupation; questions were asked in the House of Commons with MP Charles Duncan appealing for an 'end to the sacrifice of health and life resulting from the unreasonably long hours of employment in a poisonous atmosphere by the speltermen in the Swansea district'.[1] Editorial leaders were written, new legislation proposed limiting the working week and yet virtually nothing is known of these men. This dissertation seeks to explore the history of the industry and examine the lives of the people whose fortunes were bound up with its fluctuating fortunes; the owners, the speltermen, and the communities that lived in the shadows of the works.

[1] Hansard. Commons Sitting of Monday, 9th December 1912. George V, year 3, 5th series Vol 45.

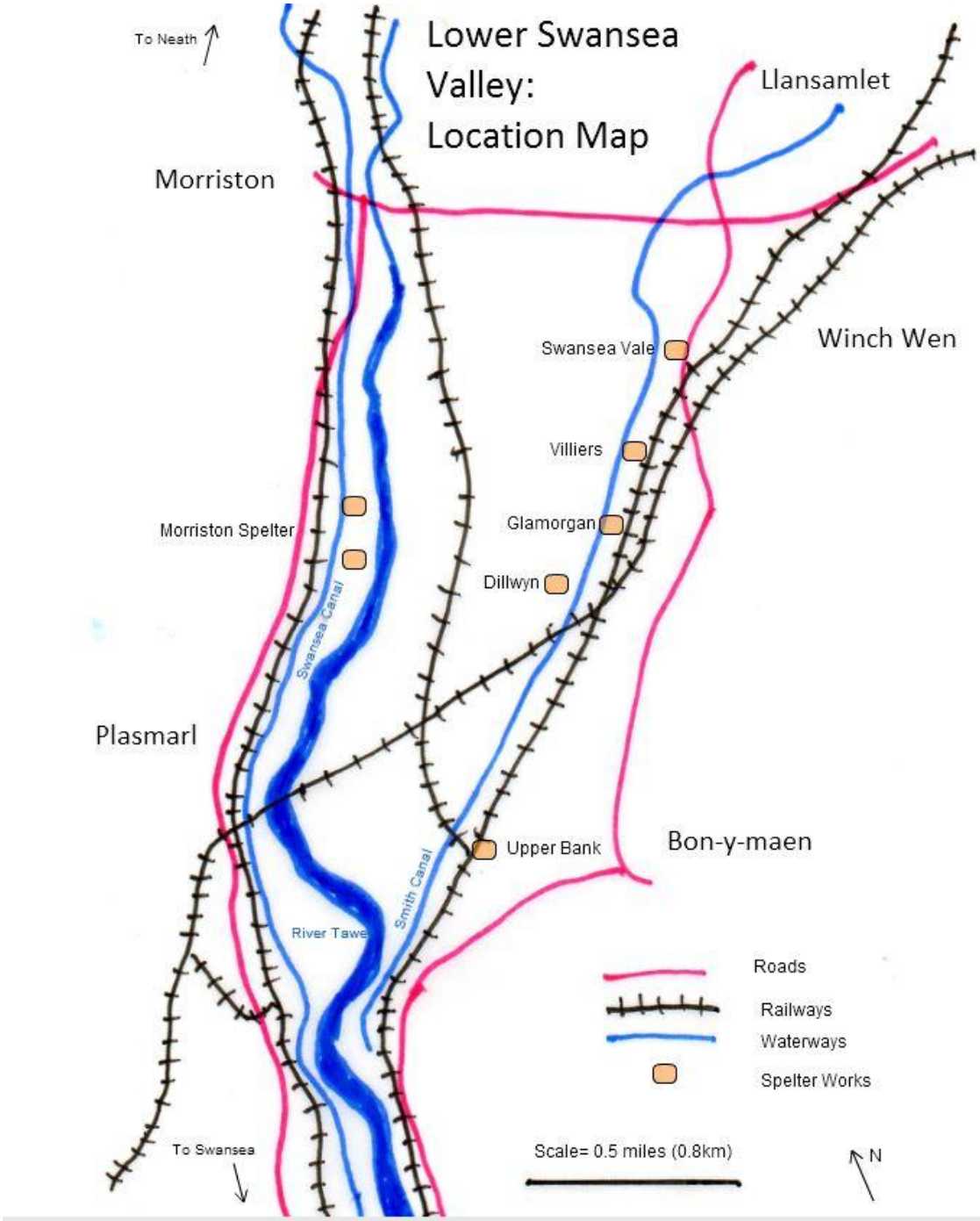


*Fig.1: Location of Swansea's spelter works*

# Introduction

Spelter is the name given to zinc prior to the 1930s. A blue-ish white metallic element (Zn) it was, until the mid eighteenth century, thought to be a debased form of some other metal. Its origins lie in the Far East and the metal was brought to Europe by Portuguese merchants where it was amalgamated with copper to create brass. Zinc doesn't have the glamour of gold and silver, nor the familiarity of copper and tin, however its anticorrosive properties made it an essential companion to steel and metal. Early short-lived experiments in zinc smelting had taken place in the Swansea area from the mid eighteenth century. Dr John Lane and his works manager John Delham, known as the 'best chemist in England,' are reputed to have experimented with zinc smelting at their copper works at Llangyfelach between 1717 and 1726.[2] However, zinc industry historians Cocks and Walters point out 'there is no evidence whatsoever to substantiate this claim'. [3]

What is widely agreed among historians is that the UK's first zinc smelter was established in Bristol by William Champion in 1743. A member of an inventive family whose interests included pottery, brass and copper, William was granted patent No. 564 in 1738 which indicates he had identified zinc blende (also known as 'black jack') as a potential source of zinc. In his patent application he claimed that:

> 'he had with great labour and expense found a method or invention for the reducing of sulphurous blendes minerals and mineral into a body of metallick sulphur known by the name or names of spelter . . '[4]

Meanwhile, in 1754, Chauncey Townsend, a rich London alderman, took out a lease to build a lead and zinc smelter at Upper Bank on the east bank of the River Tawe in Swansea but both enterprises were hit by cheap imports from the Far East so that by 1775 the Swansea experiment had closed and there was only limited production in Bristol. In the early nineteenth century a few small zinc smelters

[2] Dr Lawrence Holt, *History of the Zinc Industry*. (Lower Swansea Valley Factsheet 3) Swansea Museums Service
[3] E.J. Cocks and B. Walters., *A history of the Zinc Smelting Industry in Britain*, (London: Harrap: 1968) p7
[4] E.J. Cocks and B. Walters., A history of the Zinc Smelting Industry p7

were commissioned in the UK including small plants at Loughor and one near Maesteg but there was no impetus for development of the industry as the only use for the metal was in brass production. The industry didn't come of age until the mid-century when technological innovation produced new products that drove a huge increase in demand.

In 1805 the methodology for rolling zinc into sheets was discovered and after years of experimentation Birmingham's George Muntz obtained a patent for a new improved process in 1832 which enabled the production of an alloy called Muntz Metal or Yellow Metal which was resistant to the corrosive nature of seawater. This new product soon superseded copper for sheathing the hulls of wooden ships and was therefore a potent threat to Swansea's copper businesses encouraging its owners to diversify into producing zinc and yellow metal.

Swansea was well positioned to prosper from the fast developing spelter industry. Zinc smelting required a high proportion of coal, five tons for each ton of zinc ore smelted, and Swansea was situated on a coalfield which produced suitable smelting coals - gas, coking and carbon which burned more uniformly than the eastern coalfield's bituminous coal.[5] Moreover, the coal measures cropped down to the coast where there was a large natural harbour and the navigable river Tawe which allowed easy access for the import of ores and export of finished product. The coalfields were linked to the works by tram, canal and eventually rail. The proximity of the works to canals is telling; four of the major zinc works were situated along the old Smith Canal linking White Rock and Llansamlet which provided a supply of water to the works as well as transport [see map]. When the Cambrian Iron and Spelter's Llansamlet works were offered for sale in 1840 the advertisement noted 'canal navigation free of tolls with Wharfage at Foxhole to communicate with the river'.[6]

Other factors in Swansea's favour was that it produced the specialist clay required to make firebricks, Upper Banks works was initially owned by a Flintshire

[5] R.O. Roberts. *The Smelting of Non-ferrous Metals since 1750*. in A.H. John & G. Williams (eds) *Glamorgan County History Vol 5: Industrial Glamorgan from 1700 to 1970* (Cardiff) 1980. P49
[6] Cambrian 20 August 1840.

man who also produced firebricks at the works.[7] The town was also the centre of Britain's metallurgical expertise; and finally, from the mid nineteenth century there was also the availability of redundant copper smelters as that industry went into decline, 'between 1860 and World War One, fourteen works in south west Wales ceased to smelt copper ore and no less than eleven of these started to smelt zinc'.[8] The result was the proliferation of zinc smelters in the Swansea Valley.

The patenting in 1837 of the galvanising process, by which a coating of zinc protected iron (and subsequently steel) sheets from corrosion, created a huge export market in emerging economies where they were used for roofing, industrial buildings and temporary work camps and were in particular demand where there was a shortage of timber. According to Dr Lawrence Holt galvanised steel sheets were the main factor which accounted for the rise in world production of zinc from 5,000 tons in 1830 to 350,000 tons in 1890.[9] These sheets were used extensively during World War One to line trenches.

Swansea swiftly became established as the main zinc production centre in the UK and by its peak in 1910 there were six zinc smelting works accounting for some 75 per cent of the UK's output.[10] The major copper houses were first into action; they had made their fortunes in the copper trade and were now the investing in spelter in order to diversify and utilise excess capacity. From the middle decades of the nineteenth century there was a levelling off of the copper industry and the development of other non-ferrous industries such as zinc was vital to the firms. R. O. Roberts makes particular mention of its counterbalance to Swansea's copper dependency; bringing diversification to Swansea's economy and offering some resistance to trade deficiencies.[11]

The copper magnates were followed by other entrepreneurs, probably convinced that spelter would be the next copper and they could use this to propel

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[7] Trevor Williams. *The Economic Development of Swansea and of Swansea District to 1921* in *Social and Economic Survey of Swansea and District, Pamphlet No. 4.*. (Cardiff: UWP) 1940. p88

[8] Stephen Hughes, *Copperopolis: Landscapes of the Early Industrial Period in Swansea* (Royal Commission on the Ancient & Historical Monuments of Wales: 2008) p63

[9] Dr Lawrence Holt. History of the Zinc Industry.

[10] R.O. Roberts. *The Smelting of Non-ferrous Metals since 1750* p48

[11] R.O. Roberts. *The Smelting of Non-ferrous Metals since 1750* p48

themselves and their families into the higher echelons of society. These were often consortia of local businessmen, grossly undercapitalised and vulnerable to market fluctuations. As Roberts observes,

> 'It may be noted that the companies which were mainly owned locally were also relatively small, with paid-up capital ranging from £3,800 of Villiers Spelter Co. Ltd in 1874 to the £60,000 of Dillwyn & Co. Ltd after 1902.' [12]

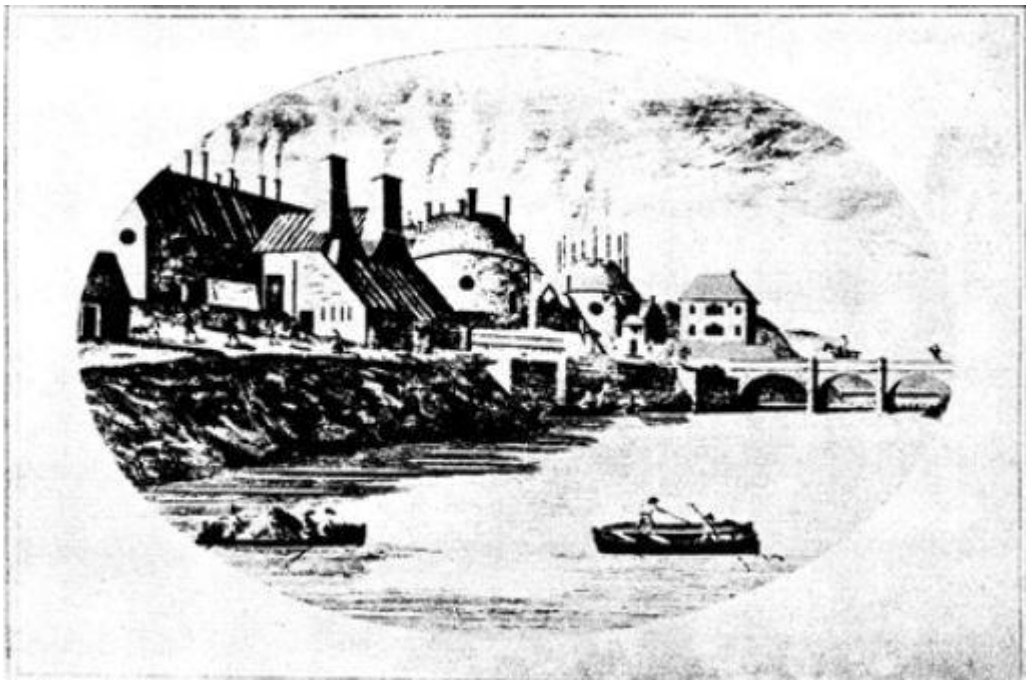

*Plate 2. Vivian & Sons Old Forest Works at Swansea, later converted into Morriston Spelter Works . Reproduced from Col. Grant Francis, 'The Smelting of Copper in the Swansea District (1881)*

As the market grew new spelter works opened; Crown Works (1866) at Port Tennant, Villiers (1873), and Swansea Vale Spelter Co (1876) at Llansamlet. [13] In 1902 works at Neath were taken on by what was to become British Silver Zinc Co. who produced zinc there until 1906; it lay dormant throughout the boom years of zinc and was last operated by the Neath Spelter Co. for five years until 1924. On the east bank of the Tawe the Glamorgan works enjoyed a brief lifespan, built circa

[12] R.O. Roberts T*he Smelting of Non-ferrous Metals since 1750,* p71.
[13] Trevor Williams. Economic Development of Swansea, p89

1887 it ceased zinc production after only 14 years in 1901. [14] The Swansea Vale Spelter Company was the last works to be built and the most successful in that, although it changed hands, it continued producing zinc up to 1971.

Meanwhile, in the aftermath of the American Civil War and the unification of Germany, the 1860s saw both countries turn their attention to building their industrial bases and rapidly establishing large modern zinc industries. In Britain however the industry received little of the attention or capital investment it required to compete internationally and unlike the copper industry, where Swansea's metallurgical expertise developed leading-edge technology, the domestic zinc industry appears to have been content to take second place to Germany. As Cocks & Walters observed, although Britain led Europe in industrial development such as steel, steam, coal and textiles during the nineteenth century 'unfortunately, the lead so readily taken by Britain in other directions did not create the urge to build up a zinc industry.'[15] During the second half of the nineteenth century world demand for zinc grew dramatically; with corrosion destroying twenty per cent of ferrous metals galvanising became increasingly important yet the British zinc industry did not expand in step with its steel industry during the nineteenth century leaving the country reliant on imported zinc.[16] Between 1880 and 1913 the world output of zinc rose by 320 per cent; the USA's production rose 1,200 per cent and Germany's by 165 per cent whereas Britain's only doubled.

While Germany and the USA developed large-scale modern zinc operations, the British Government left the small-scale Swansea operations to their own devices. It took a World War for Britain to wake up to the importance of zinc. The industry had begun its slow inexorable decline when war broke out in 1914 causing the British authorities to re-examine its policies. As war with the Germany became inevitable the Government realised it could not depend on domestic supply for the munitions, gas and galvanised trench shelters and linings it required; it turned

[14] A Chronological Account of the Works is given in R.O. Roberts T*he Smelting of Non-ferrous Metals since 1750*... in Table 4 of Appendix, pp86-91.
[15] Cocks & Walters, *History of the Zinc Smelting Industry* p12
[16] Zinc Development Association Technical Notes No.1 'Hot Dip Galvanising'(1959) quoted in Cocks & Walters*, A History of Zinc Smelting,* p12

instead to the USA and, in the words of Cocks & Walters 'Britain also endeavoured to extract a little more production from its own antiquated zinc industry'.[17] The Government provided the Swansea Vale Spelter Company with substantial tax incentives to modernise and the rebuilding of the works there was carried out by Belgian refugees. Other spelter houses did not receive comparable treatment but, with the price of zinc trebling, all the Swansea zinc smelters were at maximum production in what was to be their boom period.

At this time the Australians sought to protect their mining interests post-war and in 1916 the British Government undertook to take all the Broken Hill concentrates at a fixed price. The Australians got the best of the deal and the repercussions were still being felt in the British Parliament in the 1920s when zinc prices had dropped to £30 ton compared to the £70 when the contract was signed.[18] This was to be one of many ways in which the Swansea spelter houses felt they had been undermined by their own Government. An internal memorandum from John W Evans to Charles Eden of Vivian & Sons in 1916 complains of a 'lack of help and fostering care on the part of our Government' comparing it unfavourably to the American competition;[19] and three years later Pendarvis Vivian writes in his diary of the need to 'demand Government help based on past promises.'[20]

Perhaps the greatest betrayal was that having finally agreed the need for an integrated zinc, munitions and sulphuric acid producing capability in 1917, the British Government decided to site The National Smelting Company at Avonmouth with only a single outlying operation at Swansea. According to Cox & Walters 'there is no evidence that the Government ever attempted to establish an acid plant or munitions works in Swansea' The Swansea spelter houses were seen as dated and inefficient and with no government support to modernise they struggled to survive the post-war slump in zinc prices and international competition, America's superior technology fuelled by natural gas priced Swansea's producers out of the market. All

[17] Cocks & Walters, *A History of Zinc Smelting*, p22
[18] Cocks & Walters, *A History of Zinc Smelting*, p26
[19] Swansea University Richard Burton Archives, LAC/126/4211, John W Evans memorandum
[20] Cornwall County Record Office, Pendarvis Vivian MSS, Diaries , DDPV17/50 14 February 1919

Swansea's smelters, with the exception of Swansea Vale, which had now been incorporated into The National Smelting Company, closed during the period 1924-30 as the centre of the British industry moved to Bristol. [21] Swansea Vale did continue to produce zinc at Llansamlet until 1971 but any significant role for the zinc industry in the Swansea area was over by 1930.

## Chapter 1: The owners

The histiography of the spelter industry in Swansea, such as exists, suggests that the reasons for its ultimate demise lie within the nature of its ownership. The 1968 seminal work *A history of the Zinc smelting industry in Britain*[22] criticises the owners for lack of ambition and openness to new ideas as well as a lack of support from the Government of the day. Meanwhile economic historian R. O. Roberts of Swansea University reflects on the lack of available capital limiting their ability to develop their business.[23] This study has sought to evaluate the degree to which the owners of the spelter works were guilty as charged by examining information that has survived in business and personal records and also contemporaneous newspaper articles. Sources have been hard to come due to the plethora of very small producers and the fact spelter was very much a secondary activity for the larger producers; Swansea Vale's archives were available at the time Cocks & Walters were writing but were subsequently lost during the de-merger of ICI and the acquisition of subsidiaries. While it is dangerous to generalise on the motivations or success of this disparate group, there are enough references to spelter production in the collections of the Vivian, Grenfell and Dillwyn families to provide some insight into the attitudes of the owners.

The first group of spelter makers were the families who had made their fortunes in the copper trade most notably the houses of Vivian and Grenfell, but who, by the mid-nineteenth century, were left with excess smelting capacity on their hands. They dominated not only the economic life of the port town but every

[21] Dr Lawrence Holt, History of the Zinc Industry
[22] Cocks & Walters, *A History of Zinc Smelting*, p16
[23] R O Roberts, *Enterprise &* Capital for non-ferrous metal smelting in Glamorgan 1694-1924 in *Morgannwg* Vol23 (1979) pp49-51

single aspect of it. They were the ruling elite providing Members of Parliament and controlling every civic and charitable concern from the courts to the new health and education boards. No self respecting charity could afford to be without their patronage. At the time they began to produce spelter they were headed by well-educated and talented businessmen who saw the advantages of diversification and had, in the early days at least, access to the necessary capital to invest in the new ventures.

The second group were consortia of local businessmen - solicitors, accountants and shopkeepers - much the same as those found as shareholders of the coalmines and tinplate works of the western coalfield. They were very different to the copper masters not only socially but also financially and in terms of their business acumen. Copper had provided a few families with enormous wealth and prestige and now that it was in decline – and smelters going for a song – other would-be entrepreneurs saw spelter as the means to become the next generation of 'industrial aristocrats'. They bought the disused smelters and converted them to spelter production in the hope of making a fortune without either the specialist knowledge or capital required. Two exceptions were Villiers and the Swansea Vale Spelter Company who, despite being local consortia, raised sufficient capital to erect purpose-built zinc smelters, the only two companies in the non-ferrous metal sector in the latter half of the nineteenth century to do so.[24]

## Vivian & Sons

Vivian & Sons began life as a Cornish copper mining concern run by John Vivian of Truro. A short term involvement in a copper smelter in Penclawdd persuaded him of the advantages of setting up in the Swansea area and in 1810 he formed a partnership with his sons to establish the Hafod Copper Works. His grandson, Henry Hussey Vivian, later Lord Swansea, was to provide the leadership of a diversified organisation having 'seen the success of our neighbours the Williams who were engaged in a variety of undertakings and I resolved if possible to emulate them'. [25,26] The Vivians produced spelter at Margam, Hafod and also at Upper

[24] R.O. Roberts, *Enterprise & Capital*, p.71
[25] National Library of Wales. Lord Swansea MSS C3238-51 H. H. Vivian statement

Forest which became known as the Morriston Spelter Works, but there is some debate as to when they established their first spelter works; Toomey claims it was in 1835[27], R. O . Roberts attributes it to the conversion of the Ynys copper smelters in 1841 whereas Hussey Vivian's own notes claim the spelter works were commenced by his father in conjunction with Mr Walker of Hayfield in 1842 but does not specify at which works.[28, 29] The firm's motivation was twofold; as one of the major copper houses they had smelters lying idle and they also needed a steady supply of zinc for the rapidly growing yellow metals sector. Within ten years Henry Hussey Vivian had doubled the size of the operation adding spelter, silver, gold, cobalt and nickel to what had previously been a largely copper-making concern. The policy bore dividends, in 1844 spelter contributed over thirteen per cent of Vivian & Sons' profits and silver fifteen per cent and although these dropped significantly in the succeeding two years Hussey Vivian ascribed that to the 'unusually high price of finished copper'.[30] After Hussey Vivian's death in 1894 his brother William Graham Vivian became chairman of the family firm until his own death in 1912 when Arthur Pendarvis Vivian took over. The latter was at the helm during the turbulent war years when the spelter owners finally gained some support from the British Government. After the war the Board of Vivian & Sons were forced to consider the future of the spelter operation. In his diary, Pendarvis Vivian reflects that his father, John Henry Vivian never really liked the trade and that he, Pendarvis, was strongly in favour of abandonment.[31] In April 1920 the Board of Vivian & Sons decided to close down the spelter operation. Spelter, concluded Pendarvis Vivian, was 'always a doubtful trade' and would never be able to compete with America, Belgium and Germany.[32]

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[26] Williams, Foster & Co at Morfa works, the largest copper works in the world at the time with 120 furnaces producing copper and zinc.

[27] R.R. Toomey, *Vivian and Sons 1809 – 1924 a study of the firm in the copper and related industries*. (Garland: 1985) p15

[28] R O Roberts smelting of non-ferrous p48

[29] Lord Swansea MSS C3238-51 H. H. Vivian statement

[30] Lord Swansea MSS C33238-51 HH Vivian statement

[31] *Pendarvis Vivian Diaries,* 1 May 1920

[32] *Pendarvis Vivian Diaries,* 20 July 1920

## Pascoe Grenfell & Sons

The firm of Pascoe Grenfell, another diversified copper house, also had its roots in Cornwall. The Grenfells hailed from Penzance and in addition to their mining concerns were prominent in the trading of non-ferrous ores. Pascoe Grenfell set up its first smelting operations in partnership with Thomas Williams at Upper and Middle Bank in Llansamlet. The partnership dissolved in 1828 with Pascoe Grenfell retaining Middle Bank, by mid century the Upper Bank works had come back into the Grenfell family and spelter was added to their copper activities. Pascoe St Ledger Grenfell became Managing Partner in 1838 but when he died twelve years later the next generation of young men showed little interest and, according to R O Roberts, had little involvement in the smelting business.[33] Pendarvis Vivian observed in a letter to his brother Hussey:

> 'It would seem too that Grenfells business was latterly worth much less to what it used to be and as Francis Grenfell wrote the other day since his father's death no one has really worked at the business.'[34]

A winding up order for the company was granted on 12 October 1892 and staff at the spelter works were retained for five weeks to treat the existing ore stock. The business, consisting of all the copper and spelter works, was sold to William Foster & Co. for £40,000 and continued to trade under the name of Pascoe Grenfell until 1924[35] The ore mining and trading business Grenfells, was unaffected and continued to sell its zinc ores – much of it mined in Anglesey and at Frongoch and Cwmystwyth in Cardiganshire - to the Swansea spelter works. Data extracted from Grenfell's 1894 sales accounts show that its second largest customer was Pascoe Grenfell – now owned by William Foster; the greatest tonnage of calamine went to Vivian & Sons with English Crown, Villiers, Dillwyn and Swansea Vale also buying from them [Appendix A1] [36]

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[33] R.O. Roberts, *Enterprise & Capital,* p76

[34] Lord Swansea MSS, C267 *HH Vivian Letterbook,* Letter from Pendarvis Vivian to Henry Hussey Vivian, 9 November 1892

[35] Richard Burton Archives. LAC/45/A20 *Directors minute book Pascoe Grenfell & Sons Limited 1890-1897*

[36] Richard Burton archives. LAC/45/C7 Grenfell Zinc & lead sales 1884

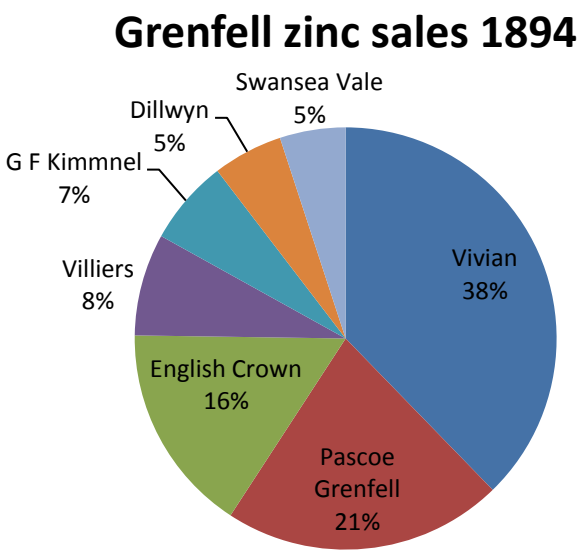


Fig. 2: Grenfell zinc sales

## Dillwyn & Co.

Lewis Llewellyn Dillwyn was a wealthy man, his family owned Swansea's Cambrian Pottery and he was Member of Parliament for Swansea when he started Dillwyn & Co. The origins of the company are once again ambiguous; R O Roberts reports that Dillwyn invested £30,000 of his own money in building a silver and zinc smelter in Landore in 1853, leasing it to E. M. Richards, MP for Cardigan in 1855.[37] Cocks & Walters on the other hand claim Dillwyn took over Evan John's old smelter next to Smith's Canal at Llansamlet in 1858 and gradually expanded it replacing the English process with Silesian.[38] Whatever the reality, Lewis Llewellyn Dillwyn was not one of the greatest businessmen of his age for when he died suddenly in 1892 his daughter Amy discovered that his estate was in deficit to the tune of £100,000 with the principal assets being the spelter works and Foxhole Colliery. Rather than face bankruptcy she took over the running of the company writing in her diary:

> 'I am taking on the spelter works and trying to learn the management, in case they should eventually become mine. Altogether I am becoming a man of business and go into Swansea and back on the tram most days.'[39]

[37] Roberts, R.O., *Enterprise & Capital* p66
[38] Cocks & Walters, *History of Zinc Smelting*, p13
[39] Swansea University Richard Burton Archives EAD 1892-3, *Amy Dillwyn Diaries,* 13 January 1894

She enjoyed the business, recording in her diary 'business rather exciting today' and 'study book on metallurgy until tea time.'[40] Through hard work and a frugal lifestyle she managed to make the concern profitable, saving some 200 jobs, and in 1899 finally paid off all her late father's creditors.[41] Of inestimable support was her General Manager, John Corfield who she awarded 'profit for five years from 1896 and after that a quarter share', commenting:

> *'*he put in no capital but he fully deserves what I have given him for the way he has worked for me and stuck to me since Papa's death – besides deserving it for his excellence as a manager.*'*[42]

In 1902 the company became limited with Amy retaining a majority shareholding and acting as director. In October 1905 she was, unexpectedly, made an offer for her share of the company by Metalgesallschaft and having considered the future of the industry concluded: 'I felt it was best for my beloved D&Co. to agree to the proposal'.[43]

## Crown Spelter Company

The Crown works at Port Tennant was unusual in that it was the only one of Swansea's main spelter works not situated in the Swansea Valley. It had been built by Shackleford & Ford adjoining their railway stock yard at St Thomas and its early days were typical of many of the small Swansea smelters who struggled to survive: Shackleford & Ford failed to succeed at spelter and sold to Swansea Zinc Company which went into liquidation within a few years. The works were taken over by the Richardson family and renamed The Crown Works before being sold again in 1883 to English Crown Spelter who operated it until 1931 when it was wound up. English Crown started off in 1883 with £73,500 capital but within thirty years had built a portfolio of property and stock of over £135,000. In that year its return on capital was under three per cent, seven years later the boom war years had boosted its profits almost eightfold but it was losing heavily by 1928 and then was wound up three years later.[44]

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[40] *Amy Dillwyn Diaries,* 14 October 1895
[41] *Amy Dillwyn Diaries*, 14 October 1895 29 May 1900
[42] *Amy Dillwyn Diaries*, 7 April 1898
[43] *Amy Dillwyn Diaries*, December 1905
[44] Cocks & Walters, *History of the Zinc Industry*, p14

## The Swansea Vale Spelter Co.

Located alongside the Dillwyn and Villiers works between the Smith's Canal and the railway in Llansamlet, the Swansea Vale Spelter Company was the last spelter works to be built in Wales and arguably the most successful in that, although it changed hands, it continued producing zinc up to 1971. It was founded in 1876 by a consortium of local businessmen under the chairmanship of John Griffiths, a local printer, and included Edwin Sidney Hartland, solicitor; James Martin, accountant; John Hopkins, accountant; Edward Gregory, grocer; Elias Thomas, butcher; Charles Davies, smith; William Williams, manager; and Thomas Harris, surveyor. The Managing Director was (Sir) Richard Martin an important local industrialist who was also involved in the Birchgrove Steel Works, the Ynyspenllwch Iron and Tinplate Works, and the Villiers Spelter Company.[45] Due to its late arrival to the industry the Swansea Vale Works was able to install improved versions of the Belgian furnaces used by the other local smelters. Nevertheless, initial production was small scale with only 1,000 tons produced annually. Profits were ploughed back into the works and additional furnaces added so that by 1914 it was producing 5,000 tons annually.[46] About this time the ownership was taken over by the German Hirsch metal family with Dr Emil Hirsch becoming a director and despite the 'Trading with the Enemy Act of 1914' they retained overall control although they had to relinquish their directorships.[47] World War One was to prove a watershed for the company; desperate to increase domestic zinc production, in 1916 the Ministry of Munitions provided financial incentives for the company to increase its production threefold. They took the opportunity to modernise and expand the works building a new plant for eight Belgian furnaces and replacing four existing furnaces in another plant. As Cocks & Walters observe:

> 'It is not known whether any of the other small zinc concerns still operating in the Swansea Valley in 1914 also received Government encouragement to expand at this time'. [48]

This modernisation allowed the company to withstand the post-war slump in the zinc trade which saw the other Swansea concerns closing. Post-war it became

[45] Dr Lawrence Holt, *History of the Zinc Industry*
[46] Dr Lawrence Holt, *History of the Zinc Industry*
[47] Cocks & Walters, *A History of Zinc Smelting, pp16-17*
[48] Cocks & Walters, *A History of Zinc Smelting, p23*

part of the National Smelting Co Ltd and in 1964 was absorbed into Imperial Smelting Corporation. The new ownership and government support led to increased investment, particularly research and development, and means were sought to develop a blast furnace to produce lead and zinc together rather than having to first separate them. The breakthrough came in the 1960s and a prototype furnace was built in Llansamlet; worldwide patents followed and, for one last time, Swansea found itself leading the world in a metallurgical process. Ironically its success led to a world glut of processed zinc and the works were shut down.[49]

There were numerous other small works, mostly transitory, of which little is known beyond their names. The Villiers works between the Smiths Canal and the Swansea Vale Railway in Llansamlet was typical in that it was run by local consortia. Built in 1873 it operated intermittently until closure in 1924.[50]

## Investment

The investors who purchased old copper smelters sat back and waited for their fortune were to be disappointed. The ready availability of smelters may have made spelter an attractive prospect but it was a capital intensive business offering a poor return on investment; for example, in 1883 English Crown received less than three per cent yield on its capital investment[51]. R O Roberts estimates that at the beginning of the nineteenth century establishing a smelter required a capital investment of around half a million pounds, an average £500 per worker, and by the 1880s that had risen to £1,000 per worker, as opposed to under £400 in tinplate production.[52] This scale of investment was available to very few people; the small local spelter manufacturers had nowhere near that amount of capital, £3,800 in the case of Villiers and only £60,000 by Dillwyn & Co according to Roberts[53]. By contrast in 1879-80 the firm of Vivian & Sons had over a million pounds tied up in capital investment with copper accounting for thirty eight percent of it; yellow

[49] Dr Lawrence Holt, *History of the Zinc Industry*
[50] *Cocks & Walters A History of Zinc Smelting p14*
[51] Cocks & Walters, *A History of Zinc Smelting,* p14
[52] R.O. Roberts, *Enterprise and capital,* p49
[53] R.O. Roberts, *Enterprise and capital,* p71

metal for seventeen percent followed by spelter at twelve per cent.[54] The capital invested included the transfer of old copper smelters but the Vivians also commissioned new furnaces to deal with spelter at the cost of approximately £70-£100 per furnace and were, in the mid nineteenth century, at the leading edge of the industry.[55]

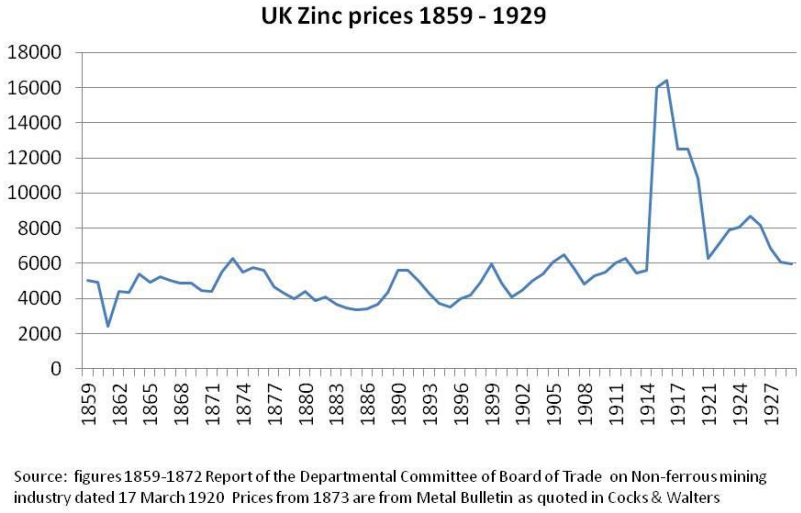
The spelter-makers soon discovered that the old English furnaces used in copper making were inefficient when it came to zinc and looked to the continent where much higher productivity was achieved. Hussey Vivian updated his company from English vertical furnaces to modified Silesian ones and eventually to Belgian horizontal furnaces. The transition was gradual and Dr John Percy observed 'in 1848 I saw English, Silesian and Belgian zinc furnaces in the works.[56] By 1854 over half the company's spelter output was from Silesian furnaces 'saving £2 per ton of metal on the old English system'.[57] By 1874 they had only Belgian furnaces, whereas Dillwyn and Grenfell were still operating Silesian furnaces, suggesting that Vivian & Sons had invested more in upgrading. The information is recorded in an internal memorandum detailing how many furnaces each company had working and idle and comments on stock levels and working practices[58]. {See Appendix A2] It shows that Vivian, Dillwyn and Crown Zinc were each producing similar outputs of between 50 and 60 tons per week, Grenfell were producing a mere 22 tons and a new enterprise called Jersey (possibly later known as the Villiers Spelter Works) only 6 tons.

Toomey, Roberts and others are in agreement that the growth of the firm of Vivian & Sons had been largely due to reinvestment of their substantial profits, averaging ten per cent in the 1830s for example. However once the business had diversified they had far less control of their industry and market fluctuations in spelter prices in particular took their toll. Board of Trade data charting the movement in average annual price of spelter between 1859 and 1929 illustrates the

[54] R.O. Roberts enterprise and capital p57
[55] Lord Swansea MSS, C2515, HH Vivian Letterbook. 12 August 1844
[56] Dr John Percy, *Metallurgy* (Vol. 1: 1860)
[57] Lord Swansea MSS C3238 Statement
[58] Richard Burton Archives, LAC/126/S1 Grenfell zinc sales

ongoing volatility of the market, the exceptional peak during World War One and the subsequent decline [Appendix A3].[59]

Between the 1880s and the late 1890s the firm began to post losses and by 1914 the capital employed was only half what it had been thirty years previously[60]. Consequentially investment would have been reduced in all parts of the business contributing to its eventual decline. It must be borne in mind that even the most successful and resourceful British smelter would have been hard pressed to maintain investment on a par with the German spelter houses who received considerable government support. Germany's Metallgeseschaft, for example, was state supported and the American spelter manufacturers who were blessed by cheap sources of ore and coal, and also easy access to investment[61].




Source: figures 1859-1872 Report of the Departmental Committee of Board of Trade on Non-ferrous mining industry dated 17 March 1920 Prices from 1873 are from Metal Bulletin as quoted in Cocks & Walters

Fig.3: UK zinc prices

## Spelter Association

For the copper houses the obvious solution to market turbulence was the creation of a spelter owners' association. The 1st and 2nd Copper Associations had largely succeeded in establishing a monopoly to control the price of ores and of the

[59] Figures 1859-1872 *Report of the Departmental Committee of Board of Trade on non-ferrous mining industry* dated 17 March 1920. Prices from 1873 are from *Metal Bulletin* as quoted in Cocks & Walters, A History of Zinc smelting p. 201

[60] R.O. Roberts, *Enterprise & Capital*, p57

[61] R.O. Roberts, *Enterprise & Capital*, p83

finished product.[62] However, what worked in copper was not to work in spelter; the British owners, that is the Swansea firms, were small players in the overall global market and therefore had little influence. There are references to an association of the spelter houses in the correspondence of the Vivians and the Grenfells but it is hard to tell how formal the association was. R O Roberts claims that a zinc smelting association was formed to 'regulate the purchase of blende, calamine and zinc ashes and also fix the price of finished zinc.'[63] In 1887 Hussey Vivian, now Lord Swansea, identified a zinc mine near Bilbao in Spain and proposed buying it in conjunction with the other zinc manufacturers in the area.[64] The Draft Article of Partnership to acquire the Vizcaya calamine mine specifies which proportion of the partnership could be allocated to each company applying to capital to be invested and ores shipped.

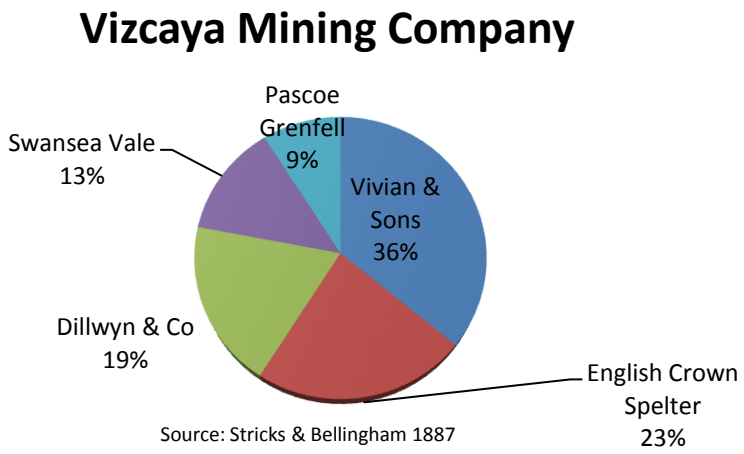



*Fig 4: Vizcaya Mining Company shares*

These proportions give us some indication of the relative size of spelter operations at the time; certainly Vivian & Sons were the driver and in the absence of a manager would conduct the business of the Partnership. However, Pascoe Grenfell's smallest share is probably more reflective of its independent ore businesses rather than its production capacity. On the formation of the partnership in 1887 Hussey Vivian expressed reservations about the unlimited liability faced in such a

[62] R.R. Toomey, Vivian & Sons, pp342-343
[63] R O Roberts *Enterprise & Capital* p75
[64] Richard Burton Archives. LAC140/A2 Stricks & Bellingham Draft Article of Partnership (1887)

Partnership and instead suggested 'the formation of a "Limited" Company formed of the members of the Swansea Zinc firms in their respective shares called, say, "The Swansea Zinc Ore Co.'[65] It may be the output of this mine that is referred to when, in 1892, the liquidators of Pascoe Grenfell & Sons apply 'to the Spelter Association for the proportion of ores to which Pascoe Grenfell are entitled.'[66] It may be that the agreements between the spelter houses were on an ad hoc basis rather than a formal association; in 1910 Graham Vivian writes to Pendarvis Vivian expressing his pleasure at hearing 'good prospects of strong [spelter association] being formed'[67] By September 1913 Pendarvis Vivian is writing of a recent trip to Cologne to 'promote our interests with the spelter syndicate' and recommends that it would be 'very necessary to keep in touch'[68] Post-war the strength of the American market was dominating the thinking and Pendarvis Vivian, writing to Budd, speculates 'how far a strong association of all the large houses could meet American competition it is now impossible to form the roughest idea'[69]

## Ores & cost savings

As the volatility of the market took its toll attention turned to cost savings; Hussey Vivian kept careful track of costs in his notebooks and concluded there were three critical commercial considerations in spelter production: wages; cost of coal, the ratio of which was higher in zinc smelting than other metals; and the quality of ore. He then set about trying to exert some degree of control.[70] He was able to control the wages bill although smelting was a labour intensive process from which there was no escape and he felt this offered little scope for cost reduction. The Vivians were, of course, coal producers in their own right as was Dillwyn but the latter part of the nineteenth century was a very turbulent time for the coal industry characterised by strikes and lock-outs halting production and driving up the cost of production. However, coal costs had always been a key consideration, as early as

[65] Richard Burton Archives LAC/140/A2 Letter from Vivian & Sons to Stricks & Bellingham (their solicitors)dated 5 March 1887 from Vivian & Sons to Stricks & Bellingham (their solicitors)
[66] Richard Burton Archives LAC/45/A20 *Director Minute Book of Pascoe Grenfell & Sons Limited*, 23 November 1892
[67] *Pendarvis Vivian diaries* DDPV/17/41 16 November 1910
[68] *Pendarvis Vivian diaries* 1910 DDPV/17/44 29 September 1913
[69] *Pendarvis Vivian diaries* DDPV/17/50 29 March 1919
[70] Lord Swansea MSS C2515, H.H. Vivian Letterbook,

1844 Hussey Vivian was looking for ways to reduce the operation's consumption and it was a significant factor in the decision to move to Belgian furnaces.[71] The problem of coal prices never went away, in 1913 Pendarvis Vivian wrote to Charles Eden that 'the increase in cost of coal is disastrous to us all round.'[72]

That left the supply of zinc ores which represented three quarters of the cost of spelter production and a subject that troubled all the spelter houses.[73] Unlike copper, where they mined their own ore, they had to buy in zinc ore of variable quality which had huge impact on the production costs of the finished product. Calamine was the original source of ore for zinc smelting, sourced from the Mendips or imported from Silesia and Belgium, it was easily treated by the English furnaces but the quality could be variable leading Hussey Vivian to write in 1844 'we have been forced to look about us and procure jack (as the ore was called) where we could; the consequence has been that we have had wretched stuff.'[74] However the Calamine deposits were unable to satisfy the increased demand later in the nineteenth century and the industry was forced to move to Blende[75] (zinc sulphide). There were some deposits in Cardiganshire, North Wales and the Isle of Man but as demand grew the spelter houses had to import from Spain, Sardinia and further afield as evidenced in reports of English Crown Spelter's Annual General Meeting in 1888: 'The Company is also associated with Messrs. Vivian in investigating blende mines in the United States and Norway.'[76]

The discovery of the abundant Broken Hill deposits in Australia in 1888 changed the ore market; its treated ores were to be the main source for Europe and Swansea's raw materials were imported from there via the Continent.[77] With world spelter production increasing dramatically, the Swansea concerns were in competition with German and American smelters for the raw material. Amy

[71] Lord Swansea MSS C2515, H.H. Vivian Letterbook *12 August 1844*
[72] *Pendarvis Vivian Diaries* PV17/44, 14 June 1913
[73] R.O. Roberts, *Capital & Enterprise*, p75
[74] Lord Swansea MSS C2515 H.H. Vivian Letter book, Letter to Edward Budd 6 December 1844
[75] Blende (zinc oxide) was a blend of zinc and lead involving a costly separation process
[76] *Cambrian* 1 June 1888
[77] Cocks & Walters, *The History of Zinc Smelting*, pp15-16

Dillwyn, explaining the sale of her majority shareholding in Dillwyn & Co. to Metalgesallschaft in 1905, writes:

> 'They have a very large control of zinc ore and wanted to get a finger into a zinc smelting business: we on the other hand are always hunting about for zinc ore and a junction between them and us ensures a supply of ore for many years to come'[78]

## Management

The biggest criticism of the owners was that they did not provide leadership, lacked ambition and were resistant to new ideas. In 1916 John W Evans, manager of the Morriston Spelter Works wrote an internal memorandum to Vivian & Sons Partner Charles Eaton Esq.[79] He laments the fact Swansea has 'almost been wiped out as a practical industry' criticising primarily the lack of government support but also reserving a significant part of the blame for the employers who:

> 'have unwisely persued (sic) a policy of conservatism in a progressive world, they have not kept abreast of the times and have been satisfied to continue working with old-fashioned or insufficient machinery'.

The letter survived in a miscellaneous collection, not part of a correspondence, so it is impossible to know whether he is criticising his own employers as well as the other Swansea houses or his motivation in writing it. Certainly by 1916 Vivian & Sons, in common with the other Swansea spelter houses, had fallen way behind both Germany and the USA and were unable to compete post-war. But this had not always been so.

The young Hussey Vivian had, unusually for the time, studied metallurgy in Germany and France before entering the family firm and had also travelled to Belgium to study their methods of spelter extraction and was impressed by both Silesian and Belgian furnaces. He paid great attention to their construction taking copious measurements and on returning to Swansea – with Belgian speltermen in tow – set about constructing a furnace on the Silesian model. The Lord Swansea MSS contains numerous letters between Hussey Vivian and Edward Budd, who supervised the commercial side of the business, regarding improving the spelter operation. Hussey Vivian is a long way removed from the caricature of the remote

[78] *Amy Dillwyn diaries*, December 1905
[79] Richard Burton Archives LAC/126/K2/3 John W Evans memorandum

Victorian industrialist; he is immersed in the detail writing about the technical aspects of furnaces, heating and rolling and his letters are peppered with diagrams showing proposed improvements to the efficiency of smelters.[80] In 1854 he recorded one of his personal contributions to the firm thus:

> 'but the real saving is that which has enabled our works alone to exist when every other Spelter works in the Kingdom was forced to stop and which now causes it to make the large profit, is the calcination of this ore by the waste heat of the furnace, this was my suggestion alone'.[81, 82]

Under the leadership of Hussey Vivian the concern had been at the forefront of metallurgy in the UK; the first to install Belgian furnaces, long before Grenfell and Dillwyn for example; and employing the eminent Belgian metallurgist Albert Borgnet and, after his suicide, his cousin Georges, on a salary of £500 p.a. 'with 10 per cent commission on all savings on charges of £2/10 per ton'[83] [84] According to his brother Pendarvis, Hussey watched the spelter trade 'like cat and mouse' but without the inspired leadership and personal commitment of Henry Hussey Vivian, the firm's appetite for this sector waned and with it went investment and any technical innovation. Pendarvis had always viewed it as 'anxiety and trouble' and on 1 May 1890 received the Board's decision to close down the spelter operation with relief.[85]

There was no equivalent to Hussey Vivian in any of the other spelter houses. Amy Dillwyn may have enjoyed the intellectual challenge of reading books on metallurgy and had an extremely capable manager in John Corfield but the firm was always small and never innovative. Pascoe St Ledger Grenfell had a reputation as a formidable businessman but had little interest in the science of metallurgy and the firm always viewed spelter as an 'add-on activity' content to follow the market rather than try to lead it. The smaller organisations, even had they the skill and

[80] Lord Swansea MSS C2515 *H.H. Vivian letter book*, Letter to Edward Budd 1 April 1844
[81] Lord Swansea MSS C3238-51 *H.H. Vivian Statement*
[82] Calcining is the first stage of extracting zinc from ore whereby Calamine is reduced to zinc oxide through heating in a furnace
[83] Georges Borgnet was the Manager of Morriston Spelter Works and author *of L'industrie du zinc dans le pays de Galles* (1877),
[84] *Pendarvis Vivian Diaries* DDPV/17/1 26 April 1869
[85] *Pendarvis Vivian Diaries* DDPV/17/51 1 May 1920

inclination, did not possess the capital to innovate the exception being the Swansea Vale Spelter Co. It started well, investing in the latest furnace technology which enabled it to take advantage of the new Australian Blende from Broken Hill which in turn secured government backing to modernise during World War One. Under German ownership the company had been the first to invest in gas-fired retorts in 1912, however, it was only when part of the National Smelting Co. Ltd that it pioneered new processes with the Blast furnace technology in the 1960s.

For the owners the success or otherwise of the spelter industry had significant impact on their companies' bottom line and, occasionally, on their own lifestyle. For the men who worked in the smeltries however, the industry was often a matter of life or death.

[86]

Plate 3. Camille Silvy, Henry Hussey Vivian, 1st Baron Swansea, 1861, Albumen carte-de-visite National Portrait Gallery. © National Portrait Gallery, London

[86] http://www.npg.org.uk/collections

## Chapter 2: The Speltermen

At the peak of Britain's spelter industry there were about a thousand men employed in the Swansea district.[87,88] These men worked in some of the most arduous conditions of the age leading one prominent German expert to proclaim that: 'at the age of 40, the men are so broken down by chronic bronchitis, gastric disturbance, nervous disease and long hours, that severe work is impossible.'[89] The speltermen rarely lived to old age and their working lives were blighted by long hours and appalling conditions. So why were they attracted to the industry and why did they not only remain in it but pass on the tradition to their sons? In coming to any conclusion it must be understood that, as with most trades, there was a hierarchy of worker from the general labourer at the bottom of the pile to the highly experienced furnaceman. In spelter manufacture the level of expertise required of the latter was higher than in any other branch of metallurgy due to the volatility of zinc and this 'class system' may have a bearing on their behaviour.

In order to consider the speltermen's previous occupations, their ties to this industry and the degree to which their sons followed them, the 1871 population of speltermen has been taken as the datum point representing the first census after the industry established a significant presence in Swansea in the 1860s. It has only been possible to identify twenty per cent of the sample ten years previously, unsurprising given they were young men with an average age of 29 years, some will have moved from England & Wales, the ubiquity of some common names and, of course, the spelling of names in this largely illiterate population was something of a lottery. Nevertheless, the results are consistent with the histiography which suggest spelter works drew their labour from copper and other metal works. However, as Table 4 below shows, over 40 per cent of those identified were previously speltermen [an interesting statistic as the 1861 census report claims no spelter workers in Glamorgan in that year] and eighteen per cent were working in

[87] *South Wales Evening Post* 23 February 1922 claimed there were two thousand workers employed but the 1911 census records a total of 974 and that of 1922 920.

[88] No women were employed in the zinc industry. The 1891 census reports shows that in Glamorgan women were a significant proportion of the tin industry with 2,522 employed but only 12 were employed in the copper industry and none in zinc.

[89] Quoted in Edgar L. Collis, HM Inspector of Factories, *Special Report on Dangerous of Injurious Processes in the Smelting of Materials Containing Lead* (London: HSMO) 1910.

the copper industry, illustrating that the vacuum left in the Swansea labour market by the decline of the copper industry was partly filled by the spelter industry.

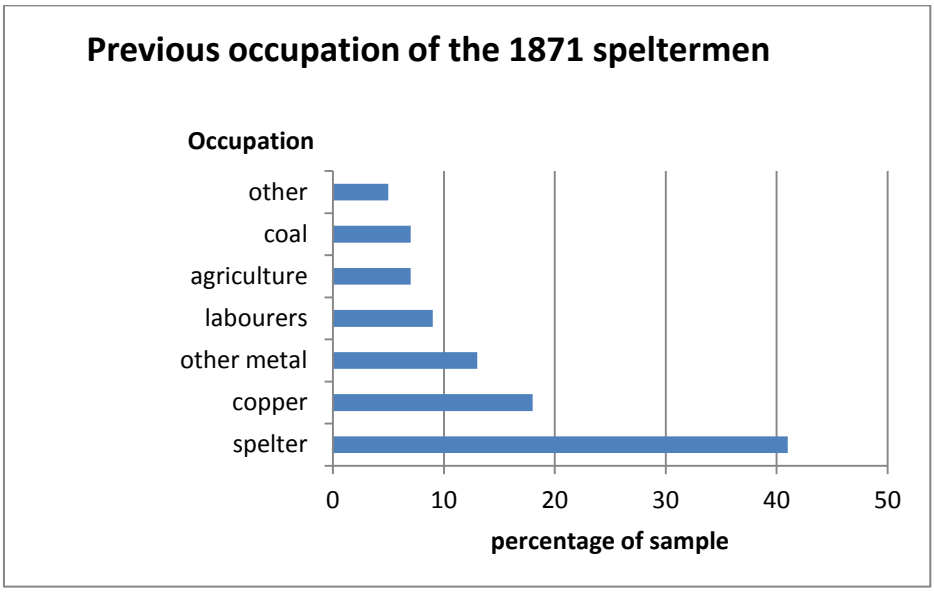



*Fig. 5: previous occupations*

Over 60 per cent of the sample were identified in the census returns of 1881. The analysis shows that 42 per cent of the group were employed in the spelter industry, only seven per cent in copper and nearly a quarter in the expanding tin and steel sectors. A major difference from 1861 is the variety of occupations that Swansea now offered; former speltermen became postmen, masons, potters and joiners or worked on the railway taking the 'other' category to seventeen per cent. Given the harsh working conditions and the toll on their health, many of the sample would have died in the intervening years but it has not been possible to access the records to quantify the numbers.

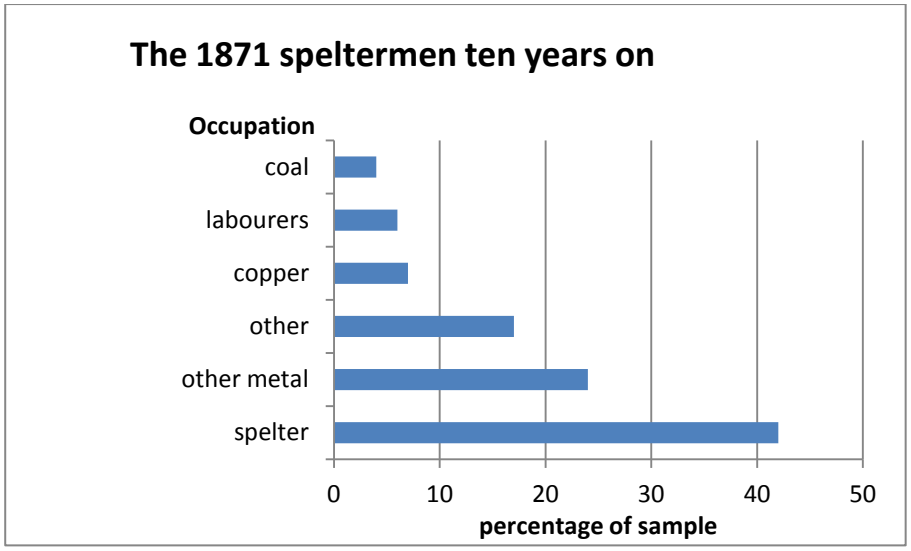



*Fig. 6: continuation in industry*

Most industry commentators make the claim that spelter was an industry where expertise was jealously guarded and handed down from father to son.[90] Analysis of later census data reveals that where the occupations of the 1871 sample's sons are identifiable, a quarter followed their fathers into the spelter industry[91]. However, when only the furnacemen, the skilled workers, are considered 42 per cent of their sons followed in their footsteps such as John Sims of Llansamlet whose three sons, John, David and Hopkin all followed him into spelter[92]. Whether you ascribe the trend to tradition or nepotism, it is clear that the more skilled the worker the more likely the sons follow the father. Lambert Lehane a Belgian, was a spelter foreman in 1871, twenty years later in 1891 his eldest son Arnold is an under foreman and in 1901 a foreman; however his other two sons became a marine engineer and engine fitter.[93,94] There is no discernible pattern as to the choice of trade followed by the sons, the emerging tin industry is well represented as is coal mining but no single category exceeds ten per cent.

By 1871 a significant proportion of those employed in the spelter industry, around 28 per cent, were highly skilled. The introduction of the Belgian furnaces had made production more economical because they used less coal but they were much more labour intensive and volatile and therefore required highly skilled

[90] R.R. Toomey, *Vivian & Sons*, p155
[91] Wales 1891 and 1901 census returns
[92] Wales 1881 census return RG11-5366-82-24
[93] Wales 1891 census return RG12-4485-33-68
[94] Wales 1901 census return RG13-5080-11-14

furnacemen. The smelting industries generally employed a high ratio of skilled personnel but when it came specifically to skilled furnacemen the numbers account for 28 per cent of the workforce in zinc works compared to nineteen per cent in lead and eleven per cent in copper. [95, 96] The foremost metallurgist of his time, Henry Hussey Vivian clearly believed that spelter furnaces called for specialist skills over and above those available from the local copper smelter. In his book, King Copper, Ronald Rees refers to an article in the Cambrian asserting that: 'the practice of employing Germans and Belgians in the Tawe Valley zinc Works was largely a response to the absence locally of men with technical and scientific training'.[97] Later in the century the Vivians were key supporters of the move to establish a technical college in Swansea but in the meantime they, along with the other houses, had to make do with recruiting from the Continent where zinc smelting was more advanced. [98]

Advertisements were placed in Belgian newspapers and Georges Borgnet explained that although the Vivians had no problem finding workers for its copper works locally it had to look further afield for spelter workers and use its continental agents to engage men in Belgium and Germany and send them to Swansea at the firm's expense.[99,100] Borgnet claimed that the overseas recruitment was necessary because 'English' workers did not relish the arduous work 'especially in the hot summer months'.[101] According to R.O. Roberts some thirty Belgian and German workers responded:

> 'their coming due not only to their skill and experience of spelter production but also the reluctance of local workers to enter the zinc

[95] R.O. Roberts asserts that skilled personnel appear to have been about a quarter of the total number employed in copper to the mid nineteenth century and "skill requirement was probably similar later in the century and alike also in lead and zinc establishments." T*he Smelting of Non-ferrous Metals since 1750*. op. cit. p62.
[96] Industrial Tables: *England & Wales 1921 Table 2.* p42. From census reports published on www.histpop.org
[97] Rees, R: *King Copper* University Wales Press, Cardiff 2000
[98] R.O. Roberts, *The Smelting of Non-ferrous Metals since 1750,* p63
[99] G Borgnet, *Metallurgie du Zinc* (1875) p581-3
[100] *Cambrian 23 August 1872*
[101] *Vivian & Sons R. R. Toomey p146*

smeltries where 24-hour shifts, Sunday work and extremely arduous and unhealthy conditions prevailed'[102]

Other writers have repeated this claim that the indigenous population were averse to working in the zinc smelters.[103] Examination of the 1871 and 1881 censuses point to the majority coming from within Glamorgan and, when added to those from the counties of west Wales (Carmarthen, Cardigan and Pembroke) they are predominantly Welsh. The proportion of Welsh-born speltermen decreased in 1881 suggesting that the growth of spelter labour in the intervening decade could not be met by the indigenous population, whether from choice or demographic, and had to attract workers from further afield. On the whole the composition of the workforce conforms to the migration theories of Ravenstein and others;[104] the initial wave of migrants travelled short distances with each subsequent wave coming from a wider area; the majority of speltermen in 1871 came from within Glamorgan with a sizable proportion from the neighbouring counties in west Wales and from Gloucestershire and Devon. Further examination of the Glamorgan contingent further supports the theories as the vast majority were born in Llansamlet, representing 22 per cent of the total spelter workforce, followed by Morriston, Llangyfelach and Swansea. The exception to the theory are the significant numbers of foreign workers, representing sixteen per cent of the spelter workforce in 1871 then reducing to thirteen per cent a decade later. This can be explained by the lack of specialist skills in the locality in the early days of zinc smelting and the need to import furnacemen in particular from Belgium and Germany as well as the growth in numbers of indigenous workers.

[102] R.O. Roberts *The Smelting of Non-ferrous Metals since 1750*. p64.
[103] R.O. Roberts *The Smelting of Non-ferrous Metals since 1750*. p64.
[104] UWTSD MA Local History notes, *Migration*, 25 January 2012

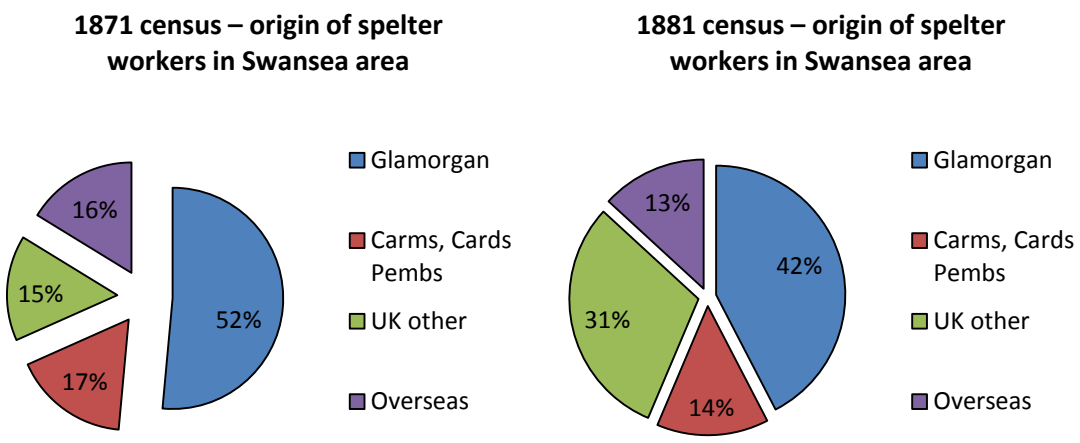



*Fig. 7: origin of speltermen*

The temperament and skill of the overseas workers were considered valuable assets by their employers and when other firms tried to lure them legal action invariably ensued. In 1872 Oscar Hougardi was charged with leaving the Crown Spelter Works without giving the required notice having been induced to do so by Vivian & Sons. It emerged during the trial that Hougardi had previously worked for Vivian and Sons as had Crown Spelter's manager Frederick Dahne who had a history of enticing people away. In another case before the bench, Désiré Sauvage was charged with leaving his work with Vivian & Sons for Crown Spelter without giving requisite notice. Vivian & Sons' legal representative commented:

> 'No one knew better than Mr Dahne himself that the Messrs Vivian & Sons had laid out large sums of money in bringing men from Germany and, to say the least, it was highly improper for him to sanction the enticement of those men away from their original employers.' [105]

There were numerous actions resulting in magistrates ordering men to return to work and serve out their contracts and on one occasion an unsuccessful appeal was made to the Court of the Queen's Bench.[106] By 1873 some of the Belgians had become so despondent that ten of them ran way from Vivians' Morriston Spelter Works only to be pursued to Queenstown in Ireland en route to New York and returned to Swansea where they faced gaol as, being foreigners, they could not meet bail conditions. Borgnet appealed for leniency but the magistrates would not

[105] *The Cambrian* 23 August 1872
[106] *The Cambrian* 28 June 1872

rescind the order and J T Nettell, the works manager had to stand surety in order to have them released to return to work.[107] This apparent contradictory response between harsh legal action and paternalistic benevolence continued up to the turn of the century. In a case in 1900 the Vivian & Sons representative explained that the firm 'brought the cases forward in no vindictive spirit but the abstentions were becoming so frequent and the loss sustained was so great that they were compelled to put a stop to it'.[108]

Typically the contracts given to overseas workers were for twelve months and R O Roberts claims these caused tension between the Belgian and Welsh zinc workers, 'especially in a period of contracting employment as in 1873-4 when the Belgians had advantage of 12 month agreements'.[109] However, court records show the contracts were unpopular with all the men; they tied in the worker for twelve months with the firms retaining the right to terminate at any time on fourteen days notice.[110] The contracts were soon extended to the native workers; as William Clark told the Swansea court in 1872: 'Mr Claus told me that they had 18 men coming from Belgium and that unless I would agree to sign . . . it should be the last day I should work there'. [111] The most contentious issue driving a wedge between Continental and British workers was that the former were paid more. In 1868 the Swansea police court heard that some twenty to thirty German speltermen had been recruited by Messrs Vivian and paid a shilling a week more than the native workers, a situation which had led to considerable bad feeling. The men applied to the magistrates for a summons against Vivian & Sons but the outcome is unknown as the case was adjourned and no further coverage traced, it is likely the firm settled out of court to avoid creating a legal precedent.[112]

R.O. Roberts and others make the claim that very few Welshmen were represented in the managerial and supervisory classes of any of the metallurgical industries and this is illustrated by the employment of Alfred Borgnet as manager of

[107] *The Cambrian* 11 July 1873
[108] *South Wales Daily Post* 28 June 1900
[109] R.O. Roberts T*he Smelting of Non-ferrous Metals since 1750, p60*
[110] *The Cambrian* 1 December 1871
[111] *The Cambrian* 26 January 1872
[112] *The Cambrian* 14 February 1868

the Morriston Spelter works from 1868, succeeded by his cousin Georges. [113,114] According to Roberts less than a third of the agents, managers and undermanagers in the metallurgical industry of the period 1800-1920 were Welsh with the exception of William Jones, manager at Taibach 1800-1830; William Jones at Hafod in the 1830s and William Morgan 1840-80. [115] This reflects the thinking of the time which saw the indigenous Welsh as untrustworthy and unreliable although by 1906 Pendarvis Vivian could see the potential benefits of promoting Welshmen: 'Burgess is of great value', he commented 'brought up from childhood amongst them and knows their Welsh tricks'. [116]

## Working conditions

If the speltermen were "tricky" then it was usually a case of slow working or absenteeism neither of which is entirely surprising considering the conditions in which the men worked. As R O Roberts summarised, speltermen worked long hours under extremely unpleasant conditions:

> 'They endured 24-hour shifts and Sunday working and in addition were susceptible to diseases such as 'spelter shakes' which not only brought about a great deal of ill-health but also led to their death at the average age of 35.'[117]

Indeed, so rife were the nervous incidences brought on by inhalation of poisonous gases that it gave rise to a condition known as 'spelter shakes'. The disease, similar to plumbism, caused disfigurement and ill health often leading to an early death. Faced with no income to support their families, speltermen occasionally turned to the courts; Vivian & Sons were made to pay compensation of £20 to Italian furnaceman after he was incapacitated by led poisoning. Crown Spelter had to pay John Bray 102 3d per week, but when the widow of 34 year old David Hughes sued them for compensation for his early death from plumbism she was unsuccessful as he had also suffered from tuberculosis. [118,119,120]

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[113] R.O. Roberts *The Smelting of Non-ferrous Metals since 1750*. p63
[114] Georges Borgnet., *L'industrie du zinc dans le pays de Galles*. (1877)
[115] R O Roberts, *The Smelting of Non-ferrous Metals since 1750,* p63
[116] Pendarvis Vivian diaries DDPV/17/37 21 August 1906
[117] R.O. Roberts, *The Smelting of Non-ferrous Metals since 1750,* p65
[118] *South Wales Daily Post* 12 January 1910
[119] *South Wales Daily Post* 22 November 1910

The MP Charles Duncan pursued the issue in the House of Commons referring to the 'plight of the Swansea speltermen' which he attributed to excessively long hours and inhalation of poisonous fumes. In 1912 he appealed to the Secretary of State for the Home Department to 'put an end to the sacrifice of health and life resulting from the unreasonably long hours of employment in a poisonous atmosphere by the speltermen in the Swansea district'.[121] It must be noted that Duncan was at the time also General Secretary of the Workers Union who represented the speltermen so was not impartial; however his representation had a long term effect. [122] He pointed out that since July 1907 'no less than seventy seven cases of lead poisoning have occurred, four of which proved fatal'. Lobbying on behalf of the zinc industry resulted in Secretary of State McKenna commissioning the 1910 inquiry into working conditions resulting in new regulations introduced in October 1911 'for the purpose of safeguarding the workers against the dangers inherent to the industry'.[123] The inquiry's conclusion, subsequently made into regulations which affected not only zinc smelting but all industries which dealt with lead, went into significant detail into work processes especially regarding inhalation of dust and sanitation.[124]

Diseases apart, the unforgiving arduous nature of the work and the long hours were extraordinarily detrimental to the men's health. The heat of the furnaces was debilitating and sapped a man of his strength. As Lawrence Holt comments:

> 'it was exhausting, even for fit experienced men, particularly in hot weather. . . charging was done up each vertical row of retorts, each man filling eight retorts which took about six hours – although it was said they could cut this down to five and a half if the 'Swans' were playing at home.'[125]

The thirst of the spelter furnaceman was legendary resulting in copious consumption of beer with inevitable consequences. The pages of the Cambrian are

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[120] *South Wales Daily Post* 7 September 1910

[121] Hansard. Commons Sitting of Monday, 9th December 1912. George V, year 3, 5th series Vol 45.

[122] The Workers Union was founded in 1898 and Duncan was its first President. It merged into the Transport and General Workers Union in 1929. Arthur Ivor Marsh, *Historical Directory of Trade Unions* p475

[123] Hansard. Commons Sitting of Thursday 9th January 1913 . George V, year 3, 5th series, Vol 46

[124] Report of Commissioners 1910 [CD5152] Lead Smelting: Special report on dangerous or injurious processes in the smelting of materials containing lead

[125] Dr Lawrence Holt, *History of the Zinc Industry*

littered with reports of the antics of drunken speltermen and when a St Thomas man was taken to court for running an illegal drinking establishment his defence argued that it was quite reasonable for the defendant to have two 18-gallon casks in his house as he was a speltermen and so were his friends.

> 'It is a well-known fact that these furnacemen drank more beer than most men . . . these people were foreigners and they had a perfect right if they chose to buy their beer in bulk.'[126]

In return for these arduous conditions the salaries paid were far from generous. In the 1917 Parliamentary Enquiry into Industrial Unrest it was said of the spelter industry:

> 'the work is disagreeable and exhausting; the men work excessive hours with no Sunday rest and are paid considerably lower wages than are earned by the steel and tinplate workers.'[127]

Labour in the heavy industries was not a high percentage of overall cost and the works managers were given some latitude to set wages according to supply and demand. R O Roberts observed that while there was a strong demand for labour in tin and coalmining there was a weak demand in metals which explains the discrepancy highlighted by the Parliamentary Enquiry.[128]

When Borgnet was appointed in 1869 to manage the Morriston Spelter Works his salary was £500 per annum with a ten per cent bonus on savings while the ore furnacemen at Hafod were paid by the ton of ore smelter averaging sixteen shillings a week. [129,130] Roberts writes that at the turn of the twentieth century managers and agents in the metalworking industries were earning as much as £750 per annum while the top furnacemen earned six shillings a day and labourers three shillings and sixpence a day.[131] This inflation may be partly caused by the emergence of new industries creating higher demand for labour and also the unionisation of the miners with consequently higher wages. The salary structure in the spelter works reflected the levels of complexity with 1st hand, 2nd hand and 3rd

[126] *South Wales Daily* Post 15 October 1896
[127] 1917-18 [Cd. 8668] Commission of Enquiry into Industrial Unrest. No 7. Division. Report of the commissioners for Wales, including Monmouthshire
[128] R.O. Roberts, *The Smelting of Non-ferrous Metals since 1750,* p63
[129] Pendarvis Vivian Diaries, DDPV/17/01 26 April 1869
[130] Pendarvis Vivian Diaries, DDPV/17/01 10 October 1869
[131] R.O. Roberts *The Smelting of Non-ferrous Metals since 1750,* p65

hand furnacemen all on different rates. In 1912 Crown Spelter were paying their first hands eight shillings per shift, the second hands six shillings and ten pence and helpers (labourers) five shillings and tuppence.[132] Toomey points out that the salary package extended beyond pay referring to 'hidden allowances . . . awarded according to supposed need' which would typically include subsidised housing and sometimes fuel.[133]

While it is likely that the speltermen cast covetous glances at the pay packets of their neighbours working in tin and steel it was the hours they worked that was the main grievance. Charles Duncan MP took up the cause of their "excessive hours" with the then Home Secretary, Winston Churchill. Churchill told the House of Commons that speltermen worked 56 to 60 hours weekly and had been subject to a Parliamentary Enquiry which although commenting on the long hours had, to the dismay of many in the industry not made any ruling on working hours. [134,135] Consequently two years later Charles Duncan was able to claim the men worked successive working weeks of 94, 68 and 48 hours averaging 70 hours weekly.[136] Crown Spelter, claiming to be representative of all the spelter works in the Swansea district, provided the South Wales Post with details of the hours worked by their furnace gangs in 1912; it claimed each gang worked nine hour shifts with one and a half hours allowed for stoppages including meals. The men's union was swift to reply on their behalf claiming that averaging the hours across each gang obscured the facts and that in any case the men were in the employ of the company for the whole of the shift and therefore stoppages for meals and so on should not be deducted as 'the men had to give attention to the furnaces at all times'. James Wignall provided a detailed breakdown of hours worked over the three-week shift pattern concluding that First Hands worked an average of 10 hours; Second hand $10\frac{1}{2}$ hours and helpers seven hours [137,138]. [see A4]

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[132] *South Wales Daily Post* 9 December 1912
[133] R.R. Toomey, *Vivian & Sons* p147
[134] Hansard. Commons Sitting of Friday 18th November 1910 . George V, year 1, 5th series Vol 20
[135] Report of Commissioners 1910 [CD 5152] Lead smelting. Special report on dangerous or injurious processes in the smelting of materials containing lead
[136] Hansard. Commons Sitting of Wednesday 4th December 1912. George V, year 3. 5th series, Vol 44
[137] James Wignall was the south Wales organizer for the Dockers' Union

Undoubtedly the biggest issue of all was that of Sunday working, an issue that was to propel the Speltermen into headlines over an eighteen month campaign concluding in a nine week lockout. It was a campaign that brought widespread support across the board from workers in other industries, the media including both Cambrian and Daily Post, and the churches and chapels. The dispute is an important, if overlooked part, of Swansea's contribution to British labour relations and highlights the way in which special interest groups adopted a pragmatic approach to furthering their own aims. The reputation of the speltermen as heavy drinkers highlights the incongruity of their alliance with the chapels and Sunday observation societies who were to be among their biggest supporters in the battle against Sunday working; the speltermen and their unions would claim that Sunday working did not allow for their spiritual fulfilment whereas all the evidence is that a great number of the speltermen would probably have chosen to spend the day with beer in hand; however, the evangelical groups were happy enough to overlook the reality on the ground in order to make their point.

The dispute arose within a period John Davies describes as the "Great Unrest," an international phenomenon which was particularly apposite to south Wales. [139] A new unionism, aligned to the early development of the Independent Labour Party, witnessed a growing breakdown between the owners and the labouring classes leading to discontent, strikes and riots as evidenced by the Tonypandy Riots in 1910, the Cardiff Dock Strike in 1911 and then the ill-fated Railway Strike of 1911. Most of the history of south Wales unionism is based on that of the coal miners who were at the vanguard of the struggle for improved conditions and pay; their struggle and in particular their success in achieving the Eight Hour Act of 1908 would have inevitably had some effect on the speltermen who lived amongst them in the neighbourhoods of Morriston and Llansamlet.

Outside the coal industry the Workers' Union was to become a major influence in Swansea; the only branch outside Merthyr Tydfil, Swansea had only a handful of members until 1907 when its recruitment among the spelter and lead

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[138] *South Wales Daily Post* 12 December 1912

[139] John Davies, *History of Wales* (Penguin, London: 1993) p485

workers proved to be fruitful[140]. The representation of speltermen was fragmented; there was a short-lived Copper, Spelter and Alkali Workers Union, the Tinplate Workers Union, the Dockers Union which had won local support from the Swansea Docks strike of 1895 and the Gasworkers' Union. When the Dillwyn men were out for four weeks over pay in 1893 the General Manager, John Corfield, refused to conduct negotiations through representatives of the Dockers' Union and insisted instead on dealing directly with the 120 men concerned. When work resumed in April the South Wales Daily Post commented. 'A strike is such an uncouth, unsatisfactory and illogical method of coming out a difficulty.'[141] The issue did not end with the return to work however, as the repercussions made it to the County Court with some of the men suing the firm for loss of pay held in hand at the start of the dispute and a counter claim for damages by Dillwyn & Co. The court found in favour of Dillwyn & Co.[142]

Over the next twenty years the Cambrian and Daily Post report regular disturbances in the district's spelter works usually over pay or, as at Swansea Vale in 1910, over working conditions. In the latter the manager, Mr R Martin JP., introduced a new mode of working the furnaces 'which the men contend is of a more arduous nature, owing to the greater heat they have to bear' and for which they sought recompense in the form of an additional three pence a day. When the men refused to implement the new working methods the management locked them out and took the opportunity to carry out extensive repairs[143] and work did not resume until late November. [144, 145]

In the meantime the Worker's Union was gathering support and its leadership saw in the speltermen's cause an opportunity to galvanise public opinion under the local leadership of Matt Giles of the Independent Labour Party and supported from the very top by Charles Duncan MP, the union's first General Secretary. They worked with other unions such as the Dockers and Gasworkers in a

[140] Richard Hyman: *The Workers' Union* (Oxford University Press: 1971) p26
[141] *South Wales Daily Post* 15 April 1893
[142] *South Wales Daily Post* 27 July 1893
[143] *South Wales Daily Post* 25 August 1910
[144] *South Wales Daily Post* 4 August 1910
[145] *South Wales Daily Post* 24 November 1910

concerted action seeking the abolition of Sunday working to bring the speltermen in line with other workers of the district[146]. The insistence by the spelter houses on a seven-day working week had long been a sore point with their workers; as R O Roberts points out copper and other workers did not face the same stricture:

> 'The period of exposure to the harsh conditions were long in the copper industry where twelve hour shifts were usual and the only appreciable break was on each Sunday when the work was largely confined to keeping 'dead flue' in the furnaces and the preparing for full heat by five on Monday morning.'[147]

The men's dissatisfaction was apparent as early as 1870 when Vivian & Sons identified one of the benefits of a Belgian furnace as 'being easier on the men and enabling them to have every other Sunday at home.'[148] Despite this, Sunday working continued to be the norm at Vivians and other spelter houses for over another 30 years.

Eventually, with other industries abandoning Sunday working, the speltermen had enough and the origin of the 1912-13 strike can be seen as early as September 1910 when Giles wrote to the Daily Post on behalf of the workers at Upper Bank and Morriston Spelter Works proposing the abolition of Sunday 'charging' at the works and instead keeping the furnaces on "dead fire". In an attempt at rationality, a hallmark of the union's approach, he recognised there would be cost implications in damping down the furnaces as a skeleton staff would have to be paid to watch the furnaces however, he claimed the manufacturers would benefit as the men would be more efficient and less prone to illness and disease. In a calculated appeal to Swansea's chapel-going population he concluded:

> 'The Divine Law of one day's rest in seven squares with all the conclusions of science in proclaiming the necessity of rest from continuous work; ignore the law and we must pay the penalty'.[149]

The pressure was turned up the following month when Charles Duncan himself visited Swansea to give support to the campaign: 'every man following this

[146] *South Wales Daily Post* 5 June 1911
[147] R.O. Roberts *The Smelting of Non-ferrous Metals since 1750,* p63
[148] West Glam RO D34/6/1/3 *Spelter matters 1870* (unattributed)
[149] *South Wales Daily Post* 17 September 1910

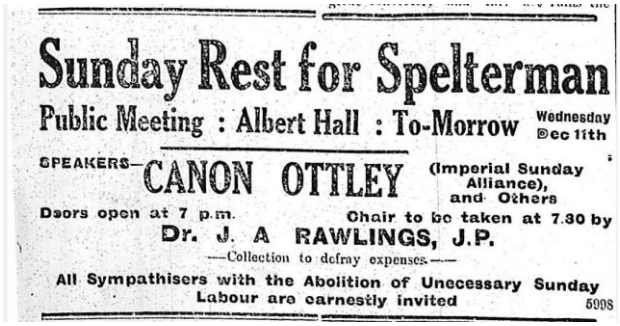
kind of employment was,' he alleged 'gradually committing suicide by the very method of earning his living'.[150] The owners fought back claiming that abolition of Sunday charging would drive up the cost of manufacture to such a degree that would make them uncompetitive internationally and ruin the industry.

No resolution was possible between the two entrenched positions and on Sunday 10 November 1911 a mass meeting of the speltermen took place at Swansea's Albert Hall. They anticipated the owners' response and vowed that if any men were locked out the following morning they would all strike. The following morning the Crown Spelter Works at Port Tennant locked out its 250 men and by night some six hundred speltermen were on strike. [151] The main body of the men worked at four key works: Crown Spelter, Upper Bank, Morriston Spelter Works and Swansea Vale. Dillwyn & Co, whose men worked only one Sunday from three continued to work normally despite the attempts of the striking speltermen to persuade them to join in.[152] The strike achieved almost daily coverage in the Daily Post which was scrupulously even handed in what was fast becoming a stand-off situation. The spelter masters claimed that if they were to damp down furnaces on Sundays they would not regain efficiency until Tuesday or Wednesday while the men contented that if the furnaces were watched on Sundays they could be fully efficient on Monday morning: 'We proved out case last Christmas when at one of the works we had two days off and the furnaces were in splendid condition on the third day'.[153]

Letters to the employers and demonstrations continued but the employers were immoveable, as the Daily Post commented 'so long as the men adhere to their present position there is no possibility of arriving at a resumption to work.'[154] Pendarvis Vivian urged united action on the part of the employers as the abolition of Sunday working would have 'fatal consequences to the industry'.[155] The original four stood firm but Villiers joined Dillwyn in breaking ranks. On 10 December The

[150] *South Wales Daily Post* 10 October 1910
[151] *South Wales Daily Post* 11 November 1912
[152] *South Wales Daily Post* 12 November 1912
[153] *South Wales Daily Post* 20 November 1912 & 26 November 1912
[154] *South Wales Daily Post* 29 November 1912
[155] *Pendarvis Vivian Diaries* DDPV 17/43 5 and 7 December 1912

Daily Post reported that Villiers Spelter Works had suspended Sunday charging and the furnaces were working satisfactorily 'in fact two out of the three furnaces produced more metal on Monday December 2nd after the Sunday stoppage than on any other day of the week'.[156]


Sunday Rest for Spelterman
Public Meeting : Albert Hall : To-Morrow Wednesday Dec 11th
SPEAKERS—CANON OTTLEY (Imperial Sunday Alliance), and Others
Doors open at 7 p.m. Chair to be taken at 7.30 by
Dr. J. A RAWLINGS, J.P.
—Collection to defray expenses.—
All Sympathisers with the Abolition of Unecessary Sunday Labour are earnestly invited
5998

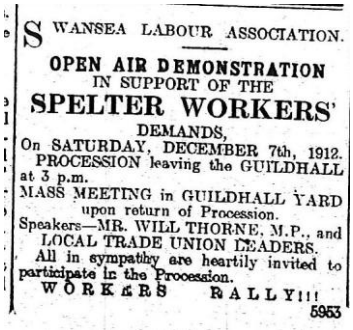

SWANSEA LABOUR ASSOCIATION.
OPEN AIR DEMONSTRATION
IN SUPPORT OF THE
SPELTER WORKERS'
DEMANDS,
On SATURDAY, DECEMBER 7th, 1912.
PROCESSION leaving the GUILDHALL at 3 p.m.
MASS MEETING in GUILDHALL YARD upon return of Procession.
Speakers—MR. WILL THORNE, M.P., and LOCAL TRADE UNION LEADERS.
All in sympathy are heartily invited to participate in the Procession.
WORKERS RALLY!!!
5953

Plate 4: press advertisements for Sunday Rest campaign [157], [158]

Support for the strike was strong in the town for example a benefit rugby match between the Speltermen and Dockers took place at Swansea Rugby Club with the mayor kicking off.[159] However, the cause of the speltermen was spreading wider. The Imperial Sunday Alliance League, a national pressure group dedicated to keep Sunday sacred, was a natural ally and one of its leadership, Canon Otley of London, travelled to Swansea where he addressed public meetings. However the local clergy of the established church were placed in a difficult position; by nature they were part of the establishment and close to the owners yet it was difficult to ignore support for men who expressed a wish to observe the Sabbath. In a classic piece of fence-sitting the Rev. and Hon, Talbot Rice, Vicar of Swansea, himself the scion of industrial capitalists, wrote:

> 'it must not be thought to imply a lack of sympathy with men who desire a weekly rest day or a Sunday every week . . . only necessary work should be done on Sunday . . it is extremely difficult for us to decide between two parties in a business which we do not understand.'[160]

A relief fund set up for the speltermen showed the non-conformist churches were not so reluctant to nail their colours to the mast and the published list of supporters

[156] *South Wales Daily Post* 10 December 1912
[157] *South Wales Daily Post* 10 December 1912
[158] *South Wales Daily Post* 5 December 1912
[159] *South Wales Daily Post* 9 December 1912
[160] *South Wales Daily Post* 12 December 1912

show most of Swansea's chapels, trades union branches, men from the other industries as well as some pubs! [see Appendix A5] The Executive of the Swansea Free Church Council passed a resolution expressing its sympathy with the speltermen's cause and offering to act as intermediaries. [161]

Meanwhile Charles Duncan kept up the pressure in the House of Commons raising questions on the issue of the Swansea 'lock out'[162] and then subsequently asking the Home Secretary about the Villiers experience to which Ellis Griffith replied that he had no particulars 'as to how that experiment was progressing.'[163] The Mayor of Swansea, Councillor David Williams, sought to arbitrate between the two factions but the best he could achieve was the agreement that the men be allowed back to work, not any movement on the issue of Sunday charging.[164] There was talk of establishing an arbitration panel similar to that employed in the tinplate industry but the employers were opposed.[165] A difficult Christmas beckoned for the speltermen and their families and then, in January, matters suddenly changed.

Despite all the support the speltermen found the owners implacable in their opposition. James Wignall, one of the men's key representatives, explained that:

> 'we could not get abolition of Sunday labour after 18 months' negotiations and a nine week strike and the threat of the employers to close the works down rather than conceded the point together with their unanimous refusal to agree to the question being referred to arbitration [left us with no option]' [166]

The dispute was formally ended on 10 January 1912 with the men winning extra pay for Sunday working but not its abolition.[167] Unusually, both Swansea newspapers had expressed sympathy with the speltermen's cause. The Cambrian, renowned for its Conservative position, concluding:

> '. . .there will be general public regret that seven day a week labour is still demanded from the same set of men. It seems an anachronism in

[161] *South Wales Daily Post* 19 November 1912
[162] *Hansard.* Commons Sitting of Wednesday 4th December 1912. George V, year 3. 5th series, Vol 44
[163] *South Wales Daily Post* 13 December 1912
[164] *South Wales Daily Post* 16 December 1912
[165] *South Wales Daily Post* 24 December 1912
[166] *South Wales Daily Post* 14 January 1913
[167] *South Wales Daily Post* 10 January 1913 & *Cambrian* 10 January 1913

the twentieth century to have conditions prevailing that are reminiscent of what has been abolished elsewhere many years ago'.[168]

However the legacy of the speltermen's fight lived on and their plight figured prominently in parliamentary debates of the Weekly Rest-Day Bill of 1913 which sought to secure a six-day working week for all workers as well as bank holidays and a week's paid holiday.[169]

> Secure one day's rest in seven for all workpeople; to make the first day of May a Bank Holiday throughout the United Kingdom; to secure a Week's Holiday for workpeople; and to secure Payment of Wages for Public Holidays.

The Bill went through two readings before being postponed in 1914 and then overtaken by war. Restricted working hours would have to wait for the post war social reform programme but its origins can clearly be seen in the pre-war spelter industry.

[168] *Cambrian* 10 October 1913
[169] *Hansard.* Commons Sitting of Wednesday 9th July 1913. George V, year 4. 5th series, vol 55

# Chapter 3: Impact on the community

Zinc smelting was a major industry in the Swansea area and inevitably impacted its development. This chapter sets out to examine the contribution it made to Swansea's economy, both directly and indirectly; the extent to which it had an impact on the physical development of the town and its hinterland; and to what extent 'spelter communities' existed and whether they had a specific identity. For the purposes of this research Swansea is taken to include the civil parishes of Llansamlet and Clase which, although partly incorporated into the town in 1894, were not fully incorporated until 1918[170].

## Economic impact

Although the spelter industry was a significant presence in the area at the turn of the twentieth century, for reasons that have been covered in previous chapters it never realised its economic potential. However, it did help to mitigate the effects of copper's decline providing direct employment for numerous workers as well as indirect employment in the building and servicing of the works and in subsidiary industries.

Despite its volatile nature and periodic slumps the overall trend for spelter through the second half of the nineteenth century was one of growth. Commentators such as R O Roberts observe that production picked up pace from 1882 onwards when manufacture of copper was declining and by the turn of the twentieth century zinc was making a significant contribution to Swansea's economy.[171]

In terms of employment an article in the South Wales Evening Post in 1922 claimed that there were 2,000 workers employed in the six spelter works of Swansea at that time but, as the census reports shows, this is at odds with data from the 1921 census which gives a total of 920 employed in the manufacture of zinc and spelter in the UK as a whole, and just 536 of them (41 per cent) in Swansea

[170] It has on occasion been impossible to disaggregate the impact of individual industries in which instances I have applied the data for the metallurgical sector as a whole and noted it

[171] R.O. Roberts, T*he Smelting of Non-ferrous Metals* p47

Borough Council [see Appendix A6]. [172,173] [174] All the industry commentators point to a massive increase in output of zinc during the First World War. The fall in employment between 1911 and 1921 therefore points to a precipitous decline in the industry post war accounting for the closure of five of Swansea's six works by 1930.

The employment generated by the industry was not restricted to the primary activity of zinc smelting; spelter also spawned its own subsidiary industries, especially in yellow metal and sheet galvanising. This contribution is illustrated by the building of the Neath Steel, Sheet and Galvanising works in 1896; addition of a galvanising plant to the Bryngwyn, Gorseinon works in 1908; and the addition of a sheet and galvanising plant at the Worcester Works, Morriston, in 1909.[175] In another example of inter-relativity, the sulphuric acid produced as a by-product of both copper and zinc production was used by the galvanising and tinplate industries hence the establishment of acid plants nearby. There were also the foundries and engineering works, essential to the building and maintenance of the smelters, and the supply of firebricks – all of which derived a significant amount of their business from zinc production at the close of the nineteenth century. The Butcher's South Wales Commercial Directory of 1881-2 lists four brass foundries, two chemical manufacturers, and seven metal merchants in Morriston and a chemical manufacturer in Llansamlet.[176] Kelly's 1891 directory for the Swansea area lists

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[172] *South Wales Evening Post* 23 February 1922

[173] 1851 – 1911 data from R.O. Roberts, *Development & Decline of non-ferrous smelting industries* in south Wales in Industrial South Wales 1750-1914 in *Essays in Welsh Economic History (London: 1969)* pp. 121-162. *1921* data from *England and Wales Census Report 1921, Industry Tables,* Table 4, p345/6. Accessed via www.histpop.org

[174] In *Development and Decline*, R O Roberts makes the point that in 1921 metal workers for each of the Welsh counties was described according to the nature of their work rather than according to the medal in which they worked. However the 1921 Census Industry Tables relate to industry categorisation rather than occupation; these are not broken down by county but a footnote provides the numbers employed in the zinc works situated within Swansea BC. In 1851 a similar discrepancy was noted regarding copper with local sources claiming 3,500 men employed but the census only 1,679. R. O. Roberts and others have attributed this to the census enumerators ignoring ancillary workers in their categorisations and something similar maybe applied to spelter in 1921 R.O. Roberts T*he Smelting of Non-ferrous Metals since 1750,* p55

[175] Trevor Williams, *Economic Development of Swansea*, p 116 and p180-181

[176] *Butchers South Wales Commercial Directory 1881-1881*

three brass foundries, five chemical manufacturers, four fire brick makers, one gunpowder manufacturer and two yellow metal manufacturers.[177]

The New Swansea Guide of 1823 makes the point that any calculation of the employment impact of the smelting industries must also include the collieries which supplied coal for smelting and the port and shipping which brought in the ore and exported the final product: 'the smelting establishments on the Swansea river alone, with the collieries and shipping dependent on them support a population of from 8 -10,000 souls, and cause circulation in their vicinity of from 2, to £3,000 weekly.'[178] It further surmised that the benefits were not limited to direct expenditure but indirectly such as providing horses for the works and producing food for the working population.

The economic multiplier achieved from downstream products and services was significant; in 1863 the expenditure of the non-ferrous works in south Wales was estimated as: 'not less than £200,000 a year' and by 1910 the South Wales Daily Post attributed '£5 worth of work' for each ton of spelter produced as well as consuming five tons of coal [179,180.] The communities in which the speltermen lived saw a proliferation of service industries ranging from shopkeepers and publicans, especially publicans, to funeral directors and, from the early twentieth century, providers of leisure activities such as cinemas.

Another way of measuring economic impact is output. In 1858 the output value of copper was estimated at £3.5 million, by 1910 that had dropped to £2 million whereas the output of zinc was 'nearly that of the entire kingdom, the annual value being given as £500,000' and they were both dwarfed by output of the growing tinplate market at £5 million. [181, 182] As we see from Appendix X the import of zinc ore to Swansea peaked in 1910 at 65,000 tons (representing about a third of

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[177] *Kelly's Post Office Directory Morriston and Swansea 1891*

[178] *The New Swansea Guide* (1823) pp 32-33 quoted in Roberts, R.O., *Development and Decline* p96

[179] *Proceedings of the Subscribers to the Fund for obviating the inconvenience arising from the Smoke produced by Smelting Copper Ores etc* (London 1863) p83 quoted in Roberts R.O., *Development and Decline*, p97

[180] *South Wales Daily Post* 15 January 1910

[181] C.S. Hall, *Book of the Wye and the Coast* (London, 1861) pp338-9 quoted in R.O. Roberts T*he Smelting of Non-ferrous Metals since 1750,* p96

[182] J Heywood, *Illustrated Guide to Swansea and the Mumbles (1911) p7*

copper ore at its peak) making the industry a major customer for Swansea Port's developing facilities.[183] According to Trevor Williams as the import of copper ores declined so 'zinc, iron pyrites, lead and other ores were important imports into Swansea during the last decades of the nineteenth century'.[184]

The other primary industry in the area was coal and its interests and that of the smelting industries are inextricably linked. The smelting of zinc required five tons of coal for every ton of spelter produced and by this estimate in 1912 the 27,000 tons of spelter made in Swansea would have required 135,000 tons of coal [185,186]. Moreover, Pascoe Grenfell & Sons, giving evidence at the Copper Smoke trial of 1833, alleged that the bituminous coal produced locally was not commercially viable for anything other than smelting and while this statement was no doubt exaggerated, R O Roberts points out that the smelters did take some poor or unmarketable coals [187,188.] The smelting and coal industries were also linked through shipping, the ships bringing the precious ores to Swansea from all over the world and laden with coal on their return trip. This interdependence between the workers in the coal and spelter industries becomes strikingly apparent during the coal strikes of the early twentieth century; The Times, reporting from Llansamlet on the miners' strike of 1912, reveals that much of heavy industry in the area was rendered idle as a consequence, including four spelter works: 'here is a whole community temporarily turned adrift by the action of the miners.' [189]

The spelter industry's impact on the development of the transport infrastructure on land is less direct; the Smith Canal was already established before the arrival of zinc smelting in Swansea and its presence an influential consideration in the location of the smelters. When the Great Western Railway to Landore and the Swansea and Neath Vale Railway route through Llansamlet opened in the 1860s the spelter industry in the area was still in its infancy and, according to Trevor

[183] R.O. Roberts T*he Smelting of Non-ferrous Metals since 1750,* p55
[184] Trevor Williams, *Economic Development of Swansea*, p154
[185] *Cambrian Daily Leader*, Industrial Supplement November 1913
[186] *South Wales Daily Post* 15 January 1910
[187] UWTSD MA Social History course notes: The Copper Trials of Carmarthen 29.02.2012
[188] R.O. Roberts, *Development & Decline*, p97
[189] *The Times* 6 Mach 1912 p10

Williams, its presence was more a cause than effect.[190] However, as the industry grew it provided traffic for the network and junctions at Swansea Vale and Six Pit serviced the spelter works.

Sadly, the lack of investment in Britain amidst growing international competition in the twentieth century meant the zinc industry would never fulfil its economic potential and contribute a legacy to the economy of Swansea; its environmental legacy, however, was a different story.

## Environmental impact

The speltermen were not only at risk of poisonous fumes at work, they and their families were at risk at home as well. So all-pervasive was the spelter smoke that it became part of common parlance as witnessed by an article in the South Wales Daily Post saying of a defendant in court in 1898: *'*the language she used was about as thick as spelter smoke and equally as sultry.*'*[191] Indeed spelter smoke was such an accepted fact of life that there is hardly mention of it in the local newspapers.

The issue of spelter smoke in the Swansea area followed on the heels of copper smoke which had, for over a century, blighted the areas downwind of the smelteries. According to Alexander the smoke 'was so laden with sulphurous and sulphuric acid that all vegetation on White Rock and Kilvay Hills was completely burnt up'. [192] The copper masters made a token effort to alleviate the problem by building taller stacks however this only succeeded in spreading the smoke over a wider area and in 1832 a group of Llansamlet farmers sought damages against Vivian and Sons. The 'Great Copper Trial' was held in Carmarthen in 1833; it was a notoriously one-sided affair with the establishment, including the medical profession, lined up to support Sir John Vivian and inevitably the verdict went in the copper master's favour. [193]

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[190] Trevor Williams, *Economic Development of Swansea*, p135-6
[191] *South Wales Daily Post* 25 January 1898
[192] W.O. Alexander., *A Brief Review of the Development of the Copper Zinc and Brass Industries in Great Britain* in *Murex Review* Vol1, No.15, 1955 p415
[193] UWTSD MA Social History course notes: The Copper Trials of Carmarthen 29.02.2012

Following the trial efforts were made to ameliorate the output of copper smoke and the Vivians were credited with successfully introducing the Gershenhofer process which piped off the sulphur gas to manufacture sulphuric acid much to the benefit of the environment - and the VIvians' coffers. However W. O. Alexander observes that the other copper works were slow to follow suit and that the 'degree of success achieved in reducing copper smoke was offset by pollution caused by new zinc furnaces from the 1870s onwards.'[194]

The communities of Llangyfelach and Llansamlet were now blighted by spelter smoke which was even more invidious as it contained lead and arsenic. As with copper smoke, it was the working men's communities which were most affected, the masters ensuring their mansions and homes were located on the seaward side.

The silence with which the authorities responded to the issue was broken in June of 1912 when a report by Medical Officer of Health, Dr E Rice Morgan, began a long running debate on poisonous fumes emitting from the Swansea Vale Spelter Works. [195] He wrote:

> 'the evidence collected . . . has convinced me that unless immediate action is taken to prevent the emission of the fumes . . . [the result will have a] deleterious effects upon human beings, particular those above middle age.'

Unlike the Carmarthen Copper Trials of 1833 the medical profession was not to be silenced this time. Two months after first raising the issue Dr Rice Morgan pleads with Swansea Rural District Council to intervene and serve an order on Swansea Vale Spelter Works:

> '. . .such air breathed into the lungs is injurious to human beings. Hence it becomes imperative on my part to urge you as custodians of the health of the public to lose no further time to put a stop to the poisoning of the atmosphere'.

Among the gases emitted was the highly poisonous sulphurous acid $SO_2$; when horses grazing on nearby fields started dying, autopsies were ordered and contents of the intestine and stomach revealed abnormally high quantities of arsenic, lead

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[194] W.O. Alexander, *Development of Copper, Zinc and Brass Industries* p415.

[195] Report of Medical Officer of Health on the sanitary condition of Llangyfelach Division of Swansea Rural District Council for the year 1913. Dr E. Rice Morgan. Swansea Reference Library

and zinc. At this point Charles Duncan MP stepped in to the fray asking questions of the Home Secretary in the House of Commons, it was to no avail as the Home Office only had jurisdiction over the workplace and the responsibility lay with the local authority. [196,197]

Given the prevailing south westerly wind direction, the problems impacted on Llansamlet and Llangyfelach, communities within Swansea Rural Council whereas the Swansea Vale Spelter Company works now lay within the boundaries of Swansea Borough Council. This became a cause of friction and, ignored by their neighbours, the Rural Council eventually referred the matter to the Local Government Board.[198] The Swansea Vale Spelter Company did agree to install a sulphuric acid plant to deal with the poisonous by-product but a series of industrial disputes were followed by the outbreak of war after which the councils were merged in 1918.

The reports of the Medical Officer of Health for Swansea Urban Council between 1876 and 1899 make no reference to the zinc industry or to illnesses specific to it. However, in 1893 there is a reference to the increasing incidence of cancer which 'during the last seven years, with the exception of 1891, has shown a steady increase in fatality, caused 63 deaths against 48 in the preceding year.' The annual cancer mortality per ten thousand of population rises from 2.88 in the period 1866-75 to 4.3 in 1876-85, 6.5 in 188-95 and 8.34 in 1896 and with the benefit of modern medical knowledge it is likely this was a result of the pollution caused by the smelting industry[199].

The Copper industry had already taken its toll on the vegetation of the lower Swansea valley: in 1848 it was reported that 80,000 tons of sulphuric acid was discharged annually in West Glamorgan, fumes destroyed vegetation, contaminated the soil and caused erosion in the region of the copper works.[200] Spelter continued the damage; R O Roberts states that fumes from zinc smelting were responsible for

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[196] *Hansard.* HC Wrt Ans 16 December 1912
[197] *Hansard.* HC Deb 09 January 2013 vol 46 cc1379-80
[198] Minutes of Swansea Rural District Council, West Glam RO 1912-1913
[199] *Swansea Health Reports* (bound volume) 1892-1899. Swansea Reference Library S614.424
[200] W.O. Alexander, *Development of Copper, Zinc and Brass Industries,* p415

contamination of soil to the north east of Llansamlet and Lawrence Holt that the marsh zone near the river Tawe 'became a convenient spot for dumping activities'.[201,202] The effects were to have long term consequences; as part of the Lower Swansea Valley reclamation initiative in the 1960s one project sought to establish grasses on zinc smelter waste. Growth of most grasses was unsuccessful, attributed to long-term zinc toxicity however, some 'zinc-tolerant' populations were established and the site was eventually grassed over.[203]

## Settlement

As shown in Fig. 10 the spelter industry was concentrated in the lower Swansea Valley between White Rock and Llansamlet and the only exception of any size was the works at Port Tennant. The copper industry had already established itself on the west bank of the river Tawe and when the spelter industry sought to locate in the vicinity during the second half of the nineteenth century the west side of the valley was already dense with copper works, its allied trades and wharfages; Vivian & Sons converted the Forest works in Morrison and Grenfell the Upper Bank Works but new ventures such as Dillwyn, later on Villiers and Swansea Vale had to occupy the land further north to the east of the Tawe which, by now, had access to both the Smith Canal and the railway network. Trevor Williams observed, 'it is no wonder … that population densities increased in proximity to the 'new industries.'[204] The speltermen would have no transport to work which necessitated living within walking distance but contemporaneous maps show housing located slightly away from the works, not through any environmental concern but because the land around the river, canals and railways was required for industry which needed them to import their coal and ores and export the finished goods.

[201] R. O. Roberts., *Enterprise & Capital,* p71
[202] Lawrence Holt, *History of the Zinc Industry*
[203] R.O. Gemmell & G.T. Goodman , *The maintenance of grassland on smelter wastes in the lower Swansea valley* in *Journal of Applied Ecology*, vol17 (1980), pp461-468
[204] Trevor Williams, *Economic Development of Swansea*, p163

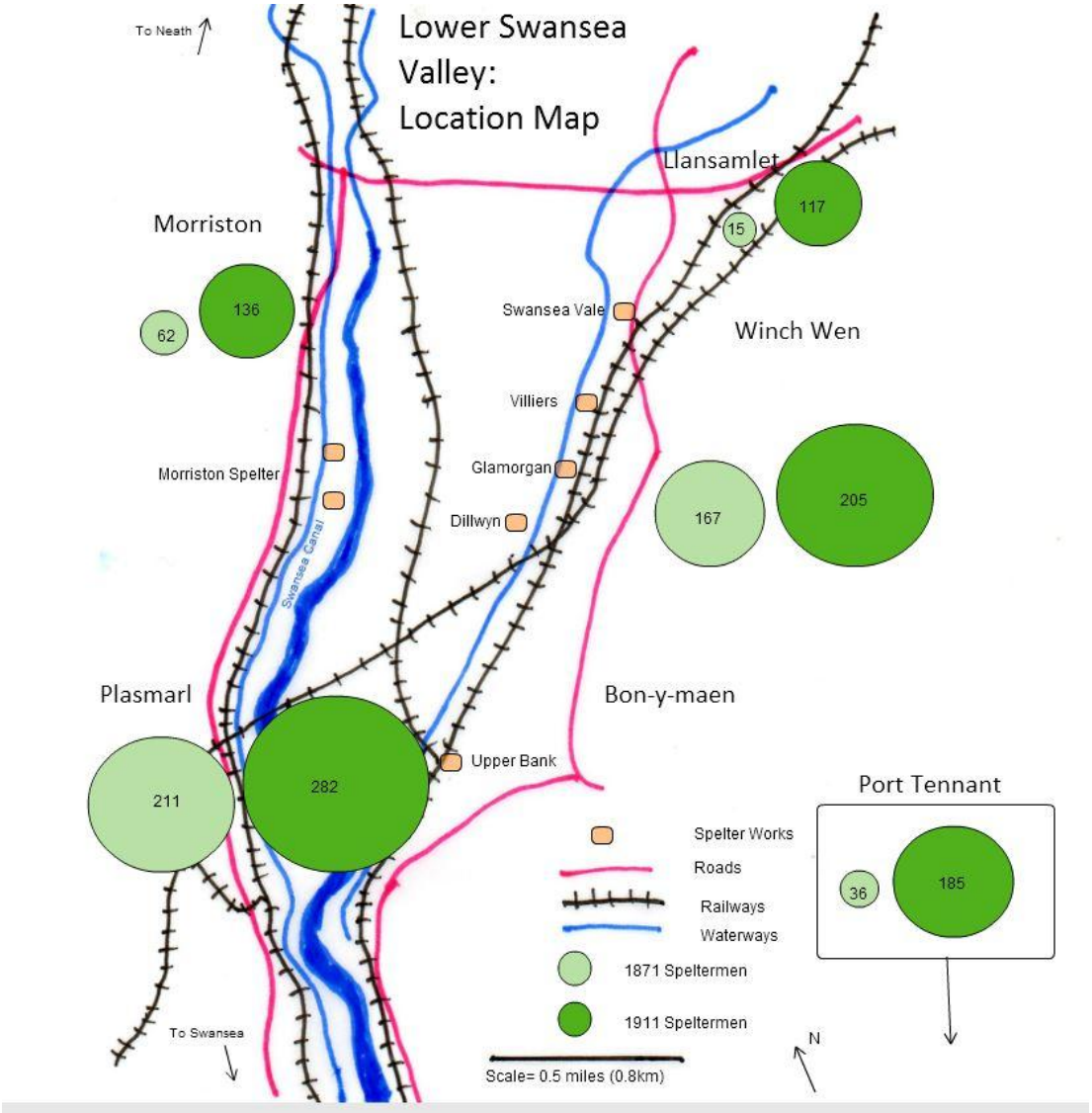


*Fig 8: Speltermen population by location*

Analysis of the 1871 and 1911 census returns identifies the location of speltermen and number of speltermen. [see Figs. 10 & 11 also Appendix A7]. The 1871 census shows that the speltermen settled in five clusters although they were not a dominant presence in any of them. There was a small community in Port Tennant and others at Morriston, Plasmarl/Landore, Llansamlet and Llansamlet Lower, the latter encompassing the villages of Bonymaen, Pentrechwyth and

Cwm[205]. The foreign workers brought in by Vivian & Sons were housed in the barrack houses at Morriston next to the works but the other speltermen lived in mixed communities. On the Llansamlet side of the river, a study of the 1891 census for Mansel Road shows five speltermen living alongside 18 workers in collieries and three in tin/steel [Appendix A9]; the sample reflects a typical community on the periphery of the town, largely self sufficient with two grocers, a blacksmith, printer, plasterer and even a hairdresser.[206] In 1871 the working population of Morris Street and Davies Street in Morrison consisted of speltermen, tinplate workers, masons, and a copper furnaceman. [Appendix A8][207] The largest concentration of speltermen in 1871 was in the Plasmarl area of Landore which together with those at Morriston would have served the Vivian's large enterprise; but there were almost as many on the east side of the valley some around Llansamlet and the majority in Llansamlet Lower.

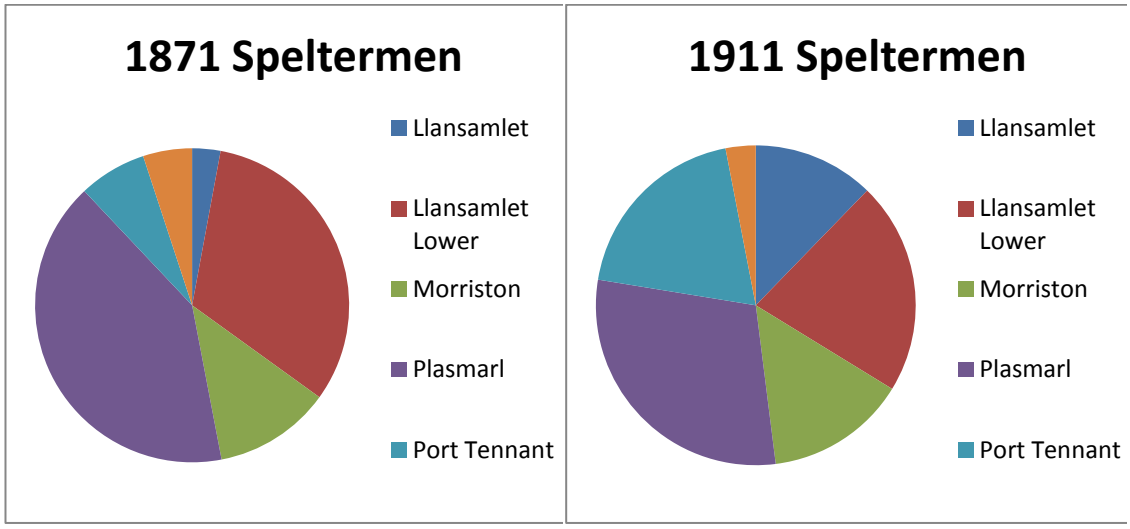


*Fig 9: Location of speltermen*

By 1911 the number of speltermen employed in the district had grown but there were also changes to their location, they remained in the same five clusters but in different proportions.[208] Although Plasmarl retained the highest concentration of speltermen other areas enjoyed greater growth: English Crown Spelter had taken over the Port Tennant works after several abortive attempts

[205] *1871 Wales census* Llangyfelach, Llansamlet and Swansea enumeration districts see appendix X
[206] *1891 Wales census* RG13/5082/1009/5-9
[207] *1871 Wales census* Llangyfelach Enumeration Dist 3
[208] *Wales 1911 census* Swansea enumeration districts

under previous ownership and there was a fourfold increase in speltermen there; the number of speltermen around Llansamlet grew by nearly 700 per cent during the 40 year period which can be attributed to the formation of the Villiers works there in 1873 and Swansea Vale in 1876; and this general consolidation of the industry saw the failure of many smaller operations so that although the spelter industry in Llansamlet Lower increased by some 24 per cent in the 40 year period, it accounted for a lower proportion of the total of speltermen.[209]

The growth in speltermen in these areas was indicative of a general increase in population during the closing decades of the nineteenth century. As we see from the Fig. 12 the rise in population from 1851 to 1891 were marked especially in the Clase district which encompassed Plasmarl and Morriston where numbers increased threefold.[210] At the turn of the twentieth century metallurgical industries accounted for a quarter of Swansea's male working population and while copper, tinplate and mining showed a decrease from 1891 to 1901, zinc was the opposite adding 150 to its workforce.[211]

The workers in the new northern industrial districts were fortunate; their lot was a great improvement on that of those living in the centre of the old town. There, in a two roomed house, often situated in a crowded court with no sanitation, the annual rent in 1845 would be approximately four pounds whereas in Trevivian, a family living in a typical two-up, two-down cottage with long gardens containing pig-sty and coal hole, would pay almost the same at £3.18s.[212] The Grenfells, however, charged some 25 per cent more on the east side of the Tawe at Grenfelltown near Foxhole.[213]

As industry expanded in the northern environs of Swansea so did house building. In 1876 there were 10,604 houses in Swansea, by 1900 there were 18,811 homes and, in line with the national trend, the number of persons per dwelling had

[209] See Fig.10: Speltermen, location and population for the relative population in 1871 and 1911
[210] By 1901 these districts had been incorporated into Swansea BC and comparison is not possible
[211] Trevor Williams, *Economic Development of Swansea*, p170-71
[212] G.G. Gabb, *Later Copper Work in the Lower Swansea Valley* [Factsheet 6 , Swansea Museum]
[213] R.R. Toomey., *Vivian and Sons*, p161

fallen from 5.8 to 5.4.[214] There would have been a mix of housing styles, terraces for the workers and better quality or semi-detached houses for the more skilled and supervisory men. Lambert Noel, whose father was a foreman at the Spelter Works , recalls his family renting a cottage at The Graig for 2/6d a week. The row of cottages were accessed by horse and cart and they were able to keep pigs, chickens, ducks and geese for the table and had a well for fresh water. 'We considered ourselves middle class,' he said.[215]

At Morriston, development was planned along a grid system, on the other bank the communities were more haphazard but in all instances the houses were within walking distance of the works and it is estimated that almost a half of the accommodation was provided by the works masters. This investment by the works owners was essential in the early days as a means of attracting workers in sufficient numbers to the copper works and collieries and later to the tin and spelter works. Later it proved a means of exerting a subtle form of social control reinforcing the dependency of the worker on his employer. The remaining houses were built by the workers themselves on land leased or sub-let from the owners and funded through the burgeoning building societies; in 1895 the South Wales Daily Post described the workmen of the Landore area as 'an exceptionally thrifty body, and a large number of them have acquired the homes they occupy by the assistance of building societies'.[216]

The zinc industry's contribution to the social development of Swansea must be considered as part of a broad industrial population as the speltermen lived in mixed communities, cheek and jowl with copper workers, tinplate workers and coal miners. In the second half of the nineteenth century these were thriving communities and, largely, self sufficient with their own stations, places of worship, schools, shops and local tradesmen. The 1871 Kelly's Directory listings for Morriston include 14 places of worship and a thriving community of shops and pubs. And

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[214] *Swansea Health Reports* (bound volumes) 1876-1883, 1884-1891, 1892-1899, 1900-1907. Swansea Reference Library S614.424

[215] *White Rock Oral Histories* TH20 recorded 2 November 1975 accessed at http://whiterocktrails.org/?page_id=52 on 18 March 2014

[216] *South Wales Daily Post* 6 February 1895

later, as leisure time increased, post war in the case of the speltermen, there was an explosion of sporting and arts organisations including choirs and bands such as the Morriston Tabernacle Choir, the Llansamlet Flute Band and the Plough & Harrow football team. [217] Some played further away; the South Wales Daily Post records that the Singleton cricket team was composed exclusively of Vivian & Sons employees made up from men from Hafod and White Rock Copper Works and the Morriston Spelter Works. Meanwhile Amy Dillwyn writes in her diary of a hockey club set up for her employees, also playing at Singleton [218,219].

Probably the greatest influence on the industrial workers in Swansea up to the First World War were the chapels which proliferated, especially in the northern industrial communities, their status epitomised by the cathedral-like Morriston Tabernacle. Their influence was far reaching, preaching temperance and Sunday observance the latter setting them at odds with the owners of the zinc works but explaining their support of the speltermen in the 1912-13 dispute.. As with all of south Wales, it was the Non-conformists who represented the spiritual life of the working classes and in the Swansea area this had a distinctly Welsh flavour due to the migration of workers from rural west Wales into the works.

Foreign speltermen, the Belgians in particular, played an important part in the development of the industry in Swansea. On arrival in Swansea they were largely found living together in the Barracks Houses next to, and probably owned by, the Vivian works in Morriston.; nearly half were married men, usually to their countrywomen, suggesting they had arrived as couples. [Appendix A10] As their families grew they were quickly assimilated into Swansea's working community, living check by jowl with coppermen, tinmen and miners, their children attending the works schools founded by the Vivians and Grenfells for their workers. A fascinating snapshot of contemporary attitudes can be found in the South Wales Daily Post in 1910 where a clear differentiation is made between 'transient visitors from abroad' such as Indian Tamils, French concrete workers and assorted

[217] Andre Scoville.{ed}, *Swansea, Landore, Clydach, Llansamlet (* Images of Wales). (History Press Limited: 2004) pp70 & 89
[218] South Wales Daily Post 16 July 1898
[219] *Amy Dillwyn diaries* April 28 1928 p82 Richard Burton Archives EAD 1892-93

nationality of seamen and the "permanent setters" such as the Germans at Mond Nickel Works and the Belgians at the spelter works.[220] The Belgian speltermen in particular played an important part in the development of the industry in Swansea; from an initial handful recruited by the Vivians in the 1860s the number had grown to 50 Belgian-born speltermen living in the Swansea and Llangyfelach registration districts in the 1881 census[221]. As J. R. Albon notes: 'By 1881 there were about 150 Belgian families in Swansea and names such as Delfosse, Mages and Verbok can still be found in the telephone directory.' [222]

They were never a sufficiently large population to keep their identity, unlike the Irish community in Swansea who preserved their religion and traditions through many generations by marrying within their community. The unmarried young men and sons of immigrant families married into Welsh families perhaps as much a result of lack of choice as a desire to integrate. Despite being outnumbered in their communities by coppermen and miners, a high proportion of speltermen's daughters married speltermen. For example, Heinrick Schramm, who came to Swansea from Germany in the 1860s had four daughters all of whom married speltermen; one German, one Belgian and two English[223]. One of them, Maria Johanna, married in Llangyfelach Church on Christmas Day 1882, perhaps the only day she could be certain that her father and groom, both speltermen, were available. Although we know there were a substantial number of foreign-born workers coming into Swansea during the latter part of the nineteenth century they left little by way of a cultural legacy. For example there are no records of specifically Belgian or German societies or places of worship which perhaps points to a conscious desire to assimilate. During World War One most of Britain's Belgian refugees came to work in the Swansea spelter works taking up roles previously filled by enlisted young men and deported or interred German workers and although many of these returned to Belgium after the war one of the legacies of the zinc industry is Swansea's Belgian heritage.

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[220] South Wales Daily Post 20 August 1910

[221] 1881 Wales census :Llangyfelach . See appendix I.

[222] J.R. Albon., *The Wider World* in Griffiths, Ralph A., [ed] *The City of Swansea: Challenges & Change* (Stroud: Alan Sutton) 1990. p127

[223] Sandry family archive in possession of Joanna Masters: marriage certificates

## Conclusions

The spelter industry as an entity spanned some sixty years in the Swansea region with a single works surviving beyond then, it employed a significant number of men and had a strong identity yet, with the exception of an unenviable environmental legacy, its demise has left little trace in the area and has consequently been largely overlooked by historians

Spelter was clearly important to Swansea, although always a poor cousin to copper and later the tin and steel industries. It nevertheless made a valuable contribution to the local economy both directly and indirectly, employing upward of a thousand men at a time when the copper works were declining, giving rise to secondary industries such as sheet galvanising, and further enhancing Swansea's reputation as a metallurgical centre.

Few understood spelter as well as Henry Hussey Vivian; in a lecture to the Royal Institution of South Wales in 1856 he commented on the volatility of zinc smelting which was a much more difficult process than that of copper and other metals. As he summed up: 'simple enough in description, not very difficult in rough practice, but most difficult to conduct with commercial success and unattainable in perfection' [224] It was this struggle to make a commercial success of spelter in the Swansea locality that was to prove difficult.

One of the reasons was, as R. O. Roberts claims, undoubtedly a lack of available capital.[225] This was certainly true of the many smaller concerns but does not wholly apply to Vivian & Son, Pascoe Grenfell, Dillwyn or Swansea Vale. The correspondence and journals of the Vivians and Grenfells show that, with the exception of Henry Hussey Vivian, there was a lack of appetite to make a success of this difficult metal; having made their fortunes, the families became conservative rather than entrepreneurial and looked to their mining interests rather than the metallurgical ones for better returns on their capital. Dillwyn and Swansea Vale

[224] *Cambrian,* 3 December 1858: reprint of lecture on Metals delivered at the Royal Institution of South Wales on Monday 29 November 1856 by H Hussey Vivian Esq MP.
[225] R.O. Roberts, *Enterprise & Capital*, p83

sold their controlling interests to German metal houses and therefore had no shortage of available capital.

Germany and America, typically of late entrants, were able to leap-frog technological advances. Calamine was gradually superseded by sulphide ores which the British firms struggled to adapt to, then, in the last quarter of the nineteenth century, the Australian Broken Hill deposits provided abundant supplies of zinc ore but were difficult to treat and the Welsh industry, with the exception of Swansea Vale, was not in a position to successfully smelt them.

According to Cocks & Walters, Britain lost a fifty year technical lead over its international rivals in zinc production but, 'by the closing quarter of the nineteenth century Germany and the USA were building large-scale modern zinc making capability. Britain, on the other hand, left its small scale spelter works in the Swansea area to look after themselves.'[226] Both contemporary and later commentators ascribe much of the blame to the British Government which was slow to see the importance of spelter, especially to a future war effort. It was 1917 when the British Government finally established its own modern zinc industry, The National Smelting Company, which it chose to base at Avonmouth. Post-war the German and American producers dominated the international marketplace, significantly undercutting domestic producers, and the independent spelter houses of Swansea successively went out of business.

The men who worked in the industry, the speltermen, are now largely forgotten and yet for a period during the late nineteenth and early twentieth centuries their name was a byword for all that was harsh and unpalatable about the working conditions in industrial Britain. Even by the demanding standards of heavy industry spelter making was arduous, took place in a poisonous atmosphere and the hours were the longest. The speltermen's fight for a weekly rest day became a cause around which the emerging trade unions and the non-conformist chapels found common ground and while the dispute did not succeed directly, the

[226] Cocks & Walters, A History of Zinc Smelting p12

introduction of the Weekly Rest-Day Bill of 1913 was surely a legacy of theirs.[227] It was claimed by concerned health experts at Britain and abroad, that a spelterman's workload was ruinous to his life with one form of lead poisoning christened 'spelter shakes'; however the authorities have not allowed access to the death records which would allow an assessment of the claim that their lifespan was the shortest of all the occupations.

The role of a spelter furnaceman was highly skilled and examination of successive censuses from 1851 through to 1911 has supported the proposition that not only did the majority remain within the spelter industry but that their skills were handed down father to son. However, claims by R.O. Roberts, Lawrence Holt and others that indigenous workers did not work in the industry is not borne out, in 1871 for example over half those working in the industry were born in Glamorgan.[228] The unique skills required led to an influx of men from Germany and Belgium who enriched the social make-up of the Swansea area; however they were never large in number and therefore quickly absorbed into the working community unlike their Irish counterparts who had the critical mass to sustain an independent identity. Although commentators have supposed that the one-year contracts offered to the foreign workers caused tension with the indigenous workers who saw them as advantageous , this is clearly not the case as the police court reports reveal as a succession of speltermen appear charged with breaking their contract, some even arrested en route back to the Continent.

The industry also had physical impact on the lower Swansea valley, especially on the eastern banks of the Tawe where the majority of the Spelter furnaces were located leaving a toxic environmental legacy. Spelter smoke blighted the community just as much if not more so than copper smoke fifty years earlier although by now the traditional social hierarchy had broken down somewhat and the authorities, whose interests were no longer wholly synonymous with those of the masters, at least attempted to take action.

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[227] *Hansard.* Commons Sitting of Wednesday 9th July 1913. George V, year 4. 5th series, vol 55
[228] 1871 Wales census

The speltermen and their families would have played a prominent, but not dominant, part in the communities of Port Tennant, Plasmarl, Bonymaen, Pentrechwyth and Llansamlet and the growth of the industry and men employed within it, would have been one of the contributing factors to the growth of these communities. The majority of speltermen were fortunate to be located in the lower Swansea valley in as much as the houses were not as crowded or unsanitary as those in the centre of the town and they often hard gardens and the ability to keep a pig.

Finally spelter can only be viewed as one part of Swansea's metallurgical past inextricably linked to the fortunes of copper in particular but also, through galvanising, to tin and steel; Spelter may not have been largest sector nevertheless it is one with an unique story to tell.

# BIBLIOGRAPHY

## Primary sources


### National Library Wales [cited as NLW]:

NLW Lord Swansea MSS, Notebook 1841-1887, E18
NLW: Lord Swansea MSS Wagebooks, E107
NLW: Lord Swansea MSS Letters from Pendarvis Vivian, C137, C151
NLW: Lord Swansea MSS South Yorkshire Miners Association offer of intermediary services during strikes, C246
NLW: Lord Swansea MSS New tenant for Morriston works, C267
NLW: Lord Swansea MSS. Letterbook 1844, C2515
NLW: Lord Swansea MSS Letterbook 1863-1869, C2516
NLW: Lord Swansea MSS Letter from Graham Vivian 17/12/1879, C489
NLW: Lord Swansea MSS Letter from Pendarvis Vivian 9/11/1892, C1036
NLW: Lord Swansea MSS Letter from Pendarvis Vivian 28/2/1893, C1051
NLW: Lord Swansea MSS Letter from Graham Vivian 4/10/1893, C1078
NLW: Lord Swansea MSS Letter from Editor of Western Mail, C2709-10
NLW: Lord Swansea MSS Miscellaneous notebook C3210
NLW: Lord Swansea MSS Statement by HHV re contribution to Vivian & Sons, C3238-51
NLW: Lord Swansea MSS Strike avoidance proposal, C3292
NLW: Lord Swansea MSS Evidence to Noxious Vapours Committee, C3435

### Cornwall County Records Office [cited as CCRO]

Arthur Pendarvis Vivian Collection. Diaries: 1869 (DDPV 171-01), 1888 (DDPV 171- 19) 1890 (DDPV 171 -21) 1891 (DDPV 171-22) 1901 (DDPV 171 -32) 1905 (DDPV 171-36) 1906 (DDPV 171 -37) 1907 (DDPV 171-38) 1908 (DDPV 171-39) 1909 (DDPV 171—40) 1910 (DDPV 171-41) 1911 (DDPV 171 -42) 1912 (DDPV 171-43) 1913 (DDPV 171- 44) 1919 (DDPV 171-50) 1920 (DDPV 171-51) 1922 (DDPV 171-53)

### Swansea University Richard Burton Archives [cited as Richard Burton Archives]

Richard Burton: Yorkshire Imperial Metals: Vivian papers LAC/126
Richard Burton Archives. Grenfell collection 1783-1897 LAC/45
Richard Burton Archives *Amy Dillwyn Diaries,* EAD 1892-3,
Richard Burton Archives. Stricks & Bellingham Collection: Vivian papers LAC140

### West Glamorgan Record Office [cited as West Glam RO]

Papers of Cllr W. T. Mainwaring Hghes: notebook on 'spelter matters' D34/6/1/3
Swansea Rural District Council Minutes 1912-1913

### Swansea Reference Library

Reports of the Medical Officer of Health on the sanitary condition of Swansea 1876 – 1883 and 1892-1899. Swansea Reference Library
Report of Medical Officer of Health on the sanitary condition of Llangyfelach Division of Swansea Rural District Council for the year 1913. Dr E. Rice Morgan. Swansea Reference Library

## Parliamentary Papers accessed via Athens

[870] [871] [872] *Royal Commission of Inquiry into State of Education in Wales Report* PP (1847) xxvii

[cd.5152] Lead smelting. *Special Report on Dangerous of Injurious Processes in the Smelting of Materials Containing Lead and in the manufacture of red and orange lead, and flaked litharge* PP (1910) xxix.51

[cd.8668] *Reports of the commission of Enquiry into Industrial Unrest. No 7. Division. Wales and Monmouthshire* PP [1917-18] xv.83

Hansard Fifth Series, Vol 20. House of Commons Sitting of Friday 18th November 1910, Speltermen's Hours of Labour

Hansard Fifth Series, Vol 44. House of Commons sitting of Monday 2 December 1912. Oral answers to question 26. Lead poisoning

Hansard Fifth Series, Vol 44. House of Commons sitting of Wednesday 4th December 1912. Oral answers to question 82: Swansea (Lock-out of Spelter Workers)

Hansard Fifth Series, Vol. 45. House of Commons Sitting of Monday 9thDecember 1912. Oral answers to questions 14, 16, 17, 82: Speltermen at Swansea

Hansard Fifth Series, Vol 45. House of Commons Sitting of Thursday 12thDecember 1912. Oral answers to questions 44, 49, 50 & 51: Lead Poisoning

Hansard Fifth Series, Vol 45. House of Commons Sitting of Monday 16thDecember 1912. Oral answers to questions 80, 81, 82 & 83: Lead Poisoning

Hansard Fifth Series, Vol 45. House of Commons Sitting of Monday 16thDecember 1912. Written answers to answers Llansamlet Spelter Works

Hansard Fifth Series, Vol 45. House of Commons Sitting of Tuesday 17thDecember 1912. Oral answers to question 77: Spelter Fumes (Swansea)

Hansard Fifth Series, Vol 46. House of Commons Sitting of Thursday 9th January 1913. Oral answers to question 97 & 98: Swansea District Spelter Works

Hansard Fifth Series, Vol 55. House of Commons Sitting of Wednesday 9th July 1913. Debate on Weekly Rest-day Bill

## Newspapers

The Cambrian

Herald of Wales

South Wales Daily News

South Wales Post

The Times

The Workers' Journal

## Printed Books

Borgnet, Georges., *L'industrie du zinc dans le pays de Galles*. (1877)

Heyward, J., *Illustrated Guide to Swansea & Mumbles* (1911)

Percy, Dr John. Metallurgy Vol 1 (London: John Murray) 1861

### Other

Butcher's South Wales Commercial Directory 1881-2
Kelly's Post Office Director of Monmouthshire & South Wales 1871 & 1891
Ordnance Survey 1st edition 15.9 (1877), 15.10 , 15.13, 15.14 (all 1881)
Ordnance Survey 2nd edition 15.14 (1912)
The New Swansea Guide (1823) accessed via books.google.uk on 18 March 2014
UK Census of Population 1871, 1881, 1891, 1901, 1911 accessed via www.ancestry.co.uk
US census reports 1871, 1881, 1891, 1901, 1911, 1921 accessed through www.histpop.org

## Secondary sources

### Books

Albon, J.R., *The Wider World* in Griffiths, Ralph A., (ed) *The City of Swansea: Challenges & Change* (Stroud: Alan Sutton) 1990
Balchin, W.G., Swansea and its Region
Cocks , E.J. and Walters, B., *A History of the Zinc Smelting Industry in Britain* (London: Harrap)1968
Day, J., and Tylecote, R.F., (eds*) The Industrial Revolution in Metals*. (London: Public Institute of metals) 1991
Davies, John. *A History of Wales*. (London: Penguin) 1993
Evans, D. Gareth. *A History of Wales 1815 – 1906* (Cardiff: UWP) 1989
Hilton, K.J.,(ed) *The Lower Swansea Valley Project* (Longmans, Green & Co Ltd) 1967
Hobsbawn, E.J., Labouring Men (1964)
Hughes Stephen. Copperopolis: Landscapes of the Early Industrial Period in Swansea (Royal Commission on the Ancient & Historical Monuments of Wales) 2008
Hyman, R., The Workers Union (1971)
John, A.H., Industrial Development of south Wales (1950)
Marsh, Arthur Ivor. *Historical Directory of Trades Unions*
*Morgan, Kenneth O., Rebirth of a Nation: Wales in Williams, Glanmor (ed), History of Wales series vol 6 (1981)*
Morgan, S.W.K., *Zinc and its Alloys* (Plymouth: MacDonald & Evans) 1977
Painting, David. *Amy Dillwyn* (Cardiff: UWP) 1987
Rees, Ronald. *King Copper : South Wales and the Copper Trade 1584-1895* (Cardiff:UWP) 2012
Rule, John. The Labouring Classes in Early Industrial England 1750-1850 (Themes in British social history) (Essex: Longman) 1986
Scoville, Andre.{ed}. Swansea, Landore, Clydach, Llansamlet. Images of Wales . (History Press Limited) 2004
Thomas, Norman Lewis., The Story of Swansea's Districts and Villages. (Neath : Guardian Press) 1964
Williams, D. Trevor. *Social and Economic Survey of Swansea and District, Pamphlet No. 4. The Economic Development of Swansea and of Swansea District to 1921*. (Cardiff: UWP) 1940

Wohl, Anthony S. *Endangered Lives: Public Health in Victorian Britain* (London: Methuen 1983)

### Articles

Alexander, W.O., *Development of the Copper, Zinc and Brass Industries in Great Britain from A.D. 1500 to 1900 Murex Rev* Vol. 1 No 15. (1955)
Baines, Dudley., *The Economics of Migration, Nineteenth Century Britain*. Refresh 27 (Autumn 1998)
Cook, Lorainne A., *The Vivians of Cornwall* Minerva Vol 4 (1996) pp22-26
Evans, D Owen., *The non-ferrous metallurgical industries of South Wales, and Welshmen's share in their development* in *Trans. Hon. Soc. Cymm* Session 1929-30 pp1-37
Evans, Leslie Wynne., *Copper-Works Schools in South Wales during the Nineteenth Century. NLW Journal*, Summer Vol XI/I (1959)
Gabb, G.G., Later Copper Works, Lower Swansea Valley [Factsheet 6, Swansea Museum]
Holt, Dr Lawrence., Lower Swansea Valley Factsheet 3: *The History of the Zinc Industry*. Swansea Museums Service. (date unknown)
Roberts, R.O., *Copper and Economic Growth in Great Britain, 1729-1784. NLW Journal*, Summer Volume X/I (1957)
Roberts, R.O., *The Development and Decline of the Non-ferrous Metal Smelting Industries in South Wales*, pp. 121-162 in *Industrial South Wales 1750-1914: Essays in Welsh Economic History* (London) 1969
Roberts, R.O*., Enterprise and Capital for Non-ferrous Metal Smelting in Glamorgan*, pp. 48-82 in Morgannwg, vol.23, 1979.
Roberts. R.O*., The Smelting of Non-ferrous Metals since 1750*, pp. 47-96 in A.H. John & G. William, eds *Glamorgan County History: vol.5: Industrial Glamorgan from 1700 to 1970*, (Cardiff) 1980
Szreter, Simon. And Mooney, Graham., *Urbanization, mortality, and the standard of living debate: new estimates of the expectation of life at birth in nineteenth-century British cities*. Economic History Review LI (Oxford: Blackwell) 1998

### Theses/Dissertations

Toomey, R.R., *Vivian and Sons 1809 – 1924 a study of the firm in the copper and related industries*. Garland, 1985
Simmonds, J.M., Irish Immigration to Swansea in the Nineteenth Century. Dissertation University of Wales School of Education (1973)

### Trinity St David's MA course notes

The effects of Industrialisation: A Social Approach. 25 January 2012
Overview of the First Half of the Nineteenth Century: The Urban Landscape. 18 January 2012
Histiography: The Industrial Revolution c.1760 – c.1850. 11 January 2012
Families in a Mobile Society – Swansea and District. 25 January 2012

### Websites

Histpop http://histpop.org

London Metal Exchange http://www.lme.com/metals/non-ferrous/zinc
US Geological Survey http://minerals.usgs.gov/minerals/pubs/historical-statistics/ds140-zinc.pdf
Vision of Britain: http://www.visionofbritain.org.uk

# Appendices

## A1: Grenfell zinc sales 1894[229]

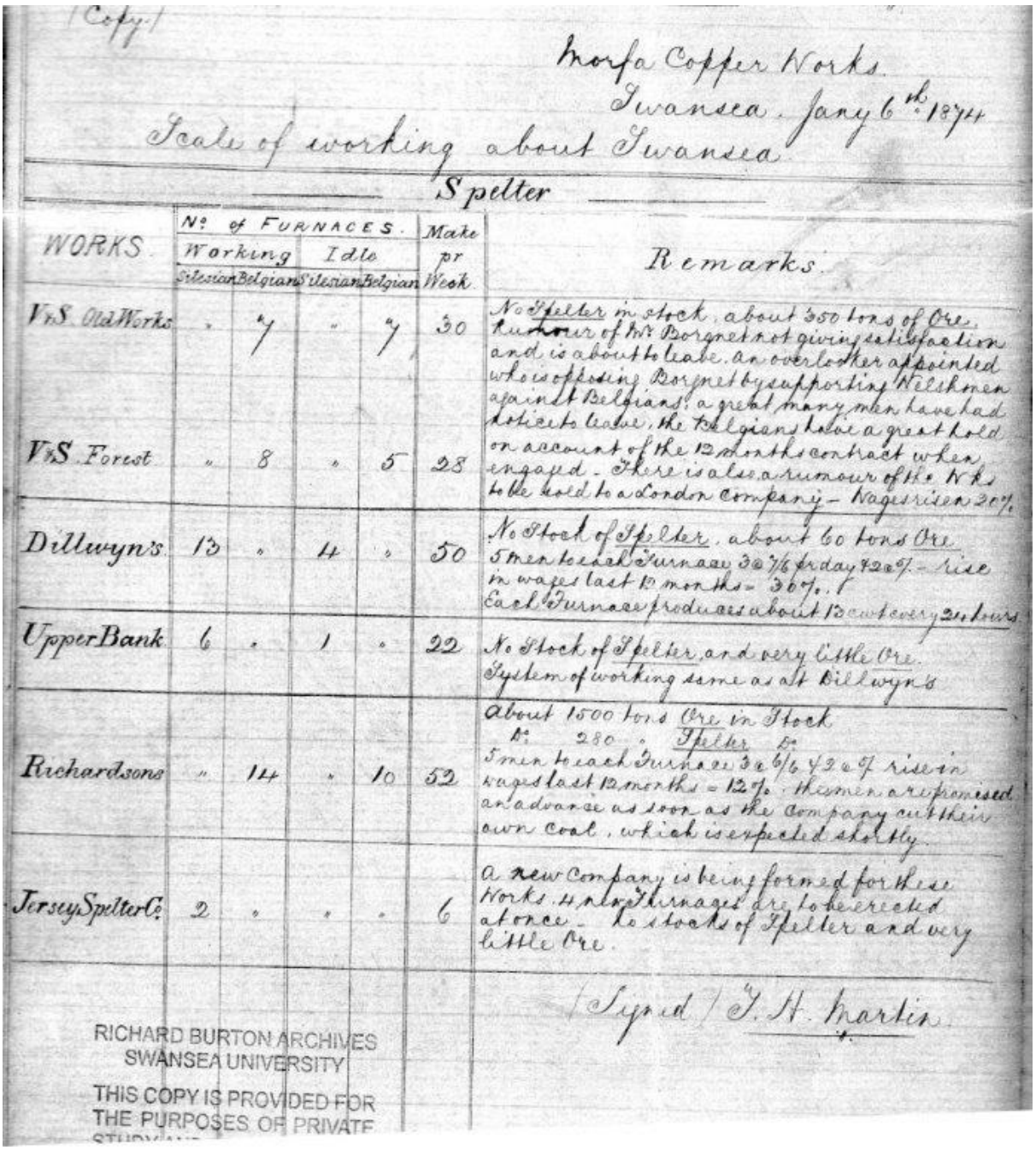
Extracted from Grenfell sales ledger for 1894

| Company | Tons (cwt) zinc ore sold 1894 |
|---|---|
| Vivian | 2,337 |
| Pascoe Grenfell | 1,329 |
| English Crown Spelter | 994 |
| Villiers Spelter | 485 |
| G F Kimmnel | 405 |
| Dillwyn | 332 |
| Swansea Valley Spelter Co. | 312 |

*Source: Grenfell sales ledger*

[229] Swansea University Richard Burton archives. LAC/45/C7 Grenfell Zinc & lead sales 1884

## A2: Scale of spelter workings in Swansea area[230]



Copy.

Morfa Copper Works.
Swansea. Jany 6th 1874

Scale of working about Swansea.

Spelter

| WORKS | No of FURNACES. Working Silesian | Working Belgians | Idle Silesian | Idle Belgian | Make per Week | Remarks. |
|---|---|---|---|---|---|---|
| V&S Old Works | " | 4 | " | 4 | 30 | No Spelter in stock, about 350 tons of Ore. Rumour of Mr Borgnet not giving satisfaction and is about to leave. an overlooker appointed who is opposing Borgnet by supporting Welshmen against Belgians, a great many men have had notices to leave, the Belgians have a great hold on account of the 12 months contract when engaged. There is also a rumour of the Works to be sold to a London Company – Wages risen 20% |
| V&S Forest | " | 8 | " | 5 | 28 | |
| Dillwyn's | 13 | " | 4 | " | 50 | No Stock of Spelter, about 60 tons Ore. 5 men to each Furnace 3s 7½d per day 12% rise in wages last 12 months – 30%. Each Furnace produces about 13 cwt every 24 hours |
| Upper Bank | 6 | " | 1 | " | 22 | No Stock of Spelter, and very little Ore. System of working same as at Dillwyn's |
| Richardsons | " | 14 | " | 10 | 52 | about 1500 tons Ore in Stock. No 280 " Spelter do. 5 men to each Furnace 3s 6½d 12% rise in wages last 12 months = 12%. the men are promised an advance as soon as the Company cut their own coal, which is expected shortly. |
| Jersey Spelter Co | 2 | " | " | " | 6 | A new Company is being formed for these Works 4 new Furnaces are to be erected at once. No stocks of Spelter and very little Ore. |

Signed J. H. Martin.



*Source: William Foster letterbook - copy of memorandum from Vivian & Sons*

[230] Swansea University Richard Burton Archives LAC/126/S1

## A3: UK Zinc prices 1859 – 1930[231]

| | £ | s | d |
|---|---|---|---|
| 1859 | 21 | 0 | 0 |
| 1860 | 20 | 10 | 0 |
| 1861 | 17 | 18 | 0 |
| 1862 | 18 | 6 | 0 |
| 1863 | 18 | 2 | 0 |
| 1864 | 22 | 2 | 0 |
| 1865 | 20 | 12 | 0 |
| 1866 | 21 | 18 | 0 |
| 1867 | 21 | 0 | 0 |
| 1868 | 20 | 4 | 0 |
| 1869 | 20 | 8 | 0 |
| 1870 | 18 | 10 | 0 |
| 1871 | 18 | 8 | 0 |
| 1872 | 22 | 8 | 0 |
| 1873 | 26 | 3 | 6 |
| 1874 | 22 | 17 | 7 |
| 1875 | 24 | 1 | 4 |
| 1876 | 23 | 6 | 3 |
| 1877 | 19 | 8 | 8 |
| 1878 | 17 | 17 | 10 |
| 1879 | 16 | 12 | 0 |
| 1880 | 18 | 7 | 1 |
| 1881 | 16 | 5 | 6 |
| 1882 | 16 | 19 | 9 |
| 1883 | 15 | 6 | 6 |
| 1884 | 14 | 8 | 11 |
| 1885 | 13 | 19 | 11 |
| 1886 | 14 | 5 | 1 |
| 1887 | 15 | 4 | 0 |
| 1888 | 18 | 1 | 9 |
| 1889 | 19 | 15 | 7 |
| 1890 | 23 | 5 | 0 |
| 1891 | 23 | 5 | 1 |
| 1892 | 20 | 16 | 7 |
| 1893 | 17 | 18 | 1 |
| 1894 | 15 | 8 | 7 |
| 1895 | 14 | 12 | 2 |
| 1896 | 16 | 11 | 10 |
| 1897 | 17 | 8 | 10 |
| 1898 | 20 | 8 | 9 |
| 1899 | 24 | 17 | 2 |
| 1900 | 20 | 5 | 6 |
| 1901 | 17 | 0 | 7 |
| 1902 | 18 | 10 | 11 |
| 1903 | 20 | 19 | 5 |
| 1904 | 22 | 11 | 10 |
| 1905 | 25 | 7 | 7 |
| 1906 | 27 | 1 | 5 |
| 1907 | 23 | 16 | 9 |
| 1908 | 20 | 3 | 5 |
| 1909 | 22 | 3 | 0 |
| 1910 | 23 | 0 | 0 |
| 1911 | 25 | 3 | 2 |
| 1912 | 26 | 3 | 4 |
| 1913 | 22 | 14 | 3 |
| 1914 | 23 | 6 | 8 |
| 1915 | 66 | 13 | 8 |
| 1916 | 68 | 8 | 11 |
| 1917 | 52 | 3 | 6 |
| 1918 | 52 | 3 | 11 |
| 1920 | 45 | 4 | 5 |
| 1921 | 26 | 4 | 0 |
| 1922 | 29 | 14 | 2 |
| 1923 | 32 | 18 | 6 |
| 1924 | 33 | 12 | 0 |
| 1925 | 36 | 5 | 0 |
| 1926 | 34 | 2 | 8 |
| 1927 | 28 | 9 | 11 |
| 1928 | 25 | 5 | 4 |
| 1929 | 24 | 17 | 7 |

Source:
1859-72 Board of Trade, From 1873 Metal Bulletin

[231] Prices 1859-72 Report of the Departmental Committee of Board of Trade on Non-Ferrous Mining Industry dated 17 March 1920; Prices from 1873 from Metal Bulletin as quoted in Cocks & Walters, *A History of Zinc Smelting,* p201

# A4: 1912 Sunday hours dispute example of press coverage [232]

## SPELTER EMPLOYERS.

### THE CASE FOR THE MASTERS IN DETAIL.

### INTERESTING LETTER FROM THE EMPLOYERS.

(To the Editor of the "South Wales Daily Post.")

Sir,—As so many erroneous and misleading statements as to the manufacture of spelter (the commercial terms for zinc) have been placed before the public during the past 18 months, we think it advisable to supply the following facts for their information, and if you will kindly insert same in your journal we shall be obliged.

The European production of spelter for the year 1911 was 623,831 tons, to which total the United Kingdom contributed only 35,022 tons—made direct from the ore.

The United States made 257,188 tons, the world's production being 882,716 tons.

The whole of this metal was produced by furnaces working continuously; that is to say, working

**Seven Days per Week;**

and all that is being made at the present time is produced by similar continuous working.

The imports of spelter into the United Kingdom last year amounted to 115,228 tons. In other words, out of every four tons used in this country we produced barely one ton. The imports were nearly all from the Continent.

Practically the whole of our supplies of raw smelting material comes from abroad, for which we have to compete with all the European smelters. Even by keeping our plant up-to-date in every possible way we have, in the past, had difficulty in meeting this competition, more especially when the price of spelter was lower than it has been for the past two or three years; chiefly because we have to pay higher wages than are paid on the Continent. Our experience teaches us that it will be quite hopeless for us to think of competing further, if we are able to work our furnaces only six days a week, as against the rest of the world's seven days—reducing our output one-seventh—(even supposing we could get the usual quantity of metal the day after the furnaces were idle, an achievement every experienced spelterworker knows to be impossible in actual practice) at the same time adding to our costs the expenses that would be incurred in keeping the furnaces in order on the day of stoppage.

**What a Furnace Contains.**

A spelter furnace contains a large number of retorts—in this district about 150/160. These are made of the best quality fireclay it is possible to get, and their renewal is an important item in the cost of smelting. The zinc ore is charged into these retorts; the metal is distilled from it, and once every twenty-four hours the residue is withdrawn from the retorts and a fresh charge put in. These residues contain a certain quantity of fusible slag, which, in the liquid state, quickly eats away the walls of the retort, rendering it useless. Now, if a furnace is idle and the temperature is kept up as if working, this fusible slag is attacking the retorts, shortening their life considerably. If, when idle, the temperature of the furnace is not sufficiently high to keep this slag in a fusible state, then the day after being idle the furnace cannot be got to the temperature required, and the result is a great loss of metal. In either case, therefore, a stoppage is bound to affect us adversely, as regards the working of the furnaces, quite apart from all other questions of costs. These conditions apply to all the local works.

**Working Hours.**

Working Hours, etc.—The following figures were those ruling at our own works up to the time of the stoppage. They are fairly representative of all the works in the Swansea district.

Each furnace gang consists of eight men—3 foremen, 3 second-helpers and 2 helpers.

Foremen work one week by night and two weeks by day, the hours being:—

| | No. of Hours in Work. | Allowance for Meals & Rest. | Net Working Hours. | Average Working Hrs per Shift |
|---|---|---|---|---|
| Week by night—8 shifts ... | 91 | 25½ | 65½ | 8¼ |
| 1st " " day —6 " ... | 51 | 6 | 45 | 7½ |
| 2nd " " " —7 " ... | 57 | 6½ | 50½ | 7¼ say |

The average wages were 8/- per shift.

Second-hands were similar to Foremen, the hours being:

| | | | | |
|---|---|---|---|---|
| Week by night—8 shifts .. | 109 | 24 | 85 | 10⅝ |
| 1st " " day —6 " ... | 51 | 10½ | 40½ | 6¾ |
| 2nd " " " —7 " ... | 57 | 11 | 46 | 6 1/7 |

The average wages were 6/10 per shift.

The Helpers work by day only, the hours being:

| | | | | |
|---|---|---|---|---|
| 7 shifts per week ... ... ... | 42 | 5½ | 33½ | 5¼ |

The average wages were 5/3 per shift.

The average hours for the whole gang is:—In works, 9 hours; allowed for meals, etc, 11 hours; net working time, 71 hours per shift.

## SPELTERMEN AND THE "CROWN."

### MR. J. WIGNALL MAKES A FEW "CORRECTIONS."

### THE AVERAGE WORKING HOURS.

Mr. James Wignall, on behalf of the Lock-out Committee, writes:—I am instructed by the Lock-out Committee of the spelter men to make a few corrections in the statements of the English Crown Spelter Works.

First, as regards the working hours, etc. The Lock-out Committee consider it is most unfair to lump together the working hours of the whole of the furnace gang and then strike out averages. Each section should be dealt with on its own, each man having to perform his own duties and not share with anyone else.

They also consider it unfair to deduct meal hours, as if during that time they were not in the service of the company. The men are in the employ of the company the whole of the shift and there are no regulated meal hours, the men having to give attention to the furnaces at all times when requested to do so.

The following is an exact time-sheet of the working hours of each of the gangs for three weeks:—

**First Week—Night Shift.**

| | 1st Hand. | 2nd Hand. | Helpers. |
|---|---|---|---|
| Sunday & Night... | 25½ | 25½ | 7 |
| Monday ..... | 11½ | 14½ | 7 |
| Tuesday ..... | 11½ | 14½ | 7 |
| Wednesday ..... | 11½ | 14½ | 7 |
| Thursday ..... | 11½ | 14½ | 7 |
| Friday ..... | 11½ | 14½ | 7 |
| Saturday ..... | 11½ | 14' | 7 |
| Totals ... | 94½ | 112½ | 49 |

**Second Week—Day Shift.**

| | 1st Hand. | 2nd Hand. | Helpers. |
|---|---|---|---|
| Sunday ..... | 0 | 0 | 7 |
| Monday ..... | 7 | 7 | 7 |
| Tuesday ..... | 11 | 11 | 7 |
| Wednesday ..... | 7 | 7 | 7 |
| Thursday ..... | 11 | 11 | 7 |
| Friday ..... | 7 | 7 | 7 |
| Saturday ..... | 11 | 11 | 7 |
| Totals ... | 54 | 54 | 49 |

**Third Week.—Day Shift.**

| | 1st Hand. | 2nd Hand. | Helpers. |
|---|---|---|---|
| Sunday ..... | 7 | 7 | 7 |
| Monday ..... | 11 | 11 | 7 |
| Tuesday ..... | 7 | 7 | 7 |
| Wednesday ..... | 11 | 11 | 7 |
| Thursday ..... | 7 | 7 | 7 |
| Friday ..... | 11 | 11 | 7 |
| Saturday ..... | 7 | 7 | 7 |
| Totals ... | 61 | 61 | 49 |

**Average Hours Worked.**

First hand—10 hours.
Second hand—10½ hours.
Helpers—7 hours.

From this it will be seen that the average working hours by the foreman is 10 hours, the second hand 10½ hours, and the helper 7 hours. It will also be noted that the helper works every Sunday; the furnaceman and second hand on the first Sunday has to be employed 25½ hours, and this has to be continued every Sunday in the order named, so that furnacemen and seconds are either leaving the works or coming in every Sunday in the year.

**A Proposal to the Employers.**

If the employers would agree to the abolition of charging furnaces on Sunday this 25½ hour shift would not then be required, and the whole of the men on each furnace, except those required in keeping the furnaces alight would be relieved from Sunday work.

From this statement it will be seen that a large section of the men, viz., the furnacemen and second hands, have to work very many more hours than is shown in the employers' statement.

In reference to the 35 spare hands named, we want to make it clear that they are casual men who come on the off-chance of getting a day's work; they are not in the employ of the company unless filling any vacant place; they are a convenience to the management, but no cost, as no employment is provided them when there are no vacant places to fill.

Assuming that the five and three-quarter shifts per week is a correct statement, we would like to know if the casual is included in the average? Also what proportion of lost time is due to sickness caused by the nature of the work and continuous employment. We are inclined to think that this average will prove to be equally as misleading as the average working hours.

**The Sunday Labour.**

The same number of men are required to work the furnaces on Sunday as any other day, and it is correct that the only men working on Sunday complains of it.

There is no question of this being a lock-out and not a strike. The men would have resumed work on the Monday morning following the stop-day but for the fact that the employers refused to allow them to restart, and had stedfastly refused to meet the men or their representatives, as have been done in the past, to discuss and consider any alternative scheme to the men's claim to the abolition of Sunday charging.

I think it will be generally agreed that men are not in a fit state to attend a meeting at 5 o'clock after a morning's work in a spelter works, and the men's request for one Sunday off during a very long period of time was not unreasonable and could have been conceded and probably would have prevented the long stoppage which has taken place.

Trusting in fairness to the men's position you will publish this reply to the statements issued by the directors and managers of the English Crown Spelter Works.

[232] South Wales Daily Post 9 December 1912 and 12 December 1912

## A5: Speltermen's Fund contributors[233]

Albert Hall collection
Alexandra-road Calvinistic Church
Atlantic Fuel Works (employees)
Bethel Welsh Congregational Church, Llansamlet
Birchgrove Collieries (employees)
Brynhyfryd Baptist Chapel
Cwmbwrla No. 1 Branch (Dockers Union)
Cwmbwrla Congregational Church
Danygraig Congregational Church
Dock Collection
Dr Rawlings
Ebenezer Calvinistic Church Llansamlet
E. S. Evans Esq.
Fishguard Baptist Chapel
Fowey Works branch (Workers' Union)
Graigola Fuel Works (employees)
Graigola Shippers (employees)
Gwydr Hotel
Hafod Brotherhood
J. Gill
Landore Blast furnacemen
Messrs. J Summers and Son Steel & Galvanising Works, Shotton (employees)
Mount Pleasant Baptist Church
Mount Zion Baptist Church
Mumbles Brotherhood
Operative Society of Painters, Manchester
Pacific Fuel Works (employees)
Pwll-street Methodist Church
Red Cow, Plasmarl - Mrs Thomas,
Rev. S. Butters
Rev. S. Jones
Rhyddings Park-road Calvinistic Church
St Helen's Baptist Church
Salem Baptist Church, Landore
Sketty Brotherhood
Swansea Shop Assistants
Tabernacle English Church
Terrace Road Calvinistic Church
The Religious Society of Friends
Three Crosses Congregational Church
Tinsheds (employees)
Walter-road Congregational Church
Wesley Brotherhood, Clydach

[233] Contributions listed in *South Wales Daily Post* 26 November 1912 and *Cambrian* 3 January 1913

## A6: Numbers occupied in Metal Industries[234]

**Numbers of people employed in non-ferrous metal industry in Glamorgan**

| | copper | lead | Zinc | brass |
|---|---|---|---|---|
| **1851** | 1679 | 1 | 32 | 13 |
| **1861** | 2213 | 5 | 0 | 41 |
| **1871** | 1781 | 23 | 515 | 94 |
| **1881** | 1908 | 75 | 606 | 60 |
| **1891** | 1903 | 61 | 433 | 133 |
| **1901** | 1954 | 104 | 624 | 4 |
| **1911** | 2101 | 118 | 974 | 165 |
| **1921** | 2369 | 146 | 436 | 60 |

**Sources: 1851 – 1911 R.O. Roberts *The Smelting of non ferrous metals since 1750*. 1921 data from 1921 census reports**

[234] 1851 – 1911 data from R.O. Roberts, *Development & Decline of non-ferrous smelting industries* in south Wales in Industrial South Wales 1750-1914 in *Essays in Welsh Economic History (London: 1969)* pp. 121-162. *1921* data from *England and Wales Census Report 1921, Industry Tables,* Table 4, p345/6. Accessed via www.histpop.org

## A7: Numbers and location of speltermen in 1871 and 1911[235]

1871 Location of speltermen
sample: 480 speltermen
total speltermen: 515

| Area | Port Tennant | Landore/Plasmarl | Morriston | Llansamlet | Winchwen/Bonymaen/ Cwm/Foxhole | Other |
|---|---|---|---|---|---|---|
| Enumeration Dist. | Swansea 34, P Tennant 35 | Llangyfelch 2,3,9,1a, 1b | Llangyfelach 6, 7, 5b | Llansamlet 1 | Llansamlet Lower 6, 5, 4 | |
| No. speltermen in sample | 34 | 198 | 56 | 13 | 156 | 58 |
| % of sample | 7% | 41% | 12% | 3% | 32% | 5% |
| extrapolated no. speltermen | 36 | 211 | 62 | 15 | 165 | 26 |

1911 Location of speltermen
sample: 317 speltermen
total speltermen: 974

| Area | Port Tennant | Landore/Plasmarl | Morriston | Llansamlet | Winchwen/Bonymaen/ Cwm/Foxhole | Other |
|---|---|---|---|---|---|---|
| Enumeration Dist. | Swansea 38,39,40 | Swansea 8,9,10,11 | Swansea 12,13,14,15,16,17,18 | Swansea 3,4,5 | Swansea 6,7,34,35 | |
| No. speltermen in sample | 61 | 91 | 45 | 38 | 67 | 15 |
| % sample | 19% | 29% | 14% | 12% | 21% | 5% |
| extrapolated no. speltermen | 185 | 282 | 136 | 117 | 205 | 49 |

***Historical context***

1. Swansea Vale Works, Llansamlet opened in 1876 and became largest in area
2. Many smaller works on the east bank closed in the period 1871-1911
3. English Crown Spelter took over Port Tennant works in 1883 and expanded

[235] Wales 1871 and 1911 censuses

## A8: Morris Street & Davies Street, Morriston 1871[236]

1871 Census: Morris Street/ Davies Street, Morriston
(men of working age)

| | | age | occupation | place of birth |
|---|---|---|---|---|
| Davies St | Andrew Schriens | 46 | spelter furnaceman | Holland |
| | William Schriens | 17 | spelter furnaceman helper | Holland |
| | Frederick Straum | 35 | spelter furnaceman | Belgium |
| Morris St | John Gray | 50 | tinplate worker | Glamorgan |
| | John Gray | 23 | tin roller | Glamorgan |
| | David Gray | 20 | tin furnaceman | Glamorgan |
| | Thomas Davies | 22 | tinplate labourer | London |
| | William Rees | 32 | mason | Carmarthenshire |
| | Caleb Thomas | 23 | mason | Carmarthenshire |
| | Wilkins Trick | 33 | tinplate agent | Glamorgan |
| | David Williams | 31 | labourer in colliery | Glamorgan |
| | Daniel Jones | 42 | Copper furnaceman | Glamorgan |
| | William Jones | 21 | tinman | Glamorgan |
| | Thomas B Ayres | 39 | spelter furnaceman | Gloucestershire |
| | Henry Ayres | 15 | tin rolling mill | Glamorgan |
| | William Ayres | 13 | in the mills | Glamorgan |
| | John Davies | 23 | iron puddler | Glamorgan |
| | William Harris | 50 | Labourer for Board of Health | Glamorgan |
| | George Ayres | 43 | gen labourer | Pembroke |
| | Henry Dawkins | 20 | engine fitter | Pembroke |
| | Richard Holloway | 14 | labourer in colliery | Glamorgan |
| | Robert Hughes | 28 | engine fitter | Glamorgan |

[236] Wales 1871 census RG10/5445/88/7-9

## A9: Mansel Road, Llansamlet in 1891[237]

1891 Census: Mansel Road, Llansamlet
(men of working age)

| | age | occupation | place of birth |
|---|---|---|---|
| William CHARLES | 23 | spelter furnaceman | Swansea |
| Daniel CHARLES | 15 | coal miner door boy | Swansea |
| Thomas REES | 36 | coal miner hewer | Swansea |
| Benjamin WILLIAMS | 71 | coal miner hewer | Swansea |
| William HARRISON | 40 | Grocer & Butcher | Swansea |
| William HARRISON | 20 | Printer | Swansea |
| Thomas HARRISON | 18 | Spelterman | Swansea |
| William WILLIAMS | 64 | Coal miner hewer | Swansea |
| David WILLIAMS | 34 | coal miner hewer | Swansea |
| Evan WILLIAMS | 27 | Coal miner trammer below ground | Swansea |
| Richard WILLIAMS | 24 | Coal miner trammer | Swansea |
| David FOWLY | 37 | Spelterman furnaceman | Swansea |
| Matthew POLEY | 66 | Engine Driver (colliery) | Swansea |
| Matthew POLEY | 18 | Stoker (tin works) | Swansea |
| Evan POLEY | 16 | Smith Stoker (Steel works) | Swansea |
| Lewis JOHN | 68 | Furnaceman (Spelter works) | Swansea |
| Thomas HUGHES | 31 | Coal Mine Hewer | Swansea |
| John ROWLANDS | 21 | Blacksmiths striker | Swansea |
| John DAVIES | 33 | Banksman Surface (Colliery) | Swansea |
| Benjamin CHARLES | 28 | Steel Tube Worker | Swansea |
| Charles PASSEY | 30 | Railway engine stoker | Hertfordshire |
| David DAVIES | 29 | Spelter furnaceman | Swansea |
| John R WILLIAMS | 53 | Grocer's shopkeeper | Swansea |
| Edward ROSSER | 44 | Coal mine hewer | Swansea |
| Benjamin WILLIAMS | 36 | Hair dresser | Swansea |
| John REES | 44 | Stoker at colliery | Llansamlet |
| Evan THOMAS | 34 | Coal Miner Hewer | Llansamlet |
| Thomas ROSSER | 35 | coal miner hewer | Swansea |
| Frederick KIEFT | 26 | Railway Engine Stoker | Devon |
| Albert MEYRICK | 20 | Coal miner labourer below ground | Llanelly |
| Thomas MEYRICK | 16 | Coal miner labourer below ground | Llanelly |
| Sidney MEYRICK | 14 | Coal miner labourer below ground | Llanelly |
| Owen RICHARDS | 85 | House Thatcher (retired) | Swansea |
| William HOWELLS | 47 | Fireman Airway Minder (colliery) | Llansamlet |
| David HOWELLS | 21 | Pumpman (Colliery) below ground | Llansamlet |
| Thomas HOWELLS | 18 | Plasterer (houses) | Llansamlet |

[237] Wales 1891 census RG13/5082/109/5-9

## A10: Occupants of Barracks Houses, Morriston in 1871[238]

***Barracks Houses in hamlet of Clase, Llangyfelach***

***Males of working age***

| | *age* | *occupation* | *Place of birth* |
|---|---|---|---|
| Lambert Barbier | 40 | spelter furnaceman | Belgium |
| Beck Tousaint | 22 | spelter furnaceman | Belgium |
| Herbert Limal | 20 | spelter furnaceman | Belgium |
| William Price | 56 | spelter furnaceman | Pembroke |
| Joseph Price | 14 | labourer in spelter works | Pembroke |
| Nicholas Gaspar | 42 | spelter furnaceman | Belgium |
| Joseph Tamme | 32 | spelter furnaceman | Belgium |
| Joseph Danze | 27 | spelter furnaceman | Belgium |
| Joseph Funke | 36 | spelter furnaceman | Germany |
| William Cymmerly | 32 | zinc smelter | Germany |
| Theodore Shunars | 33 | zinc smelter | Germany |
| Nicholas Wers | 28 | zinc smelter | Belgium |
| Arnold Belle | 22 | spelter furnaceman | Belgium |
| Joseph Brown | 43 | zinc smelter | Belgium |
| John Walbers | 28 | zinc smelter | Belgium |
| Cholle Couigue | 19 | spelter furnaceman | Belgium |
| Comber Prossine | 30 | spelter furnaceman | Belgium |
| Ubher Choferie | 28 | spelter furnaceman | Belgium |
| Thomas Stevens | 54 | gatekeeper @ spelter works | Monmouthshire |
| George Foh | 38 | zinc smelter | Germany |
| Joseph Griffiths | 28 | spelter furnaceman | Carmarthenshire |

[238] Wales 1871 census RG10/5445/85/ 1-5